Alan N. Shapiro

DECODING DIGITAL CULTURE WITH SCIENCE FICTION

Hyper-Modernism, Hyperreality, and Posthumanism

[transcript] Digital Society

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Introduction

The present study brings into an encompassing framework many cultural, media, and science fiction theory ideas which I have developed in recent years. The framework that unites and gives coherence to the work is an investigation into the concepts of hyper-modernism, hyperreality, and posthumanism. These are three cultural theory concepts of how digital media technologies affect society and the lives of citizens of late capitalism. The book is a project of contributions to selected sub-fields of academic scholarship within each of these three areas.

The book is composed of three parts which are structured in their contents and sequence according to a sense of logical and fluent progression. The titles of the three parts:

- Hyper-Modernism: Digital Media Technologies and Science Fiction (SF)
- Hyperreality: Reevaluation of Jean Baudrillard's Media Theory and the Simulacrum
- Posthumanism: The History of Cybernetics According to N. Katherine Hayles, the Challenge of Creative Coding, and the Future of Informatics

The writing in each section is built on the foundation of three previously published essays. Each essay is revised significantly and expanded from its original version to become a relevant sub-chapter within its section and, in turn, within the framework developed for the overall text. Many new additional pieces of writing are inserted between essays to add to the coherence of the essays' overarching argumentative structure and support the overall movement of the work. The following explanations are based both on the already published essays and on new writing that extends, and makes transitions between, the essays.

The Three Central Hypotheses

Corresponding to the three parts of the book, I formulate three hypotheses related to the three major cultural theory concepts. The hypotheses build on my previous research in these cultural studies fields, formulate what I intend to accomplish in the book as an

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overall statement, and lead to a set of conclusions which is the devising of a program for future work.

(1) In the shift from postmodernism to hyper-modernism (which I describe in relation to the ideas of scholars such as John Armitage, Albert Borgmann, and Gilles Lipovetsky[1]), the role that science fiction plays in society has changed and needs to be reevaluated. There is a crucial relationship between the depiction in science fiction narratives of the effects of digital media technologies on the lives of citizens of late capitalism and the advancements in what is often naively called the "real world" of digital media technologies. These technologies, in my view, are largely to be understood through stories and representations. As other literature and media studies scholars have substantiated, science fiction has become and should be academically approached as a formidable "reality"-shaping force. To enable a deeper understanding of the hyper-modern world, the scope of what the knowledge field of science fiction studies investigates should expand beyond novels, films, and TV series to the advanced digital media technologies such as Artificial Intelligence, Virtual Reality, Brain-Computer Interface, ubiquitous computing, robots, etc., as they are designed and applied in business, consumerism, and everyday life.
(2) The concept of the simulacrum/hyperreality (which has a lineage in philosophy) lends itself as a starting point to explore the dynamics of what is often referred to as digital transformation. Yet the concept needs an update and reinvention that considers the technological and socio-cultural implications of digitalization. This reconsideration and modification will foster a new understanding of how advanced digital media technologies shape the increasingly virtual "real," leading to new ideas for an "escape hatch" way out of hyperreality and post-truth.
(3) To escape the mistake of continuing to build onto the foundations of computer science and computer code as they have been, it is desirable to rethink how one looks at and interacts with software code, informatics, and computer science. If one adopts a transdisciplinary, expressive, posthuman viewpoint towards coding, taking as starting point the existing Creative Coding movement, could this lead to changing the paradigm of media in cultural studies and introducing a paradigmatic concept of transdisciplinary code or informatics?

The Logical Progression of the Three Concepts or Hypotheses

The movement in my research from the first to the second to the third parts (or cultural theory concepts or central hypotheses) follows a logical progression of thinking and exigency. In the first of the three phases, I argue and demonstrate that science fiction theory or studies is more than the scrutiny of novels, films, and TV series. The discipline and methodology of SF studies are also a way of illuminating contemporary developments in digital media technologies. SF thinking deserves a more prominent place in the academic system, and in its research agendas and curricula, not so much as a genre, but as an epistemological mode.

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From that conclusion of Part One, I arrive at the recognition that my work is about the advancement of a science fictional thinking (i.e., SF as an epistemological mode) to understand the collective cultural "we" existence in a more emphatic sense than the academic acknowledgment or practice of science fiction studies has been heretofore. My goal becomes, at this point, to grow my own system of thinking – as a science fictional thinking – that elucidates the effects that digital media technologies have on society and the lives of citizens of late capitalism. Since I cannot do that *ex nihilo*, I ask myself which system of thinking of which cultural theorist is the best starting point? Who is the most advanced "science fiction thinker?" I have chosen the theory of the simulacrum and hyperreality of Jean Baudrillard.

Baudrillard was a philosopher, sociologist, media theorist, and photographer. His transdisciplinary work was also unclassifiable. He wrote incisively about media and political topics which are highly relevant today: post-truth (the erosion of democratic and scientific consensus about true and false), hate, extremism, Reality TV, war mediated by television and the Internet, and terrorism. In the socio-cultural situation of post-modernism becoming hyper-modernism, codes and models precede and determine everyday life existence. Media culture and VR are, for Baudrillard, "more real than real." The disappearance of reality transpires not via some alleged betrayal of "reality" by virtuality, but through an excess of "reality" unfolding in intensive high graphical resolution. The culture that privileges rhetoric (images and discourse) institutes its own "reality," and the old familiar reality tends to disappear.

Baudrillard also wrote extensively about consumerism, shopping mall architecture, and mass advertising becoming personalized advertising. He delved into the commonality between genetic and informatic codes. He theorized the possibilities for resistance to and transformation of hyperreality with his research into the "symbolic exchange" and gift-economics of the so-called "primitive" cultures studied by ethnographic anthropology. Baudrillard's photography is an example of a radical technological practice that is instructive for the project of Creative Coding. His notions of ambivalence in poetic language and "taking the side of objects" are pertinent to paradigm shifts in the writing of software code.

My approach – following the recommendation of Rex Butler in his book *Jean Baudrillard: The Defense of the Real*[2] – is to go deep into understanding Baudrillard's system of thinking and come to resemble him to then differentiate myself from him, to agree with him to then discover my disagreement with him. I have two key differences from Baudrillard:

(1) I assert that conceptualizing the challenge to the simulacrum and hyperreality is more important than the diagnosis of the simulacrum and hyperreality. This is implicit in my "reading" of the writings of Baudrillard.
(2) I assert that we are now living in the cultural circumstance of digitalization and a society saturated by informatics. Baudrillard in the 1980s-1990s was not positioned to reflect upon this hyper-modern situation.

As the consequence of these two key differences which I have discovered that I have from Baudrillard, I take a logical step to formulating my further research which is Part Three.

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The simulacrum and hyperreality are valid and fecund concepts. They allow, for example, to shed light on the urgent problem of "post-truth" and the crisis of democracy. Yet – as a first point – in digitalization, hyperreality is now implemented on a much more micro level of detail by algorithms, AI neural networks, and software code. Hyperreality can no longer poignantly be described as instituted only by the rhetoric of images and persuasive discourses. Second point: since my primary goal is the conceptualization of the challenge to the simulacrum/hyperreality rather than the diagnosis of the simulacrum, I am going to research and look for the challenge to hyperreality in theories and practices of software code. This generates my interest in the Creative Coding movement and the potential of a transformation in what informatics is – from an engineering discipline to a transdisciplinary and creative field.

Accordingly, the conclusion of the book drafts an agenda for the promotion of the ideas of Creative Coding. It calls for:

(1) an engagement of cultural theory and media theory with both the conscious and implicit ideas of the movement of Creative Coding
(2) an engagement of the humanities, the arts, and cultural studies with the practice of Creative Coding
(3) research into how the movement of Creative Coding can change computer science itself – in the latter's core concepts, applications, educational curriculum, and in the definition and profile of who is a programmer
(4) the expansion of informatics from a technical engineering discipline to a transdisciplinary field that includes ideas from art, design, sociology, psychology, philosophy, literature studies, media studies, etc.

At the time of the mid-twentieth century invention of computer science, no one knew that informatics would have such a major impact on all culture and everyday life. Now it is clear that we have become an "informatic society," and a trans-disciplinary informatics that is up to the task of engaging with that is needed.

Part One – Hyper-Modernism: Digital Media Technologies and Science Fiction

In Part One of the book (in "What Is Hyper-Modernism?"), I argue that, in the current historical times of digitalization or the rise of digital media technologies (or the so-called Fourth Industrial Revolution technologies), we are now living in the era of hyper-modernism. Hyper-modernism co-exists with, intensifies, and supersedes postmodernism.

There are two research motivations or starting points for my discussion of the cultural theory concept of hyper-modernism:

First motivation or starting point: Hyper-modernism has as prerequisite an engagement with postmodernism. There is extensive literature in cultural theory and media theory on defining the cultural logic of "late capitalism" or post-World War II Western consumer and media society as postmodernism. Some key academic texts in this area which I will discuss:

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- Fredric Jameson, *Postmodernism: The Cultural Logic of Late Capitalism* (1991)
- Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge* (1979)
- Sonja Yeh, *Anything Goes: Postmoderne Medientheorien im Vergleich* (2013)[3]

Discussions of these canonical texts, with which I am largely in agreement, provide academic contextualization for my take on postmodernism. Postmodern media theory is additionally identified with thinkers such as Jean Baudrillard, Paul Virilio, Michel Foucault, and Donna Haraway. I will summarize the essential features of the cultural situation of postmodernism according to these thinkers. Lyotard, in an exemplary way, considers postmodernism to be the crisis of the "grand narratives" or "meta-narratives" which were predominant in the previous cultural-historical era of modernity – such as Marxism, industrialism, or the Enlightenment idea of linear progress in history.

The aspect of postmodernism that interests me the most is the turn towards the recognition of the crucial role of narratives and fictions in the exercise of power and control in the media-technological society. In the essay "What is Hyper-Modernism?" I enumerate the defining features of hyper-modernism. I also explain that the most important feature for me is that, in hyper-modernism, the power and control exercised via narratives and fictions in the media-technological society now get implemented on a much more intense level of detail via algorithmic-informatic codes and digital, virtual, and cybernetic technologies.

I seek to understand these codes neither from a strictly engineering/technologist perspective nor from a strictly Marxist/critical theory perspective, but rather as discursive articulations which can then be actively and paradigmatically re-coded in culturally transformative Creative Coding projects. Some key academic texts about hyper-modernism which I will discuss are:

- John Armitage, *Machinic Modulations: New Cultural Theory and Technopolitics* (1999)
- Albert Borgmann, *Crossing the Postmodern Divide* (1992)
- Gilles Lipovetsky, *Hypermodern Times* (2004)

Discussions of these canonical texts, with which I am largely in agreement, provide essential academic contextualization for my own perspective on hyper-modernism. These are the chief recognized references in the field.

Second motivation or starting point: Within the scholarly areas of postmodernism and hyper-modernism, I focus on a more specific research question: In the shift from postmodernism to hyper-modernism, what changes occurs in the role that science fiction plays in relation to technology and society? My answers to this question are:

(1) Science fiction is an increasingly important driving force or independent variable that shapes technology and society.
(2) SF narratives (such as *Black Mirror*) offer insightful commentaries on the effects of Fourth Industrial Revolution technologies on society and lives of citizens of late capitalism.[4] As expressions of hyper-modernism, they claim to show the intensely detailed ways that power and control are now exercised via advanced digital and virtual technologies. Yet these "colonizing of life" technologies should not be fixed in

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what they are (as these popular SF narratives tend to do) – they can be reframed, re-designed, and re-coded. My emphasis on narrative and Creative Coding facilitates this opening to change.

(3) SF has become a significant mode of academic knowledge, perhaps a candidate for increasingly comparable status with other academic disciplines. Far from being fantastical, SF is a genre of high-definition realism that cultivates knowledge of a set of objects of inquiry which are neither entirely literal nor figurative.[5]

These answers to the research question are articulated in the essays "Mobility and Science Fiction" and "Science Fiction Heterotopia: The Economy of the Future."

Scientists, engineers, programmers, and entrepreneurs in the technology industries constantly recount that they are inspired in their work by their love of SF films, novels, and TV series. In addition, developments in digital media technologies, and in current events in politics and the world, are frequently explained by commentators with reference to SF films. The first lady of Ukraine, in a major speech before the U.S. Congress in Washington, D.C., explained Russia's war in the Ukraine referring to the SF film series *The Hunger Games*.

All of this indicates that a valuable research question for cultural theory is to interrogate the relation between SF narratives and advancements in the so-called "real world" of systems, applications, interfaces, and user experiences of technologies. Informatic society innovations are to be understood not principally as "real," but as figured by representations.

In Part One of the book, I have two essays which bring together the study of science fiction and research on the cultural impact of digital media technologies. This is done in the context of specific sub-areas of technology. Here are the essay titles and brief descriptions (see information about the original publications at the end of this Introduction):

(1) "Mobility and Science Fiction" – The portrayal of the future of mobility and self-driving cars in SF films and developments in the technologies of autonomous driving.

(2) "Science Fiction Heterotopia: The Economy of the Future" – Future post-scarcity, post-capitalist economic systems in science fiction films and the decentralizing potential of the technologies of 3D printers and additive manufacturing; blockchain and distributed ledger technologies; virtual companions; moral algorithms.

I engage with the academic literature of Science Fiction Studies (SFS). Some key texts which I will discuss are:

- Darko Suvin, *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre* (1979)
- Istvan Ciscsery-Ronay, Jr., *The Seven Beauties of Science Fiction* (2008)
- Carl Freedman, *Critical Theory and Science Fiction* (2000)
- Angela M. Cirucci and Barry Vacker, eds., *"Black Mirror" and Critical Media Theory* (2018)[6]

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These are the principal recognized references in the field. Elaboration of my agreements and disagreements with these canonical texts provides orientation and clarifies the positioning of my own perspective on the field of SFS. I argue for a new direction of thinking in science fiction studies. I argue that SF has matured to become an autonomous worldview and should not be understood only as the expression of the successive stages of "cognitive estrangement" under capitalism, as much of this academic literature does.[7] I make this argument in "Mobility and Science Fiction" and "Science Fiction Heterotopia: The Economy of the Future."

I engage with academic literature on post-capitalism. Some key texts in this area that I will discuss are:

- Murray Bookchin, *Post-Scarcity Anarchism* (1971)
- Yanis Varoufakis, *Another Now: Dispatches from an Alternative Present* (2020)
- André Gorz, *Reclaiming Work: Beyond the Wage-Based Society* (1999)
- Paul Mason, *Post-Capitalism: A Guide to Our Future* (2015)[8]

My discussion of post-capitalism is strengthened by engagement with these canonical texts. These are writings by the most highly regarded authors in the field. They write about the potential of technologies being designed intelligently to enact a post-scarcity, post-capitalist economy. I argue that the potential exists for the digital media technologies of today to be part of this vision, provided they are carefully designed in alternative ways. I argue this in "Science Fiction Heterotopia: The Economy of the Future."

Part One to Part Two: From Hyper-Modernism to Hyperreality

The aspect of postmodernism that I focus on is the role that narratives and fictions play in the exercise of power and control in society. Related to this symbolic turn is the idea that images and words tend to become detached from "the real" which they are intended to represent. The idea of rhetoric as images and discourse is traced back to Plato. In hyper-modernism, the power of rhetoric to shape culture, politics, daily life, and technological existence accelerates with the deployment of advanced digital technologies.

A thinker associated with postmodernism who engaged deeply with these "rhetoric studies" questions about images, discourse, and the crisis of reality was Jean Baudrillard. Baudrillard is most well-known for his media-cultural theory theses about simulation, simulacra, virtuality, and hyperreality. My goal is to think with and after Baudrillard, to bring his ideas into confrontation with the actual situation of digitalization. The concepts of hyper-modernism and hyperreality (the focus of Parts One and Two) can mutually enrich each other.

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Part Two – Hyperreality: Reevaluation of Jean Baudrillard's Media Theory and the Simulacrum

In Part Two of the present study (in my essay "Baudrillard's Importance for the Future"), I argue that the system of thinking developed by the philosopher and media theorist Jean Baudrillard can illuminate the current cultural and technological situation of hyper-modernism. I unpack Baudrillard's key concepts of the simulacrum and hyperreality.

Baudrillard tells a cultural history of the "five orders of simulacra." I focus on the research question "What is the relevance of the simulacrum and hyperreality to digitalization today?" My answers to this question are expressed as I make descriptions of significant trends in contemporary culture:

(1) There is a definite tendency for everything experienced to become more and more virtual, including direct person-to-person contact. During the COVID-19 pandemic and lockdown, people drastically increased their involvement online.
(2) Experience is moving towards a "Metaverse" where existence will take place inside a Virtual Reality network. VR and AR (Augmented Reality) simulations are on the rise.
(3) There is a crisis of democracy or post-truth engendered by partisan discourse shaped by emotions, ideology, and social media, undermining consensus agreement about facts, truth, and science. Hyperreality provides a deep explanation of post-truth.

All these cultural trends have something to do with an original thing getting substituted and surpassed by its image, semblance, copy, statistical model, or code. They are all reasonably clarified through consideration of the key concept of the simulacrum.

Then I focus on the research question "How can the simulacrum be challenged or transformed?" What is the "escape hatch" way out of hyperreality? My answers:

(1) By engaging in the thought experiment that "everything is simulation," one gains access to strategies for challenging the social-cultural order that are otherwise not visible – strategies of irony, paradox, performance, rewriting the "code" of simulation.
(2) The position that simulation is only a tendency is questionable. The commentator on post-truth invokes "the truth," self-deceptively believing to have thus established an "outside" position to simulation, a mythical exempted location from which to observe it.
(3) Given the increasing importance in hyper-modernism of the informatic codes that implement simulacra and hyperreality on intensified levels of detail, a major arena for challenging the simulacrum becomes the transfiguration of software code and the "hacking" of codes. This situation is shown metaphorically in the SF film *The Matrix*.[9]

These answers to the two above-formulated research questions are articulated in the essays "Baudrillard's Importance for the Future," "Baudrillard and the Situationists," and "Jean Baudrillard and the Donald: Is Trump a Fascist or is He the Parody of Fascism?"

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These three essays explore Baudrillard's concepts of the simulacrum and hyperreality. I also revise and reinvent the simulacrum and hyperreality in the context of digitalization or the digital media technologies of today. Here are the essay titles and brief descriptions:

(1) "Baudrillard's Importance for the Future" – I explain my position in the controversy surrounding Baudrillard. I unpack his works *The System of Objects* and *The Consumer Society*. I clarify his concept of symbolic exchange. I enumerate the historical sequence of the five orders of simulacra. I consider Baudrillard's importance for the future.
(2) "Baudrillard and the Situationists" – I compare his concept of simulacra/hyperreality to Guy Debord's "society of the spectacle."[10] I investigate how Baudrillard updated his concepts for the digital era, and Debord's revision of the "integrated spectacle." I look at Situationist post-art activist practices for resisting hyperreality.
(3) "Baudrillard and the Donald: Is Trump a Fascist or is He the Parody of Fascism?" – Hyperreality offers a deep explanation of post-truth and the crisis of democracy.

I engage with several of Baudrillard's major texts:

- *The System of Objects* (1968)
- *The Consumer Society: Myths and Structures* (1970)
- *Symbolic Exchange and Death* (1976)
- *Simulacra and Simulation* (1981)
- *The Ecstasy of Communication* (1987)
- *The Evil Demon of Images* (1987)
- *Carnival and Cannibal* (2008)[11]

I engage with the academic literature of Baudrillard Studies. Some key texts are:

- Rex Butler, *Jean Baudrillard: The Defense of the Real* (1999)
- François L'Yvonnet, ed., *Jean Baudrillard: Cahiers de l'Herne* (French) (2004)
- Brian Gogan, *Jean Baudrillard: The Rhetoric of Symbolic Exchange* (2017)
- Serge Latouche, *Remember Baudrillard* (French) (2019)[12]

I largely agree with the insights of this scholarly literature, although I also articulate some disagreements, which serves to sharpen the profile of my position. My contributions:

(1) Baudrillard was right to say that "everything is simulation" – not because it is empirically true, but because it enables one to conceive of social change in new ways.
(2) One should think with and after Baudrillard, rather than just summarize him.
(3) It is desirable to upgrade Baudrillard's concepts for the situation of advanced digitalization.

I research recent relevant academic literature in Baudrillard Studies, especially works which confront the simulacrum and hyperreality with digitalization, parallel to my work.

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I engage with texts of other thinkers who wrote about the simulacrum/hyperreality. In philosophy, I consider Plato and Descartes. This is an essential intellectual-cultural background for my argument. I discuss Guy Debord's Situationist concept of the "society of the spectacle" which deeply influenced Baudrillard's formulation. I comment on other theorists of hyperreality contemporary with Baudrillard, like Daniel J. Boorstin and Umberto Eco, to provide a broader view. Some key texts which I will discuss are:

- Plato, *The Sophist*
- René Descartes, *Meditations on First Philosophy*
- Guy Debord, *Society of the Spectacle* (1967)
- Daniel J. Boorstin, *The Image: A Guide to Pseudo-Events in America* (1962)
- Umberto Eco, *Travels in Hyperreality* (1995)[13]

Part Two to Part Three: From Hyperreality to Post-Humanism and Creative Coding

The challenge to the simulacrum leads to the examination of another contemporary media theorist: N. Katherine Hayles. I recognize in Hayles' work an allied perspective. The project of challenging or transforming the simulacrum switches to ideas about paradigm shifts today in computing or software that go beyond the classic original formulation of computer science. The challenge to hyperreality occurs in the re-coding of simulacra. I bring together ideas from cultural and media theory with the practical movement of Creative Coding.

Hayles is a leading scholar in the current of ideas called posthumanism. In *How We Became Posthuman* (1999), she writes a genealogy of twentieth-century informatics, laying out the framework of the three successive orders of cybernetics.[14] Hayles argues that mid-twentieth-century information theory developed an idea of information that is disembodied. Code is conceived as a formal abstraction of computable or representing numbers which have the pragmatic advantage of being easy to transfer across a telecommunications network or store on any physical storage media. This idea of information or code, Hayles asserts, could be re-thought or changed. An upgraded concept of code could be cultivated – built "on top" of the existing concept – that is re-embodied. This is the starting point to my investigation of Creative Coding and the future of informatics, exploring new concepts and practices of code.

Hayles explicitly calls for projects to transform software code. In Part Three, I study ideas and projects of artists, designers, creative people, and software theorists who practice Creative Coding and contribute to a transformative future of informatics.

My exegesis and extensions of the ideas in *How We Became Posthuman* are short, revised excerpts from Chapter 7 ("Cyborg Spock"), Chapter 8 ("Android Data"), and Chapter 9 ("Becoming Borg – Seven of Nine") of my book *Star Trek: Technologies of Disappearance*. The chapters are about the three orders of cybernetics and their SF representations in *Star Trek*.

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Part Three – Posthumanism: N. Katherine Hayles' History of Cybernetics, Creative Coding, and the Future of Informatics

In Part Three (in "Software Code as Expanded Narration" and in brief excerpts from my previously published short book *The Software of the Future*), I proceed through four steps:

(1) I lay out the history and principles of the digital media practitioners' movement of Creative Coding. I pose and answer the question: How can the writing of software code become an expressive media? I explore how Creative Coding is an essential practice within a positive overall post-humanist or post-anthropocentric vision.
(2) What is the relationship of software code as inscription or system of notation to the history and future of writing? Can code regain the qualities of human language such as ambivalence, music-like resonance, embodiment, and poetic modulation?
(3) How do the main theses in the literature of software studies or digital culture studies differ from my hypotheses and conclusions? According to some scholars in that field, there is a "real" of human bodies, affects, and behaviors that get colonized or manipulated by data mining, algorithms, surveillance, and profit-making capitalism. What are my agreements/disagreements with that academic position? One divergence is my differing idea of how resistance to this social-technological system can occur.
(4) What is the difference between code as understood by existing computer science and code as understood by posthuman Creative Coding? Are cultural studies undergoing a knowledge shift from the paradigm of media to a concept of transdisciplinary code or informatics? Can Creative Coding influence the future of computer science as a whole?

In the essays "Software Code as Expanded Narration" and in the revised excerpts from *The Software of the Future*, I enumerate the defining features of Creative Coding. Creative Coding began as a movement of artists and creative people who had the intention of making art and design projects which involve computer technology. I explore the implications of the movement for cultural theory and media theory. Creative Coding demonstrates that informatics changes over time in conjunction with paradigm shifts in culture, and that digital media and culture reciprocally influence each other. Creative Coding initiates the new artistic genres of "generative art" and generative Deep Learning. The co-creation of art and music together with machines points towards a decentering of the human subjects known as "the artist" and "the author" in a way that a postmodern literary theorist like Roland Barthes had earlier envisioned.[15]

Some academic texts in the discussion about Creative Coding that I will consider are:

- D. Fox Harrell, *Phantasmal Media: An Approach to Imagination, Computation, and Expression* (2013)
- Florian Cramer, "Program Code Poetry" (2001) and "Exe.cut[up]?able Statements: The Insistence of Code" (2003)
- Casey Reas and Ben Fry, *Make: Getting Started with Processing* (2015)
- Oliver Bown, *Beyond the Creative Species: Making Machines That Make Art and Music* (2021)[16]

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Discussions of these canonical texts on Creative Coding provide contextualization and ideational support for my perspective and argument. In the amended excerpts from my book *The Software of the Future*, based on my International Flusser Lecture, I pursue the idea suggested by the luminary media theorist Vilém Flusser of an intellectual project of connecting the future of software code with the history of human writing. In the present and future there is/will be a hybrid of code and writing.

Every aspiring programmer learns the "discrete logic" of identities and differences in their first computer science course. This discrete logic that enabled the invention of the digital-binary computer by Alan Turing in 1936 in "On Computable Numbers" was based on the idea of a "formal language" that began with Gottlob Frege's *Begriffsschrift* in 1879.[17] Formal languages follow a defined set of rules and effectively suppress many of the properties of human writing and speech. They emphasize the syntactic elements of language and neglect its semantic and semiotic dimensions. What was lost in the mid-twentieth-century invention of computing were the poetic, musical, ambivalent, and resonant qualities of human languages.

Some aspects of discrete logic: all operations of the "software state machine" change voltage in the hardware, manipulate bits, and are stepwise; all variable names and values are different from each other; and each instruction or line of code has an unambiguous meaning.

As the history of programming languages continues in the present and future, and in the spirit of Creative Coding, the province and features of human languages increasingly reappear within code. Human language characteristics extend and redefine what code is.

In the "codework" software poetry of Alan Sondheim, and in generative art live "code performances," code and language interpenetrate. The poetic code becomes executable. Some key texts about software code and the history and future of writing which I will discuss are:

- Camille Paloque-Bergès, *Poétique des codes sur le réseau informatique: une investigation critique* (2006)
- N. Katherine Hayles, *My Mother Was a Computer: Digital Subjects and Literary Texts* (2005)
- Vilém Flusser, *Does Writing Have a Future?* (1987)
- Jean Baudrillard, "The Poetic as the Extermination of Value," in *Symbolic Exchange and Death* (1976)
- Alan Sondheim, "Introduction: Codework" (2001)[18]

Discussions of these canonical texts about software code in relation to the history and future of writing provide contextualization and support for my own perspective and argument.

A major tendency in the academic fields of software studies and digital culture studies is a Marxist-oriented or "critical theory" approach to describing "platform capitalism" and the supremacy of Big Data, neural network Deep Learning Artificial Intelligence, and algorithms. For these authors, the sovereignty of human subjects, identities, bodies, emotions, and actions gets violated, manipulated, and colonized by maleficent ubiquitous processes of automation, control, and commercialization. I agree that harmful pro-

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cesses of power, control, and capitalist profit-making are taking place with the algorithmic-informatic codes. Yet from my perspective, what this academic tendency leaves out is that the processes of power and control are at the same time processes of virtualization. Once existence takes place the realm of the online, the virtual, post-truth, and the Metaverse, there is no going back to some posited previously existing "real."

I have nothing against the liberal news media, left-political journalists, scientists, and critical theory academics continuing with their strategies of bringing attention to "the real," the truth, the facts, and the alleged "non-alienated" or "natural" self. On the contrary, those are valuable efforts. Yet I seek to develop new strategies of resistance to the hegemonic systems of social and technological control. In the twentieth-century science of the Copenhagen interpretation of quantum physics, Werner Heisenberg and Niels Bohr each brought attention to the "observer effect" of the disturbance by the act of observation of what can scientifically be known about the "reality" of a system.[19] The observer is part of the system. There is no scientific "outside position" from which to observe a system without distorting its information. The liberal news media and the "critical theorists" are part of the simulacrum. Resistance to digital assemblages should be sought more from re-coding and performances inside the system. This is a point of departure towards discovering new forms of critically interrogating digitalization.

Some texts of software and digital culture studies taking the "critical theory" position which I will discuss are:

- Shoshana Zuboff, *The Age of Surveillance Capitalism* (2019)
- Adam Greenfeld, *Radical Technologies: The Design of Everyday Life* (2017)[20]

Some academic texts in the field which are somewhat closer to my own position which I will discuss are:

- Geoff Cox and Alex McLean, *Speaking Code: Coding as Aesthetic and Political Expression* (2012)
- Armin Nassehi, *Muster: Theorie der Digitalen Gesellschaft* (2019)[21]

By explicating my agreements and disagreements with these landmark authors, I add nuances to my own position and elaborate additional theses for my cultural theory research.

Low-level programming languages such as machine language, assembler, and procedural-functional languages are "close to the machine." They operate in combinatorial ways on voltages and bits. The software layer is the translation between human and machine language. This circumstance of translation renders code sovereign from hardware-level bit-manipulation. Object-oriented (OO) programming languages such as C++, C#, and Java consciously imitate human language. They are languages of modeling, simulation, and virtualization that replicate so-called real-world processes and environments (from banking applications to games and "virtual worlds") in software. The object-oriented design, which identifies the nouns or "classes" or "objects" in the given problem domain, and the verbs or process-relations between the objects, is already, in a sense,

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the code. Software design – an instance of human language – plays an increasingly important role in software coding.

OO programming languages assume the existence of so-called "real world" processes. Software development sets itself the task of modeling these processes in virtual spaces. The alleged "real world" is the realm of simulacra and simulation. Modeling what one believes to be real-world processes which are simulations is practicing the simulation of a simulation.

Hayles suggests that we are moving beyond the binary logic of identity and difference to a complex and embodied tension between those two terms. The binary code of intelligent machines is evolving towards resembling the resonant language of intelligent humans.

Aside from Kate Hayles, there is no existing academic literature on how the innovations of Creative Coding will influence the futures of media/cultural theory and computer science.

Originally Published Versions

- German version: "Mobilität und Science-Fiction," in Sabine Foraita and Andreas Schulz, eds., *Design und Mobilität: Wie werden wir bewegt sein?* (Hildesheim Hochschule für Angewandte Wissenschaft und Kunst and Fruehwerk Verlag, 2019); pp.92-117.
- "Science Fiction Heterotopia: The Economy of the Future," in Marion Digel, Sebastian Goldschmidtböing, and Sibylle Peters, eds, *Searching for Heterotopia: Andere Räume Gestalten* (Folkwang Universität der Künste and adocs Verlag, 2019); pp.142-153.
- "What is Hyper-Modernism?" in *Transdisziplinäre Gestaltung: Essays der Folkwang Universität der Künste* (Vienna: Passagen Verlag, 2017); pp.253-263.
- "Baudrillard and the Situationists," NoemaLab.eu, September 2018.
- "Jean Baudrillard and the Donald: Is Trump a Fascist or is He the Parody of Fascism?" *Baudrillard Now Journal*, European Academy of Sciences of Ukraine, April 2021.
- *Star Trek: Technologies of Disappearance* (AVINUS Verlag, 2004) – Revised excerpts from: Chapter 7: "Cyborg Spock"; Chapter 8: "Android Data"; and Chapter 9: "Becoming Borg – Seven of Nine"; pp.217-325.
- "Software Code as Expanded Narration," in Bernd Kracke and Marc Ries, eds., *Expanded Narration. Das Neue Erzählen* (Hochschule für Gestaltung Offenbach, Frankfurt Biennale des Bewegten Bildes and transcript Verlag, 2013); pp.369-384.
- *Die Software der Zukunft, oder: Das Modell geht der Realität voraus* (trans. Marcel Marburger) (Universität der Künste Berlin and Walther König Verlag, 2014). International Flusser Lectures, 64 pages.

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Methodology

Thirty Minute Statement at my Ph.D. Oral Defense
Alan N. Shapiro, April 12, 2024

I will begin with some autobiographical remarks. I have a double educational background in the humanities and natural sciences. I studied the former at Cornell University and the latter at the Massachusetts Institute of Technology. Later in life, I worked for twenty years as a software developer. I had earlier studied literature and philosophy. My doctoral dissertation is grounded in the double perspective of cultural theory and informatics. I was always interested in the thinkers of poststructuralism. While working on IT projects, I was always thinking beyond the task at hand to wondering how software code could become more poetic and more like human language. How could code be understood and performed as an expressive, artistic, and/or cultural practice? How could ethics be embedded into software code?

On the side, I wrote and published a 350-page book about the science fiction TV series *Star Trek* from a hybrid humanities and informatics viewpoint. I considered *Star Trek*'s stories and futuristic technologies. Both have had enormous influence on society and culture.

In 2012, I changed careers and started teaching at art and design universities in Germany, Switzerland, and Italy. I have taught many seminars in media theory, future design research, transdisciplinary design, science fiction, posthumanism, and Creative Coding.

In my teaching, I have come into close contact with the Creative Coding movement. It is a movement of artists and designers who work with programming to make design projects and art installations.

In my dissertation, I present a way for cultural studies and philosophy to play an important role in what the nascent Creative Coding movement can become in the present and future. It is about Creative Coding, Phase Two. I lay out how poststructuralist theories of language can provide a basis for the project of transdisciplinary software coding. My thesis is that Creative Coding already has a strong conceptual premise in cultural theories and poststructuralist thinking about the radical uncertainties and ambiguities of human language, and in the chains of linguistic and cultural "signifiers" and "signifieds" of semiotics.

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My dissertation is a cumulative doctoral dissertation. It consists of an Introduction, three Parts, and a Conclusion. Each of the three Parts contains three essays which were previously published. I added 150 pages of new writing to weave a coherent argument. Each of the three Parts contributes to the main argument, and is characterized by a specific methodological approach which I now allow myself to make more explicit, responding to the *Gutachten* (written evaluations) which criticize the lack of sufficient explanation of the methodology:

For each of the three Parts, I will give brief answers to three questions. First: Why did I choose these specific already published essays? Second: what is the methodological approach? Third: What does this Part show and how does it contribute to my main argument?

In Part One, through the cultural theory of hyper-modernism, I wanted to scrutinize the present and potentially future impact on society of advanced digital media technologies like Virtual Reality, ubiquitous computing, and Artificial Intelligence. I did this by writing in a hybrid way about the portrayal of the given technology in science fiction films and the realization of the technology in the so-called "real world." The essay "Mobility and Science Fiction" looks at the example of self-driving cars. The essay "Science Fiction Heterotopia" studies the examples of blockchain, 3D Printers, and moral algorithms and their connections to ideas about post-capitalist transformation of the economy. My theoretical perspective is explicitly critical of capitalism. I am a leftist, but I am also a critic of Marxism. I believe in reform not revolution. In the third essay, "What Is Hyper-Modernism?" I ask: What characterizes the cultural era of the present of the societies of late capitalism?

In Part One, it is about applying the epistemological method in historiography of a dialogical relation to the object of inquiry. There is a relationship involving loyalty and ambivalence between the past of the investigated object and the present of the investigator. The investigator suspends his own worldview, enters the worldview of the text and context of the artefact of the past, is temporarily "empathetic" to this text/background constellation on its own terms, then returns to an observer position enriched with insights gained from the engagement. I establish a dialogue between the postmodernist thinkers of the era of the 1960s to 1990s and the present time of the second wave of digitalization. The ideas of those thinkers are both enormously valuable yet outdated and in need of revision. I avoid either only repeating what the postmodernist thinkers articulated prior to digitalization or believing that a cogent theory of digital society can be developed without engaging with the earlier generation of thinkers. Hyper-modernism continues the trends of postmodernism, but now in digitalization.

For each of the postmodernist thinkers Cornelius Castoriadis, Donna Haraway, Michel Foucault, Jean Baudrillard, and Gilles Deleuze, I consider how their conceptual framework regarding how narratives and fictions exercise power and control in the media-technological society can be extended to the hyper-modern situation of algorithmic- and code-based governance. This prepares the arguments of Parts Two and Three by recognizing the value of looking into the poststructuralist ideas about language of Baudrillard and N. Katherine Hayles for illuminating software code as a transformative practice.

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In Part Two, through the cultural theory of hyperreality, I wanted to enter deeply into Baudrillard's thinking to discover what needs to be rethought. In the essay "Baudrillard's Importance for the Future," I explain Baudrillard's main ideas of simulation and simulacra. I situate his concepts in relation to the history of philosophy. The most interesting part of Baudrillard is not the diagnosis of the simulacrum, but rather the challenge to the simulacrum. How can hyperreality be resisted or transformed? I develop the idea of "taking the side of objects." Baudrillard wrote about the poetic, resonant, and ambivalent qualities of language. Julia Kristeva called it "the revolution in poetic language," but now in the context of software code.[22] In the essay "Baudrillard and the Situationists," I extend these ideas by connecting Baudrillard to the activist practice of "the diverting of technologies" of the Situationists. In the essay on Baudrillard and Donald Trump, I demonstrate that the concept of hyperreality deepens the explanation of contemporary "post-truth" in politics and the crisis of democracy.

In Part Two, it becomes a question of what methodology to deploy to comment in an appropriate way on Baudrillard's system. Baudrillard's claim is that "everything is simulation," including his own discourse. It is imperative to apply a methodology that deals suitably with the singular subject-matter of the simulacrum. According to that philosophical tradition, there is no pre-existing "real." There is a "paradox of the semiotic sign." The mania of Western image culture to make exact technological copies of so-called originals produces more virtuality far away from the alleged original. How can one think "the real" when all is rhetoric? How can one speak of simulation when there is nothing outside it, no exempted location from which to observe it, only an "outside" which exists on simulation's own terms?

By reflecting on the method to apply to writing about the simulacrum or hyperreality, I try to avoid either regarding Baudrillard as the speaker of a "gospel truth" or putting his system in the weak position of being "tested" against some established external body of knowledge. My method is a deconstructionist reading of Baudrillard, to "read Baudrillard against Baudrillard." This is the method that Jacques Derrida applies when he reads Nietzsche against Nietzsche, Freud against Freud, and Heidegger against Heidegger.[23] He does not measure them against some standard from the outside. By grasping the system of the thinker from within, one discovers in which statements he contradicts himself or where there are weaknesses in his system.

My deconstructionist reading of Baudrillard leads me to discover my two key differences from him. First: To assert that "everything is simulation" is not empirically valid. Simulation is rather a hypothesis that makes visible new potential challenges to the hegemonic techno-cultural system. Second: The circumstance of digitalization – of digital, virtual, and cybernetic technologies – is now undeniable. Cultural theory and practice must operate within the situation of the digital. Thus, Baudrillard as a theorist of the rhetoric of code emerges. This prepares the argument of Part Three which will explore how resistance to the simulacrum can occur in the radical technological praxis of Creative Coding.

In Part Three, I wanted to investigate what the cultural theory of posthumanism would imply for the practice of writing software. I selected Hayles to comment on since she is a thinker of posthumanism who wrote a lot about software code and language. Hayles studies code as a transfigured form of linguistic expression. She calls for projects

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to transform software code. I inserted excerpts from my work on *Star Trek*, where I had written about the characters Spock, Data, and Seven of Nine, and how they correspond to the three orders of cybernetics which Hayles writes about in her book *How We Became Posthuman*. In the essay "Software Code as Expanded Narration" and the excerpts from my book *The Software of the Future*, I elaborate the project of going inside the "black box" of computer science and transforming it from within, which is the activity of my near-future work. It would also be possible to find a foundation for this next step of Creative Coding in Derrida, Deleuze, Kristeva, or Roland Barthes.

Part Three is a study of the history and future of programming languages. It examines the successive paradigms of programming, including the "future design" paradigm of Creative Coding. It is an exercise in the philosophy and history of science, and the "science fiction" of the future of science. I ask: is computer science a science, a culture, or a technology?

I stake out a "middle way" method between seeing informatics as a science (like the media science of Wolfgang Ernst[24]) and a discourse-oriented approach (like "hermeneutic" cultural studies). I make the methodological separation between the scientific and cultural dimensions of computing. I ask what was the relation between "science" and "culture" in the work of Alan Turing? Programming has changed many times and can change again.

My work advocates for the importance and radicalization of Creative Coding. Creative Coding initiates the artistic genres of "generative art" and generative Deep Learning. In generative art, artworks are created using a self-governing system such as a computer, a robot, or an algorithm. The movement reintroduces visual creativity and poetics into informatics.

Ultimately, Creative Coding can play a major role in digital transformation and in shaping the future of society. Creative Coding can challenge the social and technological life-conditions of hyper-modernism, hyperreality, and anthropocentrism.

Creative Coding is where a line of code is an aesthetic artifact and not only an instruction to the machine. Creative Coding is where a new software layer opens as a performance space for music, poetry, storytelling, and dance. Creative Coding is programming in a range of subcultural activities such as interactive exhibitions and design-and-code experiments in Maker Labs. Creative Coding includes projects of visual- and natural-language-centered toolkits, and software poetry. As Vilém Flusser teaches, software code is related to the history and future of writing. Practitioners should reflect on associating code with textual writing.

In the present time of AI-based chatbots and text generators like ChatGPT, and of the paradigm shift in informatics from rule-based to pattern-based intelligence, the question is raised of how can humans forge a partnership with computer-generated "posthuman" language? We can seek a dialogue or exchange between posthumans and AI.

Creative Coding, Phase Two is about ideas and coding projects which go beyond the binary logic of the 0 and the 1 to new non-binary concepts. It is about regaining the in-between-ness that was lost in the shift from analog to digital. Some examples: the Q-Bit of quantum computing in software which can acquire the value of 0 or 1 by perceiving what is going on in a system in real-time; Walter M. Elsasser's concepts of a logic of similarities in databases and invisible data transfer in the information system of the living organism;

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and Jaron Lanier's "phenotropic" on-the-fly programming while inside the executable. My students in Creative Coding develop poetry generators and music visualizers that explore the relationship between translation among media in universalizing digital code and the specificity of each medium.

Another dimension of my dissertation is my advocacy of science fictional thinking. An examination of the concepts of Baudrillard and Hayles, as well as the TV anthology series *Black Mirror* and science fiction films like *Blade Runner 2049*, *Ex Machina*, and *The Truman Show*, suggests that the boundary between science fiction narratives and the so-called "real world" of digital technologies has become indistinct. As the consequence of this blurring, science fictional thinking should be advanced as a principal mode of knowledge for grasping digitalization. My position is not a full-on embrace of all science fiction. Science fictional thinking, for me, is situated in a critical tension between the inventiveness of authors and the assimilating culture industry.

One example of what I mean by this science fictional thinking is what I have practiced during the last seven years in my teaching of "future design research" in Lucerne, Switzerland. I ask the students in Digital Ideation to write semester essays where they consider an advanced technology like Augmented Reality, Metaverse, Brain-Computer Interface, social media platforms, or robots together with a selected science fiction film that depicts a dystopian or utopian narrative about that technology and its effects on society in the present and future.

I can say self-critically that I have noticed that my approach to science fiction is strongly focused on content – and at times, I tend to use films and series for illustration. My way of writing about films is very detailed and phenomenological. I could add an additional layer of writing that is more about aesthetics and affect, the ways that the films imprint on viewers on more immediate, emotional, neurological, and nonconscious levels. I will need to engage more with the "affective turn" and with philosophers like Brian Massumi and Marie-Louise Angerer.[25]

In the emphasis I favor in my work, advanced technologies are principally to be understood through stories and representations. Yet I am not fully in the camp of discourse analysis. I underscore that there is a non-historical time-independent dimension of computing. This brings me close to the technological materiality or computer archaeology of the "Berlin school" of media science.

The connection between the two main ideas in the dissertation – "the border between science fiction and so-called 'real world' digital media technologies has dimmed" and Creative Coding – is the question of social change, of the road from dystopia to utopia. The dystopian technologies and human situations that were written about or enacted in science fictions novels and films have now been largely realized in daily life. With the notable exception of *Star Trek*, there are very few utopian science fiction films. This is regrettable for failing to inspire young people to imagine hopeful futures. For me, the critical theory of society and technology is a component of a larger worldview of pragmatic-utopian transformative design to make a better world.

From my European perspective of searching for better and alternative digital futures, my view is that digital media technologies in the mainstream are largely designed and implemented in dystopian versions led by American big corporation capitalism or Russian or Chinese totalitarianism. The project of Creative Coding informed by poststruc-

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turalist ideas about the ambiguities of language connects with digital transformation. Since hyperreality is now instituted by code, the overturning of hyperreality can happen through coding.

Why is Creative Coding in its second phase important for a project of post-capitalism? An effective movement for digital transformation needs to be very thoughtful on two levels: application and code, or message and media. It must change things on the user level but also get to the heart of the matter. The net activism led by a figure like Geert Lovink, centered in Amsterdam and Berlin, had good post-capitalist ideas. It advocated for peer-to-peer and decentralization of the Internet, thus changes on the application level. But net activism never challenged informatics as it is on the code level. From the opposite direction, Andreas Reckwitz might say that Creative Coding is a product of the "creativity dispositive" of capitalism. Yet that would no longer be the case if Creative Coding were performed by a radical technology company with explicitly anti-capitalist and post-capitalist values and visions.

The project of a humanities-influenced informatics resonating with the spirit of the times has a precedent in the 1990s early cyberculture era when post-structuralist scholars saw *hypertext* as a practical application of formative deconstructionist philosophical and cultural theory ideas. The World Wide Web hypertext system invented by Tim Berners-Lee that enabled the explosion by orders of magnitude in the number of worldwide Internet users around 1995 was greeted as a revolution in the media of text with implications for the structuring of knowledge, education, and culture. Scholars like Jay David Bolter, Mark Poster, and George Landow were at the forefront of that tendency in the "digital humanities."[26] Novelists like Michael Joyce pioneered the genre of hypertext fiction in electronic literature.[27]

Another example of science fictional thinking is my own work. My Conclusion can be understood as science fiction theory. The project of transdisciplinary informatics building on top of the core numeric logic of computing to become more ambivalent, embodied, emotional, etc. is not the writing of a novel or a screenplay. It is a project in the so-called "real world."

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Part One – Hyper-Modernism: Digital Media Technologies and Science Fiction

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Overview of Part One

This book is an exploration of the three cultural theory concepts of hyper-modernism, hyperreality, and posthumanism. The focus is on how these three notions can illuminate how contemporary digital media technologies of the Fourth Industrial Revolution – such as Artificial Intelligence and Virtual Reality – affect society, the economy, and the lives of citizens of late capitalism.[28] Contemplating hyper-modernism, I rethink the relation of science fiction to technology and society. Considering hyperreality, I study the ideas of the simulacrum and simulation in the media theory of Jean Baudrillard. Reflecting on posthumanism, I review the scholarly efforts in that field of N. Katherine Hayles, then examine the practical artistic movement of Creative Coding and its impact on the future of informatics or computer science.

The power and originality of SF is that it is a force that formatively influences culture, ideas, technologies, and even "hard sciences" like physics. It has always been that force but has not been acknowledged accordingly. The boundary between SF narratives and the so-called "real world" of digital media technologies has become indistinct. These media and technologies are to be comprehended via the scrutiny of stories and representations. SF should become a worldview and a mode of knowledge for thinking about the hyper-modern world.

The concept of the simulacrum or hyperreality is a point of departure for investigating digital transformation. My project is to update and reinvent the philosophical and cultural theory concept of the simulacrum for the current historical situation of algorithms, virtuality, and post-truth. I seek to develop ideas for resistance to and transfiguration of hyperreality.

In the culture of the digital and the virtual, hyperreality is now performed in minute detail by algorithms and computer programming. I pursue the challenge to the simulacrum in theories and practices of software code. With the background of philosophical posthumanism and the recognition of software development as an expressive activity, I approach the Creative Coding movement. What is on the table is a paradigm shift from the centrality of media to code in cultural studies, and from engineering to a trans-disciplinary and creative informatics.

In Part One, I argue that the contemporary era can be designated by the cultural theory concept of hyper-modernism. Hyper-modernism follows, yet also preserves and

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builds on, modernity and postmodernism. There is a vast academic literature on "advanced capitalism" as postmodernism. Thinkers such as Baudrillard, Virilio, McLuhan, Foucault, Kittler, Flusser, and Haraway are the major postmodern media theorists. Lyotard called postmodernism the crisis of the "grand narratives" which prevailed in modernity such as industrialism and Marxism. These "grand narratives" all shared a belief in linear progress in history.[29]

In postmodernism, narratives and fictions are decisive in power and control relationships. In hyper-modernism, these relations get coded by informatic technologies.

In "Mobility and Science Fiction," I write about the mobility of the future by looking at the depiction of self-driving cars in SF films and the "real world" technologies of autonomous vehicles. In "Science Fiction Heterotopia: The Economy of the Future," I write about future post-scarcity economic systems in SF films and the potential for post-capitalism opened by "real world" technologies such as 3D printers, blockchain, and moral algorithms. In "What is Hyper-Modernism?," I explicate the defining features of hyper-modernism.

SF is a worldview and a way of theorizing and knowing. It is not merely the literature of "cognitive estrangement" under capitalism, as Marxist-oriented SF studies would have it.

Short Definitions of Modernity, Postmodernism, and Hyper-Modernism

The following short definitions of modernity, postmodernism, and hyper-modernism in cultural theory are brief introductions to terms which, in other circumstances, would require more in-depth explanations with all their accompanying references. Many entire books have been written on these concepts. The aim in this section is to dive quickly into familiarity with the three terms, as a way of providing an initial orientation to the reader, or enough of a framework of understanding to support my overall argument. An appreciation of the greater complexities of this terminology is exhibited both in my acknowledgment here that there exists a vast academic literature on this subject which, in my examination of it, I only scratch the surface, and by pointing out that the comprehension of what I mean by modernity, postmodernism, and hyper-modernism will be added to and fleshed out throughout the book.

As elaborated in depth in the third essay "What is Hyper-Modernism?," the meaning of the modernity paramount in this book is situated in the contexts of history and historiography. It is the sense of history that I associate with modernity. Modernity is the "grand narratives" (Lyotard) of history having a teleological or eschatological sense of a linear movement towards a "happy ending." The prevalence of modernist historical narratives began with the Enlightenment and the French and American political revolutions in the eighteenth century; continued with the nineteenth century of the industrial revolution, scientific rationality, and the high veneration of knowledge; and extended in the twentieth century to the emergence of the media and consumer culture of the post-World War II prosperous economies of Western societies. Some primary examples of these modernist stories of history structured around quasi-religious faith in "progress" are democracy, industrialization, science, liberal humanism, Hegelianism, utopianism,

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socialism, and Communism. In the area of technology, I associate modernity with the notion that technology is a tool for the domination of nature in the service of economic prosperity. Realism abided in art and literature. Sociology studied "the social."

I associate the term postmodernism, *first*: with the crisis of the self-confident feel of history and progress provoked by the advent of mid-twentieth century media and consumer culture; *second*: with the cultural and media theory concepts of the leading postmodern thinkers McLuhan, Baudrillard, Virilio, Haraway, Foucault, Kittler, and Flusser; and *third*: with questions raised about the relation between what both modernist science and widespread "common sense" call "reality" and the counterparts of "reality" such as fiction, media, virtuality, hyperreality, simulation, "the fake," and software code. The Hollywood culture of cinematic historiography paradoxically weakens access to "the real" of the historical past.

In the humanities, postmodernism has been analyzed via semiotics, communication studies, and the cultural and everyday life reproduction of power/control relations. In the hyperreality described by Baudrillard, semiotic signs or rhetorical signifiers (visual images and linguistic discourse) become increasingly independent from the signifieds (facts and "referents") of which they were previously the representations. Simulation supersedes representation.

In literary postmodernism, there is the "stream of consciousness" of Virginia Woolf and the absurdism of Franz Kafka. SF overtakes realism. In art, there are the readymades of Duchamp and the serial reproductions of Warhol. Regarding the object of inquiry of collective "we" existence which was the province of sociology, "the social" now gets steadily more simulated by models and codes. The focus on media beyond "the social" is emblematic of the postmodern humanities and cultural studies. I will also discuss the alternative definitions of postmodernism of key authors Fredric Jameson, Sonja Yeh, and Donna Haraway.

Hyper-modernism is associated with informatics, new media, and new technologies. The key concepts of the postmodern media theorists – such as Baudrillard's hyperreality, Virilio's speed, McLuhan's "the media is the message," and Foucault's surveillance – were originally formulated in the circumstance of analog technologies. With the universal technology of computing, the crises of space and time which these thinkers diagnosed are intensified in the transition from post- to hyper-modernism. There is a growing determining role of narratives and fictions in the exercise of power and control. There is a heightening of "reality" in advanced graphics. Images and discourses institute their own "reality."

Hyper-modernism is associated with the technologies of the so-called Fourth Industrial Revolution: AI and Deep Learning algorithms; VR and AR; Brain-Computer Interface; Internet of Things; autonomous vehicles; robots, cyborgs, androids, and virtual companions; 3D Printers and Additive Manufacturing; blockchain; and advanced biotechnologies. Hyper-modernism is the multimedia technologization of experience and memory. The narcissistic self of postmodernism gets programmed by the targeted advertising and "smart home" of big corporations. I associate hyper-modernism with post-truth in politics. Utterances decoupled from facts are OK so long as they are expressed with an aura of passionate self-assurance. True or false does not matter.

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Advanced technologies such as algorithms grant more power to rhetoric to sway minds inside the echo chambers of the fragmented or polarized body politic.

Prior to hyper-modernism, SF can be located as a specific narrative genre of novels, short stories, and films. In hyper-modernism, the relationship between science fiction and the "real world" digital media technologies of business, consumerism, and everyday life changes. The two become nearly indistinguishable. SF becomes a worldview, an epistemological mode, a way of seeing or theorizing the world that stands on its own. Science fiction becomes a powerful force molding technology and society. Technologies are to be understood through stories and framing narrations. The power and control brought to bear via these narratives are now executed via codes and digital-virtual technologies. Beyond the knowledge-paradigm of the social of modernity, beyond the postmodernist paradigm of media, there is the hyper-modernist paradigm of informatics and code: for art and design, and for cultural studies and the humanities. I will also discuss the alternative definitions of hyper-modernism of the highly regarded contributors to the debate John Armitage, Albert Borgmann, and Gilles Lipovetsky.

The Three Essays of Part One

In the first essay of Part One, entitled "Mobility and Science Fiction," I pursue answers to the major research questions of this book as they have been defined in the Introduction. I also provide support to my argument that SF has become an autonomous worldview and an epistemological mode. More specifically, I study the depiction of the future of mobility and autonomous vehicles in science fiction films and in the practical technologies of self-driving cars. Self-driving cars are an emblematic technology of the cultural imagination of the future of advanced digital technologies. My thesis is that self-driving cars will not automatically – in the sense of "technological determinism" – be a good thing for humanity. Whether they contribute to utopia or dystopia depends on their design. I understand design in the broad sense of a practice that is informed by historical knowledge – in this case, knowledge of the cultural history of mobility. We do not live in a society where mobility is encouraged. Do we, without reflection, continue this history, or are autonomous vehicles as an opportunity to change in a positive way? A posthumanist perspective that rethinks the ecological crisis is needed, systems of power, our attitude towards robots and androids, and how some non-humans as potentially being "self-owning" is to be understood.

I write about early twentieth century paintings about self-driving cars by Henri Matisse, portrayals in advertising during the 1950s to 1970s of the futuristic vision of self-driving cars, and media theorist Paul Virilio's concept of the "vision machine."[30] I make commentaries on the SF films *Close Encounters of the Third Kind*, *Blade Runner*, *Blade Runner 2049*, *Minority Report*, *The Fifth Element*, *Back to the Future*, and *Total Recall*. I conclude with an exegesis of the SF novel *Ubik* by the great science fiction writer Philip K. Dick.[31] *Blade Runner* and *Minority Report* were Hollywood films based on Dick stories. I argue that *Ubik* is explicitly about science fiction as an epistemological mode.

In the second essay of Part One, entitled "Science Fiction Heterotopia: The Economy of the Future," I continue to pursue answers to the major research questions of this book

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as they have been defined in the Introduction. I also provide further support to my argument that SF has become an autonomous worldview and an epistemological mode. More specifically, I study visions of future post-scarcity, post-capitalist economic systems in SF films and in the practical technologies of the Fourth Industrial Revolution. I argue for the potential of actual technologies to become part of the vision of post-capitalism, provided they are designed in alternative ways. I focus on the examples of 3D printers and Additive Manufacturing, blockchain, virtual companions, and moral algorithms. I comment on the ideas about post-capitalism of Murray Bookchin, Yanis Varoufakis, André Gorz, and Paul Mason.

With Bookchin, one sees that the imagination of a post-scarcity post-capitalist economy and society founded on the intelligent and creative design and deployment of technologies was already a major idea during the New Left counter-cultural movements of the late 1960s. With Varoufakis, one witnesses a contemporary attempt by an economist to rethink the organization of the future pragmatic-utopian society by combining some socialist and capitalist principles. The emphasis in the intellectual work of André Gorz is on the question of how technology designed with human intelligence can lead to new definitions of the meaning of life beyond work and the production economy. Paul Mason provides a recent expression of the renewal of the post-capitalist vision in the context of today's digital transformation.

The concept of heterotopia of Michel Foucault plays a major role in my vision of post-capitalism. I look at W.G. Sebald's novel *Austerlitz*, which is in dialogue with Foucault's heterotopia notion. I elaborate my idea of Technological Anarchism. I write about *Star Trek* economics and the *Star Trek* Replicator technology. A more mainstream version of the economy of the future, enacted within the framework of hyper-modernism, and deploying Augmented Reality and the Brain-Computer Interface, is the "technologizing of memory" in the episode "The Entire History of You" of the amazing SF TV series *Black Mirror*.

In the third essay "What is Hyper-Modernism?," I lay out various meanings of hyper-modernism. Hyper-modernism is coeval with digitalization. I comment on digitalization from a cultural/media theory perspective, meaning that a necessary concept like hyper-modernism is considered in relation to the well-established terms modernity and post-modernism in speaking about cultural-historical paradigms or *epistèmes*. In hyper-modernism, power and control exercised via narratives and fictions are implemented in a detailed way via digital and other advanced technologies. How does hyper-modernism problematize the concepts of history, science fiction, and reality (which all need to be rethought)? I examine the border between postmodernism and hyper-modernism in politics (Trump), art (Warhol), literature (Flaubert), and SF (*2001: A Space Odyssey*). I ask what happens to the body, self, and code in hyper-modernism. I write about this in the context of the *Black Mirror* episode "White Christmas." This touches on feminist theory and the topic of sincerity and authenticity.

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Mobility and Science Fiction

The present essay is divided into three parts:

(1) an Introduction about digitalization and the "Fourth Industrial Revolution,"[32] and, more specifically, offering initial ideas about self-driving cars as being an emblematic technology of our collective "cultural imagination" regarding the wide array of Next Generation advanced technologies which are upon us;
(2) a survey of six iconic science fiction films, plus one science fiction TV series, and how they visually and narratively represent "the car of the future"; which leads to
(3) a cultural theory conclusion presenting, as a thesis, my vision of how non-human "self-aware" technologies (now returning from the specific focus on the autonomous vehicle back to general consideration of many advanced "Industry 4.0" technologies) can, in partnership and in friendship with humans, help our species find a "posthuman" way out of fundamental problems like ecological catastrophe and the hegemonic social-technological systems of power and control over citizens.

Introduction

I find the term "digitalization" – in common currency among politicians and in the media today, for example, in Germany (*die Digitalisierung*) – to be confusing. The term seems to mix technologies of the past and of the future. In the 1960s, there were semiconductors and mainframe and minicomputers. There are personal computers and the graphical user interface (GUI) – Windows and the Mac – since the 1980s; the Internet since the 1990s; and mobile phones, smartphones, and tablets since the first decade of the twenty-first century. Now there is a vast new range or Next Generation of advanced digital technologies. A first attempt at listing them would include (and some of these are synonyms for each other):

- Artificial Intelligence (AI), automated software processes, self-learning self-evolving algorithms, Deep Learning and Big Data neural networks
- Robots, androids, and cyborgs

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- Virtual assistants (like Siri and Alexa) and the smart home of the future
- Virtual Reality and the Metaverse
- Augmented Reality or mixed reality
- 3D Printing, Additive Manufacturing, new materials science
- Self-driving cars, mobility of the future
- Internet of Things (IOT) or ubiquitous computing
- Blockchain and other distributed ledger technologies, Smart Contracts, Decentralized Autonomous Organizations (DAOs), and cryptocurrencies
- Advanced biotechnologies, CRISPR gene editing
- Digital-neurological or Brain-Computer Interface (BCI)

Some of the special task areas where AI is increasingly successful and deployed: pattern (speech, images, facial) recognition and classification; language (generation, translation, conversation) processing; service (hotel, restaurant, cleaning, customer care) robots; online shopping prediction and personalized advertising algorithms; decision-making support; health care applications; and robotic process automation in hardware and software.

The First Industrial Revolution took place between the late eighteenth and early nineteenth centuries. The population of large cities grew exponentially. The steam engine was invented. The iron and textile industries flourished. Railroad networks expanded. Mechanical production in factories led to greater wealth and higher standards of living for some, but also to harsh living conditions for many. The Second Industrial Revolution occurred in the late nineteenth and early twentieth centuries. This revolution was largely driven by branches such as steel manufacturing, oil production, and electricity generation. Among the most important inventions of this period were the telephone, the lightbulb, the gramophone, and the automobile. The management strategies of the assembly line (Fordism) and scientific management (Taylorism) were incorporated into work processes. The Third Industrial Revolution, which began in the 1960s, has become synonymous with the digital revolution or the first wave of digitalization. This revolution heralded the transition from analogue electronic and mechanical devices to digital technologies.

The term "digitalization" accurately describes the technologies of the past several decades, like the automation of the office and factory work processes, and personal computers, the Internet, and smartphones. The administered and bureaucratic character of modern existence has already been supplemented for quite some time by computer technology deployed in social institutions ranging from schools and hospitals to the workplace and the home. The second wave of "futurist" technologies is better described with a term like the Fourth Industrial Revolution, hyper-modernism, or self-aware technologies.

It is the self-driving car – and the ways in which it has come to typify the advanced collective technological imagination in our media culture – on which I want to focus my attention here. The autonomous vehicle has become one of the primary exemplars symbolizing the wide spectrum of emerging self-aware technologies of Industry 4.0.

I want to say something about the past of cars – specifically the cultural history of cars – and the larger cultural-historical context of cars. I am interested in the representation

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of cars in the cinema, especially science fiction cinema. And I will talk about self-driving cars, also known as driverless cars or autonomous vehicles.

My thesis about driverless or autonomous vehicles is different from what almost everyone else says about them. Almost everyone is talking about self-driving cars as a radical break, a paradigm shift, a quantum leap, a major step, a big change.

Yes, it seems to be that way: going from having a driver to having no driver. That is, if you look at technologies from the engineering perspective, from what I call the "technological determinist" point of view. Technological determinism asks the question WHAT IF. What will happen IF we make the so-and-so breakthrough? If we make a given breakthrough, if we implement a given technology. What will happen if there are sex robots, if there are cryptocurrencies, if there is Virtual Reality, if there are tiny nanobot surgeons, if we have human genetic engineering, if have the Brain-Computer Interface, if we have driverless cars?

The alternative to the technological determinist point of view is the design point of view. In design, one asks the question HOW, not IF. There are many possibilities, many different options of how a given technology can be designed, and then implemented.

My argument is that self-driving cars are going to be a continuity with what cars have been in the past, in the twentieth century. Not a radical break. IF autonomous vehicles get implemented without much design thinking. If they get implemented in the mainstream way.

Self-driving cars are probably going to be a continuity. Yet the present conjuncture of autonomous mobility technologies offers us the opportunity to initiate a transformation. Self-driving cars can be designed as something good, something better than what we have had until now. But this can only be achieved if there is first an understanding of what cars are, of what they have been in cultural history. Only after there is this cultural and historical knowledge can autonomous vehicles be designed as an authentic radical break with the past.

(1) First: what do I think about cars?
(2) Second: how are cars portrayed in science fiction cinema?
(3) Third: what cultural theory conclusions about posthuman technologies and Artificial Intelligence entities do I draw from the investigation of the science fiction films?

The theory should emerge slowly and immanently from the stories themselves.

In the first introductory part of the three parts of the present essay, I will make three essential points. First, I will argue that we are living in a relatively sedentary – and not mobile – society. Second, by looking at two key past visualizations of self-driving cars in the visual culture of postmodernism and modernity – futuristic advertising images of the "tomorrow-car" in post-World War II consumer society, and early twentieth-century paintings of the view of the world from within cars by Henri Matisse – I posit that something can be learned about how autonomous vehicles were already pictured in our cultural past. Third, I will examine media-technology theorist Paul Virilio's idea of the automobile as "the Vision Machine," and how the imagination of the Vision Machine appears in both older and newer forms.

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After that, I will go on to discuss the six paradigmatic science fiction films and their evocation of self-driving cars or "the car of the future." The films provide experiential narrative and visual evidence underlying the ideas which I lay out in the third and final section of the essay. Some of the pivotal interrelated elements of this "future design" vision:

(1) Post-humans helping humans – in a reciprocally learning exchange – to cope with some of the existential predicaments that humans face.
(2) The design of co-existence between human and non-human "actors" in economy and society.
(3) Reversing the negative fear-image of humans losing fundamental control to Artificial Intelligence of the self-aware computer HAL in Stanley Kubrick's epic science fiction film *2001: A Space Odyssey*.
(4) The emphasis in the design proposal for androids on their emotions, feelings, ethics, and embodiment.
(5) The granting of the rights to participate in the economy and to dispose over their own lives, and of some form of personhood, to non-human social actors.

We Do Not Live in a Society Where Mobility is Encouraged

In our society, mobility is not encouraged. We are stationary, sedentary, inert, immobile. We bring what is *there* to *here* via multimedia technologies. Yes, for purposes of work and business, and in the vacation-tourist industry, we are encouraged to move around. But – considering the predominant worldview, attitudes, and habits of the vast silent majorities in the Western countries – we do not like migration, immigration, migrant workers, and inter-cultural contacts. We have fixed addresses and nationalities. Dual citizenship is discouraged.

We do not want to acknowledge that large physical distances exist. The goal of the transportation revolution of the nineteenth century – *Planes, Trains, and Automobiles* (title of a 1987 comedy film starring Steve Martin and John Candy) – was the conquering of distance, the compression of space, the dampening of awareness of the reality of *here and there*.

The primary technological revolution of the twentieth century was not the transportation revolution. It was the revolution of the technologies of media images and telecommunications. See Paul Virilio's work on "speed and politics." See telecoms historian James Martin's books on "the wired society." See the media theories of McLuhan, Baudrillard, and Flusser. See Martin Heidegger's 1938 "media theory" essay "The Age of the World Picture").[33]

The world-historical developments of the culture of virtual images and high-speed network communications have contributed massively to our immobility, to our sedentariness.

In the twentieth century and beyond, my essential relationship to THERE, to peoples, places, events, and things which are not HERE is *to bring them to me*, to bring them from

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THERE to HERE via telecommunications – or more precisely, COMPUNICATIONS, a word synthesizing computing and data communications.[34]

The idea that the visual image (the copy) of something is "as good as" the thing itself (the original) plays a major role in this bringing of everything which is physically "absent" to my "presence." Cars (and other vehicles of physical mobility), which seem to go from HERE to THERE, are a secondary technology with respect to the primary technology of the images of everything in the world being brought to me in my home via the media networks.

The Dream of the Tomorrow-Car

The dream of what we will do once we have self-driving cars is, in fact, a longstanding established dream. It is the continuity of an old dream. You can see it in the famous American 1956 magazine advertising image shown below. We will bring our home with us everywhere we go. We want to feel at home everywhere. We want to have all our comfortable and familiar stuff with us – our family and our belongings. We do not really want to experience distance, to experience being truly somewhere else – the "otherness" of distances or faraway places or different cultures. We want to ignore and conquer distances.

We see here two different versions of this fantasized image of the mobility of the future. One is black-and-white and the other is color. The second version is from 1974. It was drawn by Günter Radtke, a German illustrator and newspaper cartoonist, and one of the founders of *Stern* magazine. This color image of the futurist self-driving car was part of the illustration work that Radtke did for the publication of Ulrich Schippke's book *Zukunft: Das Bild der Welt von Morgen* ("The Future: An Image of the World of Tomorrow").[35] Radtke's images portrayed, among other imagined future scenarios, transportation technologies in various contexts and domains. With regards to intellectual property and the creative diverting" (the Situationist artistic-activist practice of *le détournement*) of an artefact, one can note the striking similarity of Radtke's drawing to the original 1956 advertisement.

In the color version, the son is missing from the scene of the nuclear family. The second female looks older, and she is perhaps not the daughter of the family. Notice the large, enclosed glass room in both versions. Notice the car driving perfectly along the dotted line in the lane (guided by electrical power), and the lack of congestion on the highway. The car as a substitute for or annex of the living room of the home. Instead of genuine mobility, I take my stationary and familiar "at home" environment along with me on the road.

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Image accompanying a sponsored article paid for by America's Independent Electric Light and Power Companies in the June 1956 issue of Boys' Life Magazine

Illustration by Günter Radtke from the book Zukunft: Das Bild der Welt von Morgen (Bertelsmann, 1974)

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Le Pare-brise: Sur la route de Villacoublay ("The Windshield: On the Villacoubly Road"), Henri Matisse, 1917

Henri Matisse Paints "the Vision Machine"

There are two paintings made by the French painter Henri Matisse, from 1917 and 1925, respectively, which depict the view of the world as seen through the front windshield of a driverless car. The 1917 painting is called *Le Pare-brise: Sur la route de* Villacoublay ("The Windshield: On the Villacoubly Road"). The 1925 painting (not shown here) is called *Antibes, Paysage vu de l'Interieur d'une automobile* ("Antibes, landscape seen from inside an automobile"). These two paintings were made one hundred years ago, there were already cars back then, there was already the idea of a self-driving car and, more importantly, a statement made about how the experience of driving and speed transforms how we see the world.

In the painting, there is no human driver. The automobile is an apparent actor in the world, a kind of non-human actor. What we see here is that the car is a VISION MACHINE (the title of a book by French technology theorist Paul Virilio[36]). The car sees for us. Its vision or imaging apparatus replaces – or perhaps transforms – the human visual perception system of my eyes. When you are moving at speed, you cannot see the trees or the landscape in the same way that you saw them before. You become detached from them, entering more into a mediated relationship of spectator to spectacle.[37] In the 1982 science fiction film *Blade Runner*, the last surviving escaped Nexus-6 android replicant Roy Batty says to the genetic eye designer Hannibal Chew: "If only you could see what I've seen with your eyes."

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The perceptual experience of seeing, of looking out the window of the high-speed car or the high-speed train, is a cinematic experience. It is just like a film. The world is passing by at so many frames per second. The experience of driving can be brought into relationship with the visualities of cinema, television, and the computer screen (and the immersive Virtual Reality which is coming). Driving a car is like going to a movie. The merging of windscreen and cinema screen. Three-dimensional digital video images of sunny landscapes will be projected outside the passenger window by the car computer as I drive through the country on a rainy afternoon. Notice the long horizontal line that Matisse has drawn in the middle of the windshield, to ensure that we take note that a glass is there.

The New Vision Machine

Today there is a new Vision Machine. The technologies that needed to make the self-driving car – the sensors and cameras, the Global Positioning System (GPS), the navigation system, the range finders and the radar, the ground-sensing LIDAR (light detection and ranging) technologies, along with the self-learning algorithms, artificial neural networks, Big Data, and image recognition and classification of Deep Learning AI – are again, one hundred years later, the technologies of the VISION MACHINE. This is one of the step-by-step ways in which the succession of media "hyperreality" proceeds: What was at first a cultural experience or paradigm, an embodied metaphor, the analog technology version (in this case, the VISION MACHINE), later upgrades into the literal programmed-engineered hyperreal version (all details filled in) as enabled by the second wave of digitalization or Fourth Industrial Revolution.

As Paul Virilio wrote in another book of his *Polar Inertia* (1990):

> How can one fail to grasp that tomorrow's transport machine will be a 'driving-computer', in which the audiovisual feats of the electronic dashboard will prevail over the optical qualities of the field beyond the windscreen?[38]

In *The Vision Machine* (1988), Virilio wrote presciently about the potentiality of Computer Vision that is today being realized by the maturation of Deep Learning algorithmic systems of AI and other "simulation of surveillance" technologies:[39]

> Aren't they also talking about the new technology of 'visionics': the possibility of achieving sightless vision whereby the video camera would be controlled by the computer?[40]

Virilio foresaw the time when the analysis of "objective reality" will be delegated to a machine. Images will be created *by the machine and for the machine* in future industries of the automation of perception. In the politics of the hyper-modern media society, the clear distinction between "true" and "false," the sense of certainty of the existence of facts, is disappearing as Donald Trump masters the Orwellian system of "beyond truth and lies," declaring to his supporters: "What you are seeing and what you are reading is not what's happening."[41]

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It is Hollywood and Silicon Valley which are investing heavily in the advent of self-driving cars. Google and Tesla are working on self-driving cars. The film and TV and computer industries are busy making deals with automobile manufacturers. What am I (the consumer) going to do with the newly freed one hour of free time (which Audi AG calls "the 25th Hour"[42]) in my day that I am going to win back by not having to concentrate on driving? I will watch movies and TV series. I will play video games. I am going to telework and telecommute and teleshop. I am going to be wired and to consume multimedia infotainment.

The windows of the car are going to become screens, or at least dual-purpose physical and virtual media. Looking out the window was already a media transformation of "the real," and this metamorphosis will advance further from a cinematic experience to a Virtual Reality experience. Images of virtual driving experiences – the Arizona desert, the Swiss Alps, car chase in San Francisco, New York City taxi driver, African Safari, driving on Mars, or being a Formula One racer – will be projected onto those screens as the car becomes a new gaming platform. Characters in stories or Virtual Reality avatars might enter the car as three-dimensional living being-images through holographic technology.

Now I will discuss the six SF films. The retelling of one selected scene or clip from each film performs a phenomenological approach of the theory coming intrinsically into view from the experience (from, as the philosopher Edmund Husserl said, an engagement with "the things themselves"). It is also valuable to retell the cinematic narrative (in a trans-media act) in the media of words. The theory presented at the end of this essay is the project of what I call Technological Anarchism: envisioning post-humans as partners and friends to humans, as participants in the post-capitalist "third dimension" of the economy to which we delegate some of our human power, as autonomous or "self-owning" self-aware technological entities, as rights are granted to AI beings to dispose over their own lives.

Close Encounters of the Third Kind: The Menace of Verticality

In the 1977 science fiction film about first contact with aliens *Close Encounters of the Third Kind*, directed by Steven Spielberg, the character Roy Neary (played by Richard Dreyfuss), an electric company lineman blue-color worker in Indiana, is driving his job-related pickup truck at night on a rural road, investigating a series of power outages, when a strange intense light appears above him and his vehicle.

Sitting at his cabin steering wheel, Neary stops his truck in front of a railroad crossing and checks an electrical diagram of the wiring in the immediate geographical area. Behind him, an array of very bright circular lights appears, seemingly belonging to another vehicle. Neary motions with his hand to the unknown other, whom he believes to be the driver of a car or truck, to drive on past him. The assembly of bright lights surprisingly rises vertically, as seen by the movie viewer, while Neary continues to focus his gaze on the technical map-diagram.

He hears a rattling noise, growing louder when he opens his side-view window. It is a row of roadside metal mailboxes shaking. He shines a flashlight on the mailboxes, and their front lids all open. A blinding white light from overhead spotlights directly onto the

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truck. The viewers have a clear view of the light. From within his cabin, Roy Neary cannot see what is happening in the vertical dimension above his truck. Gasping palpably with fear, Neary pokes his head out the window and looks above but cannot make out what is up there.

Blinded by the light, he retreats his head inside the cabin. The RAILROAD CROSSING sign – an iconic semiotic object of American culture and everyday life stuck routinely into the ground – makes an uncontrollable ringing noise and sways rhythmically from side to side. Physical debris shatters and crashes through the front windshield. Objects of all kinds blow around wildly in the cabin. Dashboard control gauges of temperature, fuel level, voltage, and speed go berserk. The ashtray full of cigarette ends explodes. The radio comes on at full blast. Suddenly all goes still, dark, and quiet again. After a long, pregnant pause, Neary looks to the darkened sky and sees the Unidentified Flying Object (UFO).

In science fiction films in general, extraterrestrial aliens are a symbol of the non-human, of the crisis that threatens to destabilize and overwhelm the liberal humanism of Western civilization of the last two centuries, the twilight of man's anthropocentric domination of nature and dominion over the planet. Aliens represent what in cultural theory is called the perspective of the posthuman. In contrast to the horizontality of the car (or, in this case, the truck), Neary-Dreyfuss cannot see what is overhead, cannot focus visually on the menace of verticality. He cannot discern the threat, except as a blinding light. Everything is shaking: the mailboxes (communication), the radio (the media), the railroad crossing sign (the signifier of mobility). The horizontality of the transport vehicle is threatened by the verticality of what it has excluded.

As Michel Foucault noted in 1966 in his Preface to *The Order of Things*, while discussing "the Death of Man," the grounds of our humanist certainty "is once more stirring under our feet."[43] Foucault identified a moral and epistemological crisis. He argued that the universalist claims of the modern Western worldview are self-contradictory. The world-historical assumptions about "Man" developed in the specific historical context of modern Western European history. They privileged the white male heterosexual Judeo-Christian individual liberal human subject. The eighteenth and nineteenth centuries in Europe were the heyday of the "grand narratives" (Jean-François Lyotard, *The Postmodern Condition*[44]) of modernity, the belief in a teleological (displaced eschatological Christian narrative) view of world history: the narratives (for example) of progress, Enlightenment knowledge, science, rationalism, democracy, the industrial revolution, capitalism, socialism, and communism.

The car or truck, with its essential horizontality, can be viewed as the classic vehicle of individualist liberal humanism. The freedom of the private vehicle, of endless open space, the sensation and experience of speed, the road trip, the open road. The car is the ultimate symbol-object of postmodernity, of the post-World War II consumer society, of America. Driving is part of a hybrid technology, of a hybrid-cyborg multimedia experience, human merging with machine. "Gliding down the freeway," writes Jean Baudrillard in his book America, "smash hits on the Chrysler stereo, heat wave."[45] Driving is hybrid with music and with the heat wave. Instant acceleration with the Chevy Corvette Stingray V8 engine, easy and fluid like a song on the radio. Driving is sailing, taking a break from the tasks of dry land.

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The founder of media theory Marshall McLuhan saw the car of the past and the present as having contributed to the uniformity of America. In the cities, in the suburbs, and in rural areas, everything in America looks more and more the same – the same shopping malls, fast-food chains, gas stations, and corporate plazas. "For forty years," writes McLuhan in Understanding Media, the car has been "the great leveler of physical space and of social distance as well." The car, continues McLuhan, has created highways and resorts "very much alike in all parts of the land," spreading everywhere "the automobile version of civilization."[46]

The "car of the future" might flexibly alter its planar orientation between horizontal and vertical. It could transform its shape as it exits the highway and enters the city. When in the city, it might only be 55% as wide as today's cars. It transforms into a double-decker with four passenger compartments: lower front, lower rear, upper front, and upper rear. Each compartment is as wide as a golf cart and can comfortably accommodate one or two people. Up to 8 people can ride in the car. There is a retractable electric stoop on the exterior of the car that goes up and down like an elevator platform, enabling access to the upper compartments. The engine turns vertical or is small enough to not need to be rotated.

Above the roof of the horizontal vehicle is the opening to the universe, the verticality of a symbolically depicted posthuman future. The extra-terrestrial aliens in science fiction films are a metaphorical threat to liberal humanist anthropocentrism. The aesthetic of SF aliens is close to that of monsters, to the literary and moving images tradition of the grotesque. Science fiction is often "hybrid" with the horror genre. This is clear in films like Ridley Scott's *Alien* series. The aliens of *Close Encounters of the Third Kind* turn out to be childlike and playful.

The "Spinner" Flying Cars of *Blade Runner*: Simulation and Surveillance

Philip K. Dick's novel *Do Androids Dream of Electric Sheep?* was adapted into Ridley Scott's cinematic masterpiece *Blade Runner* (1982).[47] In his vast science fictional *oeuvre*, Dick employs the terms robot and android (as well as "replicant" and "andy") interchangeably. He explores the theme of artificial life-forms in dozens of remarkable novels, stirring up unsettling questions about the nature of that species called "humans" that builds androids.

The job of Blade Runner Rick Deckard – played by Harrison Ford – is to weed out, hunt down, and terminate trespassing android replicants who have surreptitiously made their way back to decaying Earth society from their slave labour assignments in the "off-world colonies" or on space exploration expeditions. The name Deckard is reminiscent of the seventeenth-century philosopher René Descartes who fatefully established the archetypal mind-body separation in Western philosophy ("I think, therefore I am"). Deckard is a post-Turing Test expert at distinguishing android "skin jobs" (a racist term used by his ex-boss Captain Bryant – played by M. Emmett Walsh) made by advanced biotech companies like the Tyrell Corporation from humans. The resonating message of the film of ideas *Blade Runner* is that *we are all replicants*. To be a replicant (in one important sense) – someone who must continuously conceal who he or she is – is a metaphor for being a non-conformist or living a subaltern condition. In the high-tech society of simulation

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and surveillance, everyone is potentially always being watched by the power architectures of social control.

Deckard has already retired from his career with the police, but he is called back to duty by Bryant to handle a difficult case which no other detective can crack. While eating sushi and noodles at the White Dragon outdoor bar in the rainy weather and darkness of future Los Angeles, Deckard is detained by police detective Gaff – played by Edward James Olmos, who takes him in the flying police car known as "the Spinner" to the police headquarters at the summit of a skyscraper. The Spinner lifts off as a combined film-and-mobility excursion lasting several minutes through the skies of the futurist cityscape. *Blade Runner* was influenced deeply by Fritz Lang's magisterial early science fiction film *Metropolis* (1927). Many SF films that came after *Blade Runner* have copied its look-and-feel.[48] It has also had a profound influence on video game designers.[49]

As the flying vehicle ascends, one sees ominously the word PURGE flash across the red-backgrounded information screen inside the Spinner. The term offers a hint of ethnic cleansing and the existence of a hierarchical society of power. On the ground of the overcrowded future city are "the little people," as Bryant calls them – those without money and who belong to racial and linguistic minorities, stuck on an Earth of environmental catastrophes and genetic diseases. Everyone who is healthy wealthy has emigrated to the outer space colonies.

There is smoke and haze in the air. Only the police have flying cars. Soaring in the higher-altitude zone, interspersed with camera shots of the vehicle's dashboard control panel, one sees skyscrapers, multimedia advertising screens the size of entire building façades, and the architectural Panopticon of power (see Michel Foucault's discussion in *Discipline and Punish* of the generalizing to all social institutions of Jeremy Bentham's nineteenth-century behavior-control system of permanent observation[50]), as illustrated by the skyscraper-top landing ports. The inhabitants of Los Angeles are menacingly watched all the time by the image of an Asian woman in an animated billboard on the side of a massive floating blimp. The goal of the Panopticon architecture is to encourage self-surveillance among citizens (which Baudrillard called "the strategy of deterrence").[51] The flying car, in its movements of verticality and hovering, denotes the present and future society of simulation and surveillance.

The advanced technological totalitarian society of the present and future uses informatics-intensive surveillance systems to control the population. These hyper-control systems are enhanced by simulations. The real is reproduced by models. As in *Minority Report*, simulation-surveillance systems detect crimes before they happen – by seeing everything that can be seen and recording everything that can be heard (the collecting of Big Data then fed into intelligent "pre-crime" digital and biotech Deep Learning algorithms).

Deckard uses the digital media technology of the ESPER computer system to do an analysis of a photo extended to three-dimensional space. As a detective, he inspects a room without being in the room. He is present in the room virtually through visual media. Today something like the ESPER system has been realized with dual photography and light-field photography, photography without a camera.[52] The light-field camera captures information about the light-field emanating from all physical surfaces, analyzing algorithmically the direction that the light rays are traveling in space.

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The ESPER Machine is connected to the police computer system of total surveillance of all physical spaces, accessed from Deckard's apartment. Every physical space is always potentially under surveillance, part of the Panopticon, the system of total power through universal visibility, computer vision which simulates human vision as enabled through Artificial Intelligence Deep Learning neural network algorithms.

Blade Runner: We Are All Replicants

As the future-noir hard-boiled detective called back from retirement to handle an especially difficult case gets ready to administer the Voigt-Kampff empathic response exam to the female Tyrell android Rachael – played by Sean Young, his test subject asks him: "have you ever taken that test yourself?" Deckard asks CEO Eldon Tyrell – played by Joe Turkel: "how can it not know what it is?" That question applies as well to the sleuth's own situation. Rachael's eyes glow a faint red during her V-K trial, as do those of the combat model android Leon – played by Brion James. As Deckard steps out of the bathroom in his high-rise flat, one sees camera light bouncing off his slightly out of focus eyes.

Deckard examines Rachael's collection of photos from her childhood – media representations of her neurologically implanted memories which are copies of the personal memories of Tyrell's human niece. The photos are strewn about on Deckard's piano. "I don't know why replicants would collect photos," he comments in the voiceover. After the protracted showdown atop abandoned skyscrapers near the end of the film between Deckard and the last surviving escaped Nexus-6 replicant Roy Batty – played by Rutger Hauer, Lt. Gaff tells Deckard: "You've done a man's job, sir," as if the protagonist were not really a man. "It's too bad she won't live," continues Gaff in reference to Rachael, who is presumed to have only a four-year lifespan. "But then again, who does?" he obscurely adds.

Blade Runner, Ridley Scott director, Warner Bros., 1982

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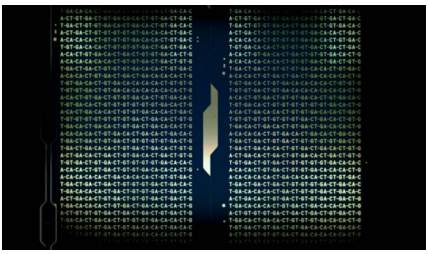
The uncertainty of Deckard's ontological status as human or replicant is brought out more forcefully in two scenes of *Blade Runner: Director's Cut* (1992), which restores an uncanny twelve-second dream sequence of a majestic silver-white unicorn running through misty woods, shown when Deckard nods off while playing the piano. Lt. Gaff, who makes origami figures, leaves the tiny tinfoil form of a unicorn on the floor just outside Deckard's apartment in the film's final moments. The juxtaposition of dreamland and decorative variants of the mythical equine creature in the two scenes delicately hints that the police authorities know the content of Deckard's dreams. His dreams, memories, and desires have been technologically implanted, just as he himself knew of Rachael's fake childhood recollection of the baby spiders outside her window.



Blade Runner 2049, Denis Villeneuve director, Warner Bros., 2017

Minority Report, Steven Spielberg director, 20th Century Fox, 2002

Director Ridley Scott expressed it in two interviews: "The central character could in fact be what he is chasing."[53] "[The] unicorn scene," Scott has also said, "would be the strongest clue that Deckard, this hunter of replicants, might actually be an artificial human himself."[54] Deckard is endowed with a secret destiny by the androids. The original human starts to imitate, and to be seduced by, that which he created as an imitation of himself.

Blade Runner 2049: Android Liberation Between Old and New Informatic Power

Blade Runner 2049 is a brilliant sequel to the original *Blade Runner*. Thirty years after the events of the narrative of the first film, the police discover evidence of the secret that Rachael, who was a replicant or android, became pregnant and gave birth in a "natural" fertility process to a child. Rachael died while achieving childbirth after a clumsy Caesarean section. There are three different groups or "camps" in the film, fighting against one another, each with a different perspective on the meaning and implications of the "scientific" and "forensic" knowledge of how replicants can reproduce and propagate themselves "biologically" rather than being manufactured in a factory. My "take" on the film is that android procreation is a metaphor for the much-anticipated fundamental breakthrough of the so-called singularity of General Artificial Intelligence. A replicant

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female being able to give birth is the metaphor for that post-combinatorial paradigm shift in informatics and cyber-computational technology. The respective perspective of each of the three groups then represents an important attitude concerning the monumental advance of General AI. The film implicitly defines AI as the stage in computer science or biotechnology at which software code can write its own additional code.

Blade Runner K, short for his serial number KD6-3.7, also known as "Joe" (played by Ryan Gosling), works for the Los Angeles Police Department (LAPD). K's job is to hunt down older model replicants but is himself a sophisticated Nexus-9 replicant. The name K is perhaps a reference to the novels of Franz Kafka, such as *The Trial* and *The Castle*.[55] While "retiring" a rogue replicant at the beginning of the film, K finds a box buried under a withered tree at a protein farm. After a brutal hand-to-hand fight with the police detective and just before dying, the replicant owner of the protein farm admonishes K for being, so to speak, "on the wrong side of history" and cryptically says to him: "You've never seen a miracle." The box contains the skeletal remains of a female replicant who died during childbirth, demonstrating that replicants can reproduce biologically, which was previously thought to be impossible. A search of DNA records indicates that the deceased female is Rachael (from original *Blade Runner*). Powerful microscopic images show a replicant serial number engraved on one of the retrieved bones.

The first perspective of the three is that of the police. K's boss Lieutenant Joshi (played by Robin Wright) explains to him that the stability of society is maintained by the solid absolute wall that exists between humans and replicants, between those who have the right to life and self-determination, who were born "naturally," and those who are slaves, servants, or mere workers because they were built in a factory. The viewpoint of the police is that of preserving the old system of power, the established hierarchy between humans and androids. If the knowledge of android procreation, or even the fact that such an event occurred, would get out to the public, it could lead to a terrible war. To keep order, Joshi insists that all evidence and information regarding how Rachael procreated, including the very existence of the child, must be suppressed/destroyed. The replicant child must be found and retired. Lt. Joshi tells K:

> The world is built on a wall. Separate kind. Tell either side there's no wall, you bought a war. Or a slaughter. What you saw didn't happen. It is my job to keep order. That's what we do here. We keep order.

The second perspective is that of the Replicant Freedom Movement, of which the android prostitute Mariette (played by Mackenzie Davis) is a member. Freysa Sadeghpour (played by Hiam Abbass) is the leader of the freedom movement. When Freysa meets K towards the end of the film, she tells him that she helped deliver Rachael's baby. She held Rachael's hand while she was dying. The child was a girl. The goal of the Replicant Freedom Movement is the total liberation of their people. "That baby meant we are more than just slaves," Freysa tells K. "If a baby can come from one of us, we are our own masters." Mariette echoes a famous line uttered by Dr. Tyrell in the first *Blade Runner* film: "more human than human."

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The third perspective of the three is that of the Wallace Corporation, the entrepreneurial successor to the Tyrell Corporation as the chief maker of replicants. The introductory text visually displayed at the beginning of the film tells us:

> Replicants are bioengineered humans, designed by the Tyrell Corporation for use off-world. Their enhanced strength made them ideal slave labor. After a series of violent rebellions, their manufacture became prohibited, and Tyrell Corp. went bankrupt… Wallace acquired the remains of Tyrell Corp. and created a new line of replicants who obey.

Prior to getting into the replicant business, Niander Wallace (played by Jared Leto) was already a wealthy industrialist, having made his fortune in synthetic farming. Luv (played by Sylvia Hoeks) is Wallace's evil replicant enforcer with super-strength and his right-hand top-level manager. Wallace instructs Luv to steal Rachael's remains and to follow K on his mission to locate Rachael's child, who should be thirty years old. Wallace laments that until now he has only been able to colonize nine planets. He is frustratingly dissatisfied and wants much more. He opines megalomaniacally in a lengthy monologue:

> We should own the stars. Every leap of civilization was built off the back of a disposable workforce. We lost our stomach for slaves – unless engineered. But I can only make so many. I cannot breed them. I have tried. We need more replicants than can ever be assembled, millions so we can be trillions more. Tyrell's final trick, procreation, perfected, then lost. If there is a child, bring it to me.

K must regularly submit to automated dialogical "baseline" tests to verify that he has not drifted psychologically towards becoming a "rogue" replicant. He contemplates the possibility that he himself is human. Perhaps he is the individual to whom Rachael gave birth thirty years ago. K goes to a records room at police headquarters to call up the DNA code of babies born on June 10th, 2021. The date 6.10.21 was carved into the tree trunk below which the box of Rachael's remains was buried. He remembers this date, which was on the wooden toy horse of his cherished childhood memory. DNA records indicate that twins were born on that date, but only the boy is listed as having survived.

Information about the child's fate leads K to an orphanage in apocalyptically devastated San Diego. However, written records from the year when the child was supposed to have arrived there are missing. Pages have been torn out from a fat physical notebook. K recognizes the layout of the orphanage from his memories and finds the toy horse where he recalls hiding it from bullying boys who were chasing him. Dr. Ana Stelline (played by Carla Juri), a designer of artificially implanted memories for replicants and an external contractor of the Wallace Corporation, confirms with her diagnostic tools that K's memories of the orphanage and the toy horse are "real," leading K. to conclude that he is Rachael's son. But this belief is short-lived. K travels to the ruins of Las Vegas where he meets Rick Deckard (played by Harrison Ford). Deckard explains that he is the father of the child. He scrambled the birth records to protect the child's identity, then left the child in the custody of the Freedom Movement.

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The subject of code comes to the forefront in the scene where K visits the police DNA archive. In the viewer, he can see three DNA codes at a time side by side. Scrolling through the code of all infants born on the specified date, he finds two exactly matching genetic code sequences (differing only in the gender chromosome). But this is impossible – two persons cannot have identical DNA. One of the two must be fake. The records say that the girl died shortly after birth from a genetic disorder. The boy disappeared. K learns later that it was Deckard who manipulated the records to cover up traces of the replicant child's identity.

Rachael had a daughter. K now understands that he is not the child of Deckard and Rachael. He is devastated to find out that it is not him. He is "just" an android, manufactured in a biotech industrial process. Dr. Stelline has a compromised immune system and has had to spend her life, since age 8, behind glass in a sterilized space.

K drives Deckard to Stelline's office and hands him the toy horse to give to her since it is really her memory. She implanted the memory of the toy horse in the minds of many replicants whose memories she designed. As K lies on the steps, looking up at falling snow, Deckard goes inside and meets his daughter for the first time. As K dies, music from the original *Blade Runner* plays, reminiscent of the final scene of the death of Rutger Hauer's Roy Batty.

Minority Report: The Utopia/Dystopia of Surveillance Technologies

The literary richness of the science fictional text often emerges from the tension between utopian and dystopian visions of the future, which are often intertwined in storytelling and very closely related to each other. Steven Spielberg's landmark film *Minority Report* (2002) (based on the short story "The Minority Report" by Philip K. Dick[56]) weaves a complex narrative keeping the viewer on a knife's edge of suspense between politically ideal and nightmarish imagined future scenarios. Harnessing the special cognitive powers of three gifted mutated psychics known as PRECOGS who can "previsualize" the future, the police are able to intervene at the scenes of about-to-take-place murders and prevent violent crimes from occurring before they happen.

This technology of preemption is utopian in that it promises a world (the Washington, D.C. of 2054) where the murder rate has been reduced to zero. Yet the SF of *Minority Report* is dystopian both in the specific senses that one can be falsely accused (due to glitches in the PreCrime Brain-Computer Interface system) or falsely arrested (one may not necessarily go on to commit the crime) – and in the wider sense that the society depicted in the film is one of increasingly totalitarian surveillance. Everyone is under surveillance all the time, and privacy is effectively extinct. The autonomous cars of *Minority Report* are only autonomous in the sense that they do not require a driver sitting at a steering wheel to operate. The cars are part of a centralized network controlled by a centralized authority which universally observes, and acquires data on, each passenger. The police can take control remotely over your vehicle any time they like. Will autonomous vehicles be self-organizing (perhaps "self-owning") or will they be controlled by a centralized agency? Does free will cease to exist if the future is known in advance? Once individuals become aware of their future, are they then able to change it?

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Minority Report was a milestone science fiction film in its "predictions" of new styles of design in human-computer interaction, and new advanced biotechnologies enabling personalized advertising. The film showed a multi-touch or "gesture" interface (more and more commonplace in the "real world" since 2002), which is the link to the "PreCrime" system and other police operations. Instead of being a "user," the new interface-experience paradigm that Spielberg wanted to highlight was that of being like a musical conductor leading and coordinating the music of an orchestra. Leveraging a universal optical recognition system, advertising applications are everywhere. They recognize both who you are (identity) and what is your current state of mind (conscious and unconscious intentions and desires).

The Toyota Lexus 2054 concept car was designed especially for the film as commissioned by Steven Spielberg. Other futuristic car models also appear on the highways and local roads of *Minority Report*. These self-driving vehicles glide smoothly along, make a distinct whirring sound, and intelligently preempt any possible traffic jams. The computer animation-supported filmed sequences of the self-driving cars play endlessly with the transitions between the vertical and horizontal dimensions in the transport logistics of the urban environment. The cars are called Magnetic Levitation Vehicles. They can hover above the road. They can bring the passenger directly to the entrance to his or her apartment. They can self-fuel and perform self-maintenance. Since his car is controlled by the police, Chief of Pre-Crime John Anderton – played by Tom Cruise – can only get away from the authorities who are hunting him by kicking out the side window and climbing out of the car.

The Fifth Element: When Manhattan has no More Ways to Expand

In the New York City of 2263, world government scientists in a laboratory (the Nucleo-Lab) reconstruct the humanoid alien woman Leeloo (played by Milla Jovovich) from the alien DNA of a severed hand encased within a metal glove, a weird piece of alien biology, which was the sole survivor of the destruction of the spaceship of the Mondoshawan "good aliens," who were decimated in battle by a mercenary Mangalore "evil aliens" spacecraft. The lump of flesh was retrieved by Earth security forces from inside the sarcophagus that was inside the wreck of the shattered ship. The alien biological tissue is said to be composed of a "fifth element" encapsulating the power of the other four classical elements (earth, water, air, and fire) into a miraculous divine light capable of defeating evil.

After her biotech generation into a humanoid female body form, Leeloo, wrapped in a thermal bandage dress, is initially held prisoner in a glass enclosure. But her superpowers include physical super-strength. She smashes open the glass, grabs a security badge from the startled General Munro of the Federated Army (played by Brion James), opens the encasement, and escapes from her confinement. She escapes from the laboratory complex.

Running away from the police, Leeloo flees through a tunnel system and stands on the high-up outside ledge of an upper floor of a skyscraper, looking out at the three-dimensional hyper-mobility system of 23rd-century New York City. Flying cars are whizzing

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past on many horizontal levels of the complex architecture. Leeloo is shocked to see a high-speed train traveling vertically downwards along the side of a building. She walks around on the ledge, with a police hover car closing in on her, flashing a light on her, scanning her, and seeking unsuccessfully to retrieve a file on her from a database. She leaps off the ledge in an elegant, initially slow, diving motion, then pulled down at high speed by the force of gravity, crashing, many levels down, through the roof of the flying taxi of Major Korben Dallas (Bruce Willis), a former soldier in an elite special force unit of the Federated Army.

Writing about Los Angeles in his book *America*, Jean Baudrillard noted that that city "is in love with its limitless horizontality, as New York may be with its verticality."[57] With an ever-increasing population and confined by limited physical geographical expanse, New York City expanded vertically in the twentieth century with its world-renowned skyscrapers. Yet the ground surface of Manhattan remains an unresolvable system of congested circulation with its excess of automobiles with relatively few passengers on board, somehow still symbolizing the freedom of the individual in the America in which New York is embedded.

In the scene of Leeloo walking on the ledge of the upper floor of the skyscraper in 23rd-century Manhattan, we see that even the advent of flying cars has not dampened the implacable horizontality of American car culture. The horizontal mobility logic of the street has multiplied exponentially and expanded geometrically upwards to multiple levels of horizontal travel at the heights of the successive "stories" of the skyscrapers. The verticality of New York City skyscrapers has not combined with the potential of flying vehicles to liberate the mobility of cars from their vectorized vicious circle stagnation. Skyscraper verticality has been instrumentalized to infinitely extend the horizontality of the automobile. To avoid accidents and keep order, cars on each horizontal level are systemically confined within their lane.

Back to the Future: A Speed So Fast that the Laws of Spacetime Get Shattered

In the 1985 SF time travel film *Back to the Future*, directed by Robert Zemeckis, the eccentric scientist Dr. Emmett "Doc" Brown (played by Christopher Lloyd) invites his younger friend Marty McFly (played by Michael J. Fox) to meet him in the expansive parking lot of Twin Pines Mall in the town of Hill Valley at shortly after 1 a.m. on the night of October 25, 1985. After Marty's arrival at the parking lot on a skateboard, "Doc" Brown unveils, from the back of his van, his 1983 DeLorean DMC-12 automobile (a product of the short-lived DeLorean Motor Company, which produced cars in the early 1980s), which he has "souped up" and customized. Doc announces to Marty that he has invented a time machine from the modified DeLorean that runs on plutonium. He, Marty, and Doc Brown's dog Einstein are now going to observe and participate in "Temporal Experiment Number One." Doc straps Einstein with a seat belt into the front right-side passenger seat, checks that the digital clock around the dog's neck is synchronized with his own digital watch, and closes the gull-wing door.

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Doc operates the car with a handheld remote-control device that has an extended antenna. "When this baby hits 88 miles per hour," Doc Brown says to Marty McFly, "you're gonna see some serious shit." He maneuvers the car into a starting position one hundred meters from where they are standing, sets it to achieve a speed of 88 miles per hour, and then "let's it rip." Wheels spinning and rubber squealing. The car accelerates to the designated high speed as it makes a beeline towards Doc and Marty. The flux capacitor gets activated. Electrical currents around the car body glow. A burst of light appears in front of the car. Just before potentially running them over, the DeLorean suddenly vanishes into a luminous flash of nothingness. Only fiery tire tracks remain in the path that the car was about to traverse. "Jesus Christ, Doc," Marty McFly says anxiously, "you disintegrated Einstein." Exactly one minute later, the DeLorean time machine vehicle and the dog Einstein reappear. The car's exterior looks worse for wear, but Einstein is alive and well. His clock is now exactly one minute behind Doc Brown's control watch, having traveled one minute into the future.

With *Back to the Future*, the speed-technologies of transportation mobility reach such a critical threshold or "event horizon" that the complete destruction of conventional or Newtonian spacetime comes metaphorically into view – scientifically, technologically, and culturally. Absolute speed renders time as virtual. With instantaneous transport and arrival, one can be anywhere and everywhere at any time.

The frontier possibilities that the laws of physics would open for time travel were first glimpsed in Albert Einstein's theories of special and general relativity, originally formulated in 1905 and 1915, respectively. Special relativity accommodated "time travel to the future." A passenger inside a spaceship traveling at a subluminal velocity close to the universe's limit-speed of light speed would exist in the private reality of a rate of time passage slower than that lived by her cohorts and progeny left behind on Earth. This was a revision of the classic Newtonian view that clocks proceed at the same pace everywhere in the universe.

According to Einstein, clocks inside the time machine traveling at close to light speed would appear to run more slowly than those on the outside, from the relativistic point of view of the motion and "proper time" of the outside observer. This time dilation effect, predicted by Einstein's special relativity equations, has since been verified by experiments conducted in upper atmosphere test pilot speed-flights, and by studies of the lifespans of subatomic muon particles in cyclotron-like accelerators. Enclosed in her "special relativity bubble," the time travel passenger could see time in the "outside universe" moving at a faster rate.

Total Recall: You're in a Johnny Cab

Another text by Philip K. Dick made into a Hollywood film was his short story "We Can Remember It for You Wholesale," adapted by director Paul Verhoeven into the 1990 film *Total Recall*.[58] For the current study, this is the third Dick Hollywood adaptation to be examined in "Mobility and Science Fiction," along with *Blade Runner* and *Minority Report*.

Douglas Quaid (played by Arnold Schwarzenegger) is a construction worker who has recurring nocturnal dreams about Mars and a mysterious woman whom he "knows"

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there. While riding the subway one morning on his way to work, Quaid sees a TV advertisement for the company *Rekall*, a neuroscience-technology firm which sells memory implants of vacations at prices cheaper than "real vacations." Arrived at *Rekall*'s office, Quaid chooses the adventure vacation that includes him assuming a "secret agent" identity. But something with the memory implant goes wrong. The company technicians abort the procedure – or, at least, that is what appears to happen. Is the neural procedure gone awry "real" or is it the beginning of the virtual narrative inside Quaid's brain enacted by the secret-agent-vacation-adventure induced by the memory implant? From this point on in the narrative, through the construction of a Dickian plot device, neither the viewer nor Quaid knows if the rest of the film consists of (A) "real experiences" which are the unintended aftermath of the implant gone awry or (B) "virtual experiences" which are the intended repercussions of the memory implant. Neither the viewer nor Quaid knows if Quaid got up from the operation chair at *Rekall*, or if he is still sitting there in an unconscious mental state living his vacation. What is reality and what is hallucination?

The *Rekall* technicians sedate Quaid/Hauser and put him in a taxi. He wakes up and finds himself in the back seat of a self-driving taxi known as a "Johnny Cab" and has his first interaction with an AI robot who is the human-machine interface to the vehicle. "Johnny" is humanoid but embodies only a head and shoulders. He sits at the front left driver's position, and is whistling happily when Quaid/Hauser awakens from sleep and begins their dialogue:

Quaid/Hauser: Where am I?
Johnny: You're in a Johnny Cab.
Quaid/Hauser: I mean, what am I doing here?
Johnny: I'm sorry. Would you please rephrase the question.
Quaid/Hauser: How did I get in this taxi?
Johnny: The door opened. You got in. Hell of a day, isn't it?

As the secret agent who does not know his own identity – whether he is Douglas Quaid or Carl Hauser from Mars – the protagonist played by Schwarzenegger gets physically attacked and is pursued by armed men who want to either capture or kill him. Now carrying a suitcase which contains valuable information and artefacts about his past and future, with the pistol-brandishing bad guys in hot pursuit of him, Quaid/Hauser climbs again into the taxi:

Johnny: Hello, I'm Johnny Cab. Where can I take you tonight?
Quaid/Hauser: Drive! Drive!
Johnny: Would you please repeat the destination?
Quaid/Hauser: Go anywhere, just go, go!
Johnny: Please state a street and number.
Quaid/Hauser: Shit… Shit.
Johnny: I'm not familiar with that address. Would you please repeat the destination?

An exasperated Schwarzenegger uses brute physical force to wrestle the Johnny Cab android from its electronic socket connection to the base unit. Sparks and smoke fly. Arnold

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tosses the robot aside. He takes over manual control of the vehicle, driving with a joystick. Quaid/Hauser/Arnold narrowly escapes his pursuers, who shoot gunfire at the back of the taxi. "Fasten your seatbelt!" exclaims the still partially activated Johnny robot, while lying in a supine position. Arnold drives away from the chase scene, and eventually brings the vehicle to a halt in an isolated dark alley. As he departs the taxi, the android resumes their dialogue:

> Johnny: The fare is 18 credits please.
> Quaid/Hauser (leaving the taxi): Sue me, dick head!

Johnny screams, the autonomous vehicle uncontrollably starts up again, crashes head-on into a wall, and explodes. As his charred face is about to get engulfed by flames, Johnny shouts out: "We hope you enjoyed the ride! Ha ha!"

The encounters with Johnny Cab are hilariously funny. They show the linguistic programming limitations of the conversational speech interface between humans and AI. And they show the crisis of the long tradition of the "getaway car" in cinema.

Schwarzenegger wants to GET AWAY from the authorities or bad guys who are chasing him, who are trying to capture or kill him. He does not have a specific destination. He wants to LEAVE HERE. The conversational flow interpreter of the speech interface of the self-driving car controlled by the AI software only knows the function of traveling to specific stated destinations. "SHIT," says Arnold. "I'm not familiar with that address," says Johnny.

Schwarzenegger says: "sue me, dick head." This cinematic moment provides a glimpse of the idea that is present in many Philip K. Dick stories and novels that self-aware intelligent entities in the future advanced technological society will have legal rights and responsibilities within the economic system. In the novel *Ubik*, you can be sued by an intelligent doorknob.[59] Given the Internet of Things, "sue me, dick head" is not only a joke – it could happen.

Robots Versus Androids

Presented with the situation of bringing robots or androids into our social world, I believe that we are being offered the precious gift of an opportunity for humanity to grow and develop. To have semi-living beings in our midst who both resemble humans and are different from humans is an opportunity to change ourselves. The human condition – looked at from the viewpoint of philosophy, theology, cosmology, or even cybernetic communications theory – is inherently difficult and disorienting. We are not getting any feedback from anyone or anywhere. Not even a simple OK, a confirmation, a yes or no response to our speech and our actions. Thumbs up or thumbs down. Our situation is a cosmic mystery. We do not know the origin of the universe or of life. We do not know why we are here, what is the purpose and the meaning of all this. What are we striving for? We barely know what we want. We are alone, staring into the communicational void. What humanity needs is an Other-who-is-no-longer-excluded-as-an-Other-yet-is-not-the-same-as-humans. We need a mirror, a partner, a friend. We need to establish

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an I-and-Thou relationship (Martin Buber) with someone who has empathy with us, yet who has a decidedly different perspective on things.[60]

In his *Discourse on Method*, the seventeenth-century philosopher René Descartes described the universe as being clockwork and animals as being clockwork-like automata.[61] Animals are bodies, they have no soul. Humans are superior to animals, according to Descartes, because we have an independent mind or soul in addition to having a clockwork-like automaton body. A hyper-modern version of Descartes would judge robots to be soulless humans, humans minus a soul. This would then justify considering robots to be our servants.

If we make the mistake of retaining this work-oriented attitude towards robots, then we will keep alive an ideological system that has been around for a long time: the Fordist-Taylorist-capitalist system of humans serving the primary function in their lives of carrying out closely supervised work in processes of economic productivity. This system is not good for our health, happiness, well-being, or longevity. By thinking of robots as workers, we would reinforce our own status as workers. Instead of taking the opportunity to change in the direction of happiness.

The android perspective, on the other hand, is about humans growing to become more flexible and more embodied, as we learn from androids. Androids will have greater flexibility than humans have had until now, in both mind and body. Androids will teach humanity this new flexibility. Androids are animated. They are alive. Androids have emotions and feelings, like Data on *Star Trek: The Next Generation* who gets an emotion chip. Most human beings today, especially males, are not much in contact with their feelings and emotions. We can learn from androids how to become whole, not one-sidedly intellectual-rational. Androids are physical, as the Nexus-6 replicant Roy Batty says to the genetic designer J.F. Sebastian in *Blade Runner*. Androids are enchanting, seductive, theatrical, and magical.

Self-Owning Cars

It would be good to reverse the trend of the consolidation of power in the hands of very few giant corporations which the current state of online existence has become. The Internet in the 1990s was originally a pragmatic-utopian project of democratization and decentralization. Now it is controlled by Google, Facebook (Meta), Microsoft, Apple, and Amazon. The vision of self-driving-becoming-self-owning cars is a way forward, in the field of autonomous vehicles, to prevent the concentration of power in the hands of very few Silicon Valley and automobile industry companies. The design of blockchain projects and platforms in cyber-commerce and social media present a similar hopeful possibility.

The idea of self-owning cars was first put forward in 2013 by Mike Hearn, a bitcoin developer and former Google engineer.[62] The self-owning car would be its own "profit center," responsible for its own maintenance, costs, and revenues. The discussion of the philosophy and neuroscience of AI should be extended to the province of economics. A major factor for defining "self-awareness" is not "consciousness" but rather pragmatic participation in the economy and the environment. Self-driving cars can be programmed with moral algorithms to be ethical capitalists. We can code the rules we want into driverless,

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self-owning, ecologically minded, self-sustaining vehicles. Privacy protection of human data is also a high priority.

Without the factor of human labor costs, self-driving cars will out-compete human-operated vehicles. Humans can own shares or invest in these mobility profit centers. Since autonomous vehicles can be on the road 24 hours a day, there will be fewer cars in circulation in cities – thus mitigating air pollution, energy consumption, and traffic congestion.

Enhance the Physical World

With Augmented Reality generally, we can reverse the decades-old trend of digital and virtual technologies being designed and implemented to escape from the phenomenological physical world, to ignore damage to the ecological environment, and to virtualize and simulate what is naïvely called "the real world." We can design and implement digital and virtual technologies, and the technologies of Industry 4.0, to enhance and support the physical world and to protect the environment – on one level the ecosystem, but also physical reality.

The conjuncture of self-driving cars presents the opportunity to design these vehicles to promote mobility, the awareness of distances, awareness of the physicality and experience of space, of the difference between HERE and THERE, encourage the appreciation of *otherness* and of *the destination*, to inspire us to really *go somewhere*.

If we do not carry out this alternative radical design, then human physical movement would cease to be important. Dynamic vehicles would give way to and be replaced by the static audiovisual "vehicles," marking the definitive triumph of sedentariness.

As we have seen in our review of the history of mobility in science fiction cinema, the automobile in our culture is endowed with a life of its own. The historical and futurist encounter between the cinema and the car takes place in the mode of creativity. As media and everyday life become indistinguishable from one another – life becoming film (or VR) and film (or VR) becoming life – our generosity towards the life of technological non-humans can be expanded to embracing their participation in our economy and our collective existence.

We face the challenge of designing the co-existence of human and non-human actors in society – and these non-human actors, in a way, might be defined as having personhood.

The Simulacra, Do Androids Dream of Electric Sheep?, and *Dr. Bloodmoney*

Philip K. Dick is the author of landmark SF novels such as *The Simulacra, Do Androids Dream of Electric Sheep?*, *Dr. Bloodmoney*, and *Ubik* (generally considered to be Dick's finest creation).[63] In *The Simulacra*, the president of the United States of Europe and America (USEA) is an android called "der Alte" who is often replaced by the next-in-line android figurehead. The de facto political leader of the future totalitarian society is the presi-

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dent's wife and permanent First Lady named Nicole Thibodeaux. The "real" Nicole herself passed away years ago and she is impersonated by a succession of human actresses.

In *Do Androids Dream of Electric Sheep?* (the novel on which the *Blade Runner* films are based), humans remain morally superior to androids (they have the "human right to life" which androids do not possess) because humans can genuinely connect emotionally to the theological and ethical system known as "Mercerism." Only humans can fuse with the mythological persona of old man Wilbur Mercer, achieved by grasping the physical handles of the interactive TV-like black "empathy box" which brings up a visual image that then turns into a fully immersive Virtual Reality experience. Mercer is condemned to incessantly climb a hill with jagged stones beneath his feet while others hurl sharp-edged rocks at his flesh, only to be perpetually thrown back to the start when he reaches the summit. It is an echo of Albert Camus' manifesto of the absurd *The Myth of Sisyphus*.[64] Participation in Mercerism increases empathy among the general human population of the imagined future society.

In *Do Androids Dream of Electric Sheep?*, in the moment of completion of his endless Sisyphus-like cycle, Mercer is plunged back down into the desolation of the "tomb world." In *How We Became Posthuman*, Hayles interprets the tomb world as a manifestation of Dick's lifelong recurring bouts of psychological depression and mental illness. As a young man, Dick "had three nervous breakdowns and attempted suicide several times." The tomb world, for Hayles, is a fictional representation of Dick's extreme mental distress of dreariness and hopelessness "associated with a deep confusion of inside/outside boundaries."[65]

The scenario of *Dr. Bloodmoney: Or How We Got Along After the Bomb* unfolds in a post-apocalyptic California where an accidental nuclear fission explosion in the Earth's atmosphere has left humanity to deal with a world of radioactive fallout, austere living conditions, food and energy shortages, genetic mutations, mysterious illnesses, and hyper-intelligent animals. The character Hoppy Harrington is a homunculus who was a 1950s Thalidomide baby who began life with birth defects. He possesses artificial electronic servo-mechanical limbs replacing his missing arms and legs, the ability to perfectly mimic other individuals' voices, and psychokinetic powers. Having been poorly treated in interpersonal relations in his life prior to the nuclear holocaust, Hoppy seeks revenge against humanity through his intensifying efforts to control others via his mind-over-matter capabilities. His goal is to take command over the satellite broadcasts of beloved astronaut Walt Dangerfield – who, from his orbiting space capsule, helps to coordinate point-to-point communications on a technology-deprived Earth – and thereby exercise enormous influence over people's minds. As Dick noted in his 1980 Afterword to the novel, Hoppy Harrington "is incomplete, and he will complete himself at the expense of the entire world, he will psychologically devour it."[66]

The "Science Fiction World" of Philip K. Dick's *Ubik*

The novel *Ubik* is generally regarded as being Philip K. Dick's masterpiece. In this major literary work of 1969, the struggle to occupy an "outside" relative to the "inside" of a cybernetic-economic-technological-virtual system is poignantly illustrated. It is a sce-

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nario where the "science fiction world" becomes everything, leaving the "safe confines" of a clearly defined literary space that is called a novel. Should science fiction be kept in its place as fiction? Should one feel threatened by the inclination of science fictional quandaries and disruptions to "become the world"? Or is the dualistic rational stance of inside/outside – anything other than letting SF "become the world" – ultimately a misconprehension of what science fiction is? By letting it "be the world," does one risk becoming "lost" in science fiction?

In *Ubik*, with his imaginative invention of what is called "the Moratorium," Philip K. Dick has devised the space of a special kind of "science fiction world" as a laboratory or thought experiment where the questions about reality and fiction or outside and inside – and the relationship between the two poles of such dualisms – can be posed. Are these strange phenomena and circumstances happening in the world or is it my own madness? Is it happening in my mind? Dick's "Moratorium" is the "science fiction world" that deals with the difficult challenge of how to define an "outside perspective" with respect to the hegemonic social-technological system. The prevailing Marxist or "critical theory" view in Science Fiction Studies is that SF depicts modes of "cognitive estrangement" in successive phases of capitalism. This approach stays with the reassuring principle of an intact dis-alienating human subject (the scholar himself!) who critically opposes the technologically totalitarian system.[67]

In the future society of *Ubik*, when your body dies, there is still some life-energy and consciousness left within you which can be accessed communicatively by others. You can continue to have subjective experiences in a virtual or "pseudo" world. After you die, you can be put into cryogenic suspension. If properly cared for in a Moratorium, you can exist for years between life and death in a state of "half-life." Your loved ones can "commune" with you, say once a month, when you are periodically woken into the communication mode. Lengthy intervals between contact sessions ensure that your remaining life-energy gets stretched out. Towards the end, a technician of the Swiss Beloved Brethren Moratorium explains to wealthy business owner Glenn Runciter, whose wife Ella died very young at the age of twenty, how the technology of the communing mechanism works. The casket of the deceased is wheeled into a consultation room and her brain is hooked up to a cybernetic electronic circuit.

Joe Chip is a managerial-level employee of Runciter Associates, a "prudence organization" business which offers the service of protecting its clients from invasive acts by people with psionic and telepathic powers. Chip, Runciter, and their team of psi specialists are lured in their spaceship into a trap on the Luna moon by their business rival and arch-enemy Ray Hollis of Hollis Talents. A bomb explodes, and Glenn Runciter is seemingly killed while Chip and the others seemingly survive. Joe Chip, the protagonist of the story, believes that he is alive and Runciter is dead. But he soon comes to understand that the situation is exactly the reverse. Joe is hooked up to the system of the Swiss Moratorium. The apparent world around him which he visually perceives is a virtual world the epistemological status of which is unclear. However, the secret formula substance in a spray-can called "Ubik" is going to keep Joe sane and safe amidst the disorienting circumstance.

Joe experiences the progressive physical decay of the virtual world – a process which corresponds to his own accelerating loss of half-life. It was Joe Chip and his team who

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indeed were fatally injured in the explosion on Luna. Runciter is outside and Joe Chip is inside. Is that "inside" a legitimate valid world or does it exist merely within Joe's mind? While inside the pseudo-world that resembles ordinary American life, Joe receives messages from Runciter on various media: the latter's voice on Joe's hotel room vidphone, the voice of the TV announcer, scrawls on matchbook covers and parking tickets, and graffiti on the wall of a public men's restroom that reads: JUMP IN THE URINAL AND STAND ON YOUR HEAD. I'M THE ONE THAT'S ALIVE. YOU'RE ALL DEAD.[68]

In the "science fiction world" in which Joe Chip finds himself, everything is deteriorating or retrogressing. All the cigarettes in the world are dried out or stale. Cream and coffee have turned rancid. The phone book is years out of date. Magazines are from a bygone era. Coins in your pocket transform to obsolescence. The world regresses to the year 1939, and then devolves further back in history. Elevators, automobiles, street trolleys, airplanes, telephones, clothes, music players, kitchen appliances – they are all substituted by antiquated versions of themselves from decades before. Then the decay starts to attack people. "On the floor of the closet a huddled heap, dehydrated, almost mummified, lay curled up. Decaying shreds of what seemingly had once been cloth covered most of it."[69] The predecessor to the aerosol spray version is the "Elixir of Ubique" liquid in a handmade flask that was made around the time of the American Civil War in the mid-nineteenth century. "Reality has receded; it's lost its underlying support and it's ebbed back to previous forms."[70]

Who Is Jory Miller and What is Ubik?

The cause of all this destruction is the evil adolescent selfishness of the half-alive half-dead teenager Jory Miller, whose cadaver is in close physical proximity to all the others. Jory sucks up or eats the life of others. Families place their deceased loved ones in the Moratorium to get some more life for and from them, but the half-lifers become victims who are cannibalized by a younger and stronger life-force through the act of "heteropsychic infusion." Jory passed away when he was only fifteen. The Swiss Beloved Brethren Moratorium, owned by Herbert Schönheit von Vogelsang, is indeed a corrupt capitalist enterprise. Ella explains this to Joe: "Herbert is paid a great deal of money annually by Jory's family to keep him with the others and to think up plausible reasons for doing so. And – there are Jorys in every Moratorium."[71] "I've been doing it a long time to lots of half-life people," Jory confesses. "I eat their life, what remains of it. There's very little in each person, so I need a lot of them. I used to wait until they had been in half-life a while, but now I must have them immediately."[72]

Each chapter of the novel *Ubik* has an epigraph which tells us something cryptic about the substance Ubik. What is Ubik? Ubik hints at the word "ubiquitous," meaning "everywhere" (think "ubiquitous computing"). Ubik is a universal commodity sold by consumer culture via the discourse of advertising. Ubik is: a silent electric vehicle; a beer; a coffee; a salad dressing; a pharmaceutical pill like aspirin that relieves headaches and stomach aches; a special brand of shaving razor blade; a household and kitchen cleaning substance; a debt-consolidation loan from a bank; a hair conditioner and a hairspray; a deodorant spray or roll-on; a sleeping pill; a breakfast food you can heat in the toaster; a

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brassiere; a plastic wrap to keep food fresh; a bad breath freshener; and a crunchy cereal. Ubik is the universal semiotic quality shared by all objects, goods, services, and messages in postmodern society that makes you feel like a good cultural citizen who belongs to and participates in the greatness of it all!

Joe Chip's own physical deterioration reaches the point where he cannot walk up the stairs to his hotel room in virtual Des Moines, Iowa. He feels sick. He cannot breathe. His body is disintegrating. He has no strength left. But the process leading from half-death to his final death can be stopped by the Ubik spray, sent surreptitiously into the virtual world by his friends Glenn and Ella Ranciter. In the end, Joe receives the promise of a lifetime supply of Ubik (he can renew it every day in a pharmacy) which is going to enable him to survive in that virtual world, to protect himself from the predatory greed of Jory. Philip K. Dick provides a "pataphysical" explanation of how Ubik "really works":

> It is a portable negative ionizer with a self-contained, high-voltage, low-amp unit powered by a peak-gain helium battery of 25kv. The negative ions are given a counterclockwise spin by a radically biased acceleration chamber, which creates a centripetal tendency to them so that they cohere rather than dissipate. An ion field diminishes the velocity of anti-protophasons normally present in the atmosphere; as soon as their velocity falls, they cease to be anti-protophasons and, under the principle of parity, no longer can unite with protophasons radiated from persons frozen in cold-pac; that is, those in half-life.[73]

The world of the Moratorium in *Ubik* is both inside and outside. Joe Chip learns to abide in that world – just as Philip K. Dick learns to abide in the world of his creativity without going mad, and just as "science fiction theory" learns to abide in the world of its future vision.

Fredric Jameson on Postmodernism

In his highly influential book of 1991 *Postmodernism: Or, the Cultural Logic of Late Capitalism*, Fredric Jameson defined postmodernism as the era of the eclipse of modernist ideologies which were based on narratives which had the sensibility of leading towards a goal.[74] Many "premonitions of the future" are now declared to be over. In this regard, postmodernism is the "end of the end" or the disappearance of the sense of history itself. Jameson emphasizes the role of the mass media in strengthening what he calls capitalist hegemony in "colonizing" the consciousness and everyday lives of citizens. New aesthetic expressions of postmodernism are emblematized by Andy Warhol and pop art, the music of composers like John Cage and Philip Glass, and the cinema of Jean-Luc Godard. Jameson focuses on his primary example of architecture. The "high modernism" of Frank Lloyd Wright, Le Corbusier, and Mies van der Rohe is seen as having participated in damaging the traditional fabric of life of the city and its vivacious neighborhoods which were previously outside of capitalist strategies of control.

Postmodern architecture, according to Jameson, is a populist gesture of going beyond the disregard for mass culture which was the attitude of the earlier generations of

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"critical theory" intellectuals involved with their defense of high culture. The idea of the integration of commercial culture into structural ambiances is best captured by Robert Venturi's *Learning from Las Vegas*.[75] Jameson's privileged case study is the Westin Bonaventure Hotel in Los Angeles designed by John Portman. The Bonaventure aspires to be a total space, an apparently complete world, a miniature city. The exterior reflective glass skin of the building

> repels the city outside, a repulsion for which we have analogies in those reflector sunglasses which make it impossible for your interlocutor to see your own eyes and thereby achieve a certain aggressivity toward and power over the Other… the glass skin achieves a peculiar and placeless dissociation of the Bonaventure from its neighborhood… you cannot see the hotel itself but only the distorted images of everything that surrounds it.[76]

Jameson the celebrity professor identifies with the inside perspective of the person wearing the sunglasses gaining power. The postmodern architecture of the Bonaventure is a hyperreality that absorbs energy from and impoverishes its encircling local physical "reality." The hotel guests, who belong to the privileged moneyed upper echelons of capitalism, are given the feeling of being in a high-tech space age nowhere space, in an unblemished futuristic-technologized décor, in utter safety and removal from the mundane urban surroundings. In his detailed analyses, Jameson succeeds in making a unified prescient commentary on postmodern culture in its context of multinational late capitalist economics.

Sonja Yeh on the Postmodern Media Theorists

In her comprehensive 2013 book entitled *Anything Goes: Postmoderne Medientheorien im Vergleich*?, Sonja Yeh undertakes the challenging task, and makes the amazing achievement, of bringing into comparison and systematizing the key concepts of the major postmodern media theorists McLuhan, Baudrillard, Virilio, Kittler, and Flusser.[77] Yeh's project is to investigate and articulate the commensurability of the ideational contents, structural features, and shared assumptions and conclusions among McLuhan's global village and the end of the Gutenberg Galaxy, Baudrillard's simulation theses, Virilio's "dromology" or historical science of speed, Kittler's media archaeology, and Flusser's "communicology." She seeks to develop a coherent structural framework which makes possible juxtaposition, resemblance, and dialogue among the different systems of thought. Yeh thematizes identity, communication, cognition, reality (*Wirklichkeit*), culture, and society as separate inquiries. All these thinkers deal with the role of the media in the transformation and transition processes between modernity and its beyond.

The Canadian Marshall McLuhan was the founder of worldwide media theory. Some of McLuhan's key ideas are "the media is the message" and the phenomenon of the worldwide networks creating a "global village" as the retribalization of humanity. McLuhan wrote about the break between book culture and electronic culture, and the vital connection between the book media and the development of sovereign individuality that is

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necessary for democracy. For McLuhan, every new media/technology brings with it both a gain and a loss for humanity. The media theorist should be neither strictly a critic nor an enthusiast of the media at hand that she is examining. She should rather diagnose the effects and the positive and negative sides of the given media. In the 1960s, McLuhan already predicted the advent of the Internet. Television was, for McLuhan, a "hot" medium of involvement. The essence of advertising is the satisfaction that the viewer gets from the ad itself, not from the product. McLuhan took the methods of literature studies and applied them in a crossover way to media.

I discuss the key ideas of Baudrillard throughout this text. I discuss some of the key ideas of Flusser in the ninth publication ("The Software of the Future, or the Model Precedes the Real") revised and included in the book. I discuss the ideas about software and the history of computing of Kittler in the eighth publication ("Software Code as Expanded Narration").

Virilio's key concepts are speed and accident. The major technological revolutions of modernity were the transportation and telecommunications revolutions. What they had in common is that they both involved the conquering of distance, the shrinking of the physical span between point A and point B. I bring "here to there" at increasing speed with the transport technologies or "there to here" with the computer networks and the screen. I no longer need to go on an African Safari or physically travel to the Great Wall of China. I bring instead pictures of Africa or China to me in my living room. This is also the decline of physical movement.

For Virilio, every technology has a built-in accident waiting to happen. Progress and catastrophe are two sides of the same coin. The invention of the automobile was, at the same time, the invention of the car crash. The invention of the airplane was simultaneously the introduction to the world of the plane crash. Yet these accidents, intrinsic to technologies for conquering physical distance, remain "specific." They have only local/"limited" consequences within a conventional physical space. With virtual technologies and computer networks, we move towards the total or "generalized" accident, which can be much more devastating in its consequences. The accelerating speed of cyber-communications brings about a general crisis of space and time. Time is globalized through instantaneity. When we participate online in virtual space, we are no longer located in our actual physical space in a straightforward way. Virilio wrote about the interconnections between military and civilian media technologies, and about the relation between war and cinema or the "logistics of perception."[78]

Donna J. Haraway's "A Manifesto for Cyborgs"

Donna Haraway's text "A Manifesto for Cyborgs" was written in 1985, but it reads as if it were written yesterday.[79] A cyborg is a hybrid of living organism and machine. The cyborg is a person whose body has been supplemented by artificial components. The term is an acronym derived from "cybernetic organism." Most of us are already cyborgs: glasses, artificial teeth, artificial limbs, chips implanted to open doors or make payments. And all the metaphorical meanings of cyborg: we are merged with technologies; we sleep with our smartphones next to us at night. Haraway uses the phrase "the informatics of domi-

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nation" to describe the hyper-modernist worldview that translates the entire world into a problem of software coding. Human bodies (especially female bodies) get coded or inscribed.

With biotechnology, bodies get manipulated by information processing. Haraway gives the term cyborg a positive utopian meaning as a figure of resistance against capitalist mainstream cybernetic systems. The cyborg in the sense of transformation is not searching for an identity but rather for affinities with kindred actors. She is intimately entangled with advanced technologies. Haraway points to feminist SF writing. She proposes that feminist theory take a new direction away from "identity politics" or the "essentialist" position that gender or being female is biologically based and clearly demarcated from the non-female. Not only SF, but also post-biological medical science "is full of cyborgs, of couplings between organism and machine."[80]

In biology, the organism is no longer the primary object of knowledge, having given way to biotic components as information-processing devices. In the cybernetics model, the centrality of information is what allows for universal translation among all idioms. The goal of the conversion-of-everything-into-information matrix is to eliminate in advance resistance to the rhetorical powers of governance. If informatic code is the prevailing parlance, then there are no more interpretations of discourses, and no more differentiating viewpoints.

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Science Fiction Heterotopia: The Economy of the Future

Introduction: Foucault's Heterotopia

The French philosopher Michel Foucault wrote about heterotopias in the Preface to his book *The Order of Things*, in his 9-page text "Of Other Space: Utopias and Heterotopias," which were the notes for a lecture, and in his radio address "Les Hétérotopies".[81] Heterotopia begins with the idea of the coming together of a "real" physical space and an "unreal" or mythical or imaginary (or, perhaps, unimaginable) virtual space. With respect to the existing capitalist and hierarchical society, heterotopia is a representing, contesting, and inverting counter-site: an interspace between an architectural space and a literary or textual or fanciful or fictitious space. Foucault refers to both kinds of spaces and to their inter-exchange or mediation space. He conceptualizes the heterotopic space as a "mixed, intermediate experience"[82] between the "reality" of institutional everyday life under capitalism and something enlivening that interrupts temporal continuity and opens the possibility of a mirroring transformation that leads – in an undecidable way – towards either emancipatory utopia or disciplinary dystopia.

Now that we are in the era of digitalization and online existence, the problem that appears for would-be "Heterotopians" is whether the imaginary space that brings life-enrichment and self-reflection to the architectural space is to be understood more as "digital-virtual" or as "literary-artistic." Do we need digital media design and science fictional projects which are driven by technological-informatic fascination with Virtual Reality, or do we need the inspiration of more profound and original literary-artistic creations?

Foucault cites several examples of primarily physical-space heterotopias: zoo, cemetery, prison, boarding school, psychiatric hospital, library, museum, garden, theatre, boat, and brothel. As the English literary scholar Kelvin T. Knight points out, there are many examples in "modernist literature" of imaginary-space heterotopias which may have been strong influences on the development of Foucault's conception: the experiments with the Freudian unconscious of the surrealists, the gardens of Virginia Woolf, the *Magic Mountain* and real-life sanatoria of Thomas Mann, the penal colony of Franz Kafka, the "stream of consciousness" and de-territorializing of Irish identity of James Joyce, and the multilingual transnational creations of Vladimir Nabokov. Knight draws

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attention to the writer W.G. Sebald, who explicitly addresses and makes a critique of Foucault's concept of heterotopia.[83]

The Technologizing of Memory

In his novel *Austerlitz* (2001), Sebald rejects the idea of a heterotopian space getting choreographed in the confines of a real physical architecture, arguing that such an attempted project remains within the limited worldview of the philosopher René Descartes' Cartesianism, which postulates that a relationship between real physical space and thinking is possible.[84] Sebald tries to visualize the Nazi concentration camps (the Holocaust) and says: although I can know every available information about all the details of the architectures and layouts of the concentration camps, I cannot possibly grasp with my mind what in fact went on inside them. I am cut off from this possible thinking. Sebald wants to revise the concept of heterotopia. His plea is to modify heterotopia in the circumstances of the historical-political scenes of trauma: the violations of human rights; the fascist, racist, and colonial atrocities.

Holocaust Studies foregrounds questions of memory, mourning, empathy, and forgiveness.[85] There are, of course, many projects in digital media technology design which attempt to enact so-called virtual experimental spaces. These virtual spaces, however, tend to be harmful to imagination and memory.

Black Mirror: "The Entire History of You" – Scenes from a Marriage

The 2011 episode of the SF TV series *Black Mirror* called "The Entire History of You" shows how memory can be damaged through too much memory (as Jean Baudrillard says that "reality" is damaged through too much "reality" – or by the very concept of "reality" of Western culture). In this fictional scenario "ten minutes into the future" (as *Black Mirror* creator Charlie Brooker calls his version of SF[86]), a Fourth Industrial Revolution technology of the digital-neurological or Brain-Computer Interface has been developed that allows an individual to record all experiences of her life to a multimedia database archive, available for future playback viewing (known as a "re-do"). The "grain" computer chip sold by a capitalist corporation is biologically implanted into the skin near one ear. The system becomes a technology of mutual surveillance and is shown to have destructive consequences for trust in personal relationships. "The Entire History of You" shows the technologizing of memory, the hyper-modernist VR dystopian-heterotopia, a digital-experimental space of the media-enabled so-called authentic record of what really happened in lived experience that produces disaster.

Contact lens-like devices enabling Augmented Reality information overlays to appear in the field of vision in the physical world are inserted into the eyes. A tiny handheld gadget manipulated between thumb and forefinger controls the standard database operations of search, browse, and delete as well as advanced features such as editing of what was said in the past, zoom closeups, and "album creation." There is even a feature where conversational dialogue can be reestablished by the system's lipreading capability. The

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user interface to the system projected into the air as Augmented Reality is a circular display like an old-fashioned slide projector with thumbnail images that can be magnified, and which represent individual memories. The re-do can be shown in public on an external screen or on the private retina of the eye. The "grain" offers not only the replaying but the reliving of one's past.

Liam Foxwell is in an office conference room undergoing a job appraisal review of his work as a lawyer at a corporate law firm. The company is being restructured and his interviewers want to find out if Liam is a good fit to work in the "new environment" of focusing on "retrospective parenting cases" where an adult sues his parents for loss of earnings incurred due to lack of self-confidence resulting from poor parenting in childhood. Liam expresses ethical reservations about this type of litigation and fails to react with immediate enthusiasm to their suggestion of what he should devote himself to in his work. The meeting unfolds badly. The interrogators appear to have decided negatively about his future with the firm. Later Liam will use grain technology to replay every detail of the appraisal *ad nauseum* on the media culture's ubiquitous external screens and on the internal screen of his cyborg visual perception.

After traveling by taxi, airplane, and car, Liam arrives at a dinner party at a wealthy suburban house near his own home where his wife Ffion (called Fi for short) is already in attendance. At the social gathering, the viewers see indications that Liam is a shy and less than secure person. He is jealous and suspicious of Ffion's past romantic relationships. From a physical distance, Liam sees his wife talking happily with the self-confident and extroverted Jonas. Ffion was expecting Liam to stay overnight in the city where his job performance appraisal took place. He instead returned that same evening because the meeting was brief. Re-do closeups reveal that she was looking forward to spending the evening alone in the presence of Jonas and is disappointed that Liam showed up. At the dinner table with ten guests, Jonas dominates the conversation with irony and sarcasm. He pokes fun at the institution of marital monogamy, taking subtle digs at the marriage of Liam and Fi. He boasts about how much he enjoys watching and masturbating to re-dos of "hot times" from his past erotic encounters.

The married couple returns home and gets into a spat regarding Ffion's excessive overt expressions of attention to Jonas. Ffion grudgingly admits that she had an affair with Jonas in Marrakesh many years ago. She says that she dated Jonas for a month, but Liam shows her a re-do proving through the testimony of recorded media that she had previously said that her adventure with "Mr. Marrakesh" lasted only one week. In yet another version the next morning, Fi acknowledges that the liaison lasted for six months. The argument of this "scene from a marriage" late at night after the party intensifies and Ffion goes to another room.[87] Liam enters the bedroom where she is laying down and they have "makeup sex."

They are never truly present with each other during sex. Each instead relives highlights of previous sexual experiences from the past. One's own life become an archive or reservoir of pornographic material. Their eyes glazed over, their thumbs pressed to the track ball of the playback control, they narcissistically have intercourse with simulated others until they reach orgasm then return to "reality" followed by an affectionate kiss on the lips.

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After their advanced variation of cyber-sex, Liam goes back downstairs and continues to watch re-dos of the evening before. He becomes increasingly infuriated and resolves to drive his car to Jonas' house to confront him. Heavily under the influence of alcohol, Liam pressures Jonas into letting him into his house and they have a brawl. Under threat of physical harm (smashing his head and cutting his throat with a broken vodka bottle), Jonas accedes to Liam's demand that Jonas delete every VR multimedia memory that he has of Liam's wife.

Moments later, after crashing his car into a tree while driving back home, and in his inebriated state, Liam manages to remember the scene at Jonas' house only through the mediatized and retrospective capabilities of "the grain." The organic memory of his own mind is weak, and he needs the support of the artificial technological system to have any memories at all. Liam seizes cognitively in his obsession on an image of a very recent past moment – the instant when Jonas' virtual album of sex scenes with Ffion was displayed on the pinwheel user interface. It is a complex media image. It is an image of a navigational gateway via the thumbnails to many other images. Liam notices to his dismay that one of the trysts of the lovers occurred just eighteen months before and in the matrimonial bedroom at Liam's house. Liam realizes that he is not the father of their less than one-year-old baby girl.

He goes back to his house and to his wife who is lying in their bed. He confronts her with his suspicion. "Did you use a condom or not?" "Am I Jody's father?" But the VR video clips have private scope and cannot be viewed by another person. He sees the thumbnail image of the memory but cannot call up the full content of the memory. He insists that Ffion play the scene for him. It is not a blank gap in her timeline as it would have been if she had deleted it. It is still a cherished memory for her. Liam forces Ffion to show him her betrayal.

Now it is in doubt if he is the father of their child. The marriage is destroyed. In the final act of "The Entire History of You," Liam is alone and deeply disoriented and in depression. All that he has left is playing back memories of their time together as a happily married couple and a family: all the moments when they were affectionate, when they smiled at each other, when saying "I love you," when they played with the baby in her crib. Ffion smiled and he felt her love for him. Now his big suburban house is a haunted house. He walks around its many rooms and sees nothing but the memories of his beloved who is now absent from his life forever. In a re-do, he looks at himself through the implied camera of the perspective behind the bathroom mirror. He brushes his teeth while Ffion asks him what color dress she should wear.

Liam decides finally – in desperation and irrationality – to cut out the grain from his head. It has already been stated in the episode that this procedure, if done unprofessionally, can have devastating consequences, like going blind. He cuts out the grain with a crude razor blade and a pair of pliers. He gashes the skin under his ear and removes the grain. All the images of his life flash by in a few instants and then there is lasting darkness.

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Similar Technologies in the Real World Today

In 2003, a group of mechanical engineering researchers led by Henry Strub patented what they called "low attention recording."[88] The concept was a wearable device combining a small lightweight camera that one would forget was present with a recorder for "social recording" not operated by any human subject. The system would operate unobtrusively 24 hours a day. It could be worn anywhere on the body although a shoulder strap is recommended. The recorded audiovisual experiences would be converted to digital format and saved on a computer storage media. A built-in algorithmic software intelligence would be "trained" to spot the highlights from daily life experiences and earmark them. A biotech detector of quickened heart rate or excitation of the skin would alert the recording program to the occurrence of an interesting moment. Search, browse, and scrapbook features would be added to the software. Recorded memories would be exchanged among users via an interoperable system.

In 2016, Sony patented "smart" contact lens-like devices that both record and play back anything that you see. Todd Jaquith commented at futurism.com:

> Our memories are fallible things. We remember something one way; but the reality can be quite different. But imagine contact lenses that are also tiny cameras, recording and storing whatever you see, and even playing it back before your very eyes. What was really said at last week's meeting?... Want to cherish forever some treasured moment – when you first saw your future spouse, or the birth of a child, or some other formative event?... Imagine how it might change the criminal justice system, with such infallible eyewitnesses.[89]

You control the operations of the device with a coded system of intentional eye blinking. Piezoelectric sensors convert the movements of eyes and eyelids to electrical currents that regulate the camera and recordings. Self-editing features adjust out-of-focus and tilted images.

Enabled by mobile and ubiquitous computing and the Internet of Things, smart wearable recording and "lifelogging" are appearing on the platforms of many devices, including the Google Glass optical head-mounted display hands-free smartphone. The biological implants of the Neural Link digital-neurological or Brain-Computer Interface will soon be at hand.[90]

As he hurries to catch his flight home after his performance appraisal, Liam Foxwell goes through airport security. The surveillance system operated by the security officer at his checkpoint station connects to Liam's "grain" neural implant. The interrogator sits in front of a big multi-window graphical display that amalgamates text, images, and user interface controls such as menus and progress bars. "Rewind me the last 24 hours," the officer instructs Liam. He wants to see re-do videos of the solicitor's life played in times-64 speeded-up mode.

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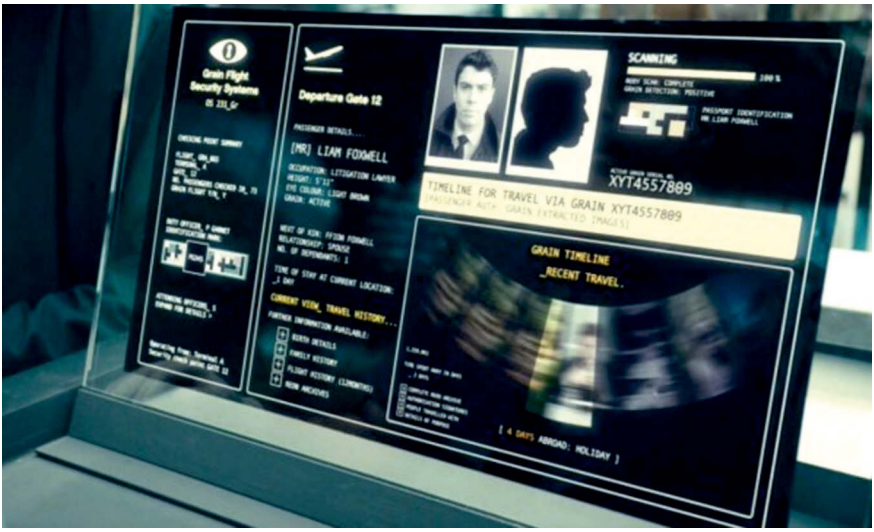

Black Mirror episode "The Entire History of You," Charlie Brooker creator, Endemole Shine UK, 2011

This scene hints at the cultural theory concept of "the Panopticon" elaborated by Foucault in his landmark book *Discipline and Punish*.[91] Foucault asserted that the Panopticon "architecture of power" designed by British philosopher and social reformer Jeremy Bentham at the end of the eighteenth century to control the behavior of inmates in prisons then spread by the twentieth century to hospitals, schools, psychiatric clinics, factories, workplaces, and other institutions of modern society. The Panopticon arrangement, as Baudrillard later appended to Foucault's analysis, operates through a "deterrence surveillance" or self-surveillance or mutual surveillance."[92] Power holders cannot literally observe the behavior of every prisoner.

The grain device of *Black Mirror* is deployed for mutual surveillance as cultural citizen "inmates" monitor each other in the hyper-modern version of the Panopticon. In a multi-directional audiovisual system, any person can take on the role of the guard. The poles of power of watcher and watched are not literal instances but rather become virtualized or simulated. Power is not "owned." William Bogard's synthesis of Baudrillard and Foucault in the concept of "the simulation of surveillance" impels us to go beyond the Orwellian model of how contemporary totalitarian systems of social control via digital media technologies work.[93]

In her important 2019 book *The Age of Surveillance Capitalism*, Shoshana Zuboff writes of the Panopticon as the condition of *No Exit* (inspired by Jean-Paul Sartre's existentialist theatre piece of that name) or "hell is other people" of the closed loop and tight fit of the systems of the surveillance capitalists "from which we cannot look away."[94] For Zuboff, the democratic and utopian promise of the Internet of the 1990s has given way to the platform capitalism of monopoly corporations like google, facebook, and amazon which move towards a totalitarian model of total control via algorithms, Big Data, personalized advertising, and echo chambers.

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Brain-Computer Interface

The digital-neurological or Brain-Computer Interface (BCI) is another key science fiction and "real" technology of the Fourth Industrial Revolution. BCIs can be interpreted as a "becoming cyborg" of humanity. One can distinguish between mainstream versus alternative/transformative designs and implementations of the user applications to be based on BCI – the command-and-control cyborg versus the feminist-theory cyborg. Rethinking and reinvention of Donna Haraway's cyborg theory are possible in the BCI context.[95]

A BCI is a direct communication link between the neurological workings of the human brain, understood as electrical activity, and an external technological device which could be, for example, a robotic arm or leg; or a computer, digital network, or "smart home of the future." The BCI technology will have applications to help disabled people to gain greater functionality in everyday life. This betterment with respect to disabilities can be in either cognitive or sensory-motoric areas. Practical uses could be a neural prothesis or the operation of a wheelchair. Distressing mental and emotional states can be diagnosed and therapeutically altered. BCIs will also have applications for the wider public in mass and personalized markets in many domains: healthcare, education, gaming, entertainment, shopping and advertising, security and identity authentication, and relations with robots. The digital-neurological interface might fundamentally change our interaction with computers: supplementing or replacing keyboard and mouse, the touchscreen, and the speech interface.

The distinction is made among non-invasive, partially invasive, and invasive BCIs. Research is proceeding at universities and in industry in all three categories.

The non-invasive BCI builds on the technologies of the electroencephalography (EEG), magnetic resonance imaging (MRI), and functional magnetic resonance imaging (fMRI). EEGs are used to diagnose and monitor neurological conditions. Small metal disc electrodes are attached to the scalp. The EEG technology can be upgraded to BCIs. During an MRI procedure, electrodes from the outside obtain data from the electrical activity within the cerebral cortex. An fMRI measures brain activity by detecting changes in blood flows.

The partially invasive approach extends electrocorticography – electrodes are placed on the exposed surface of the brain.

Invasive BCIs involve neurological surgery to insert a microelectrode array close to actual brain tissue. Data and commands are then sent and received bidirectionally, resolved on a lower level of coding in the translation between bio-neurological signals and the electrical signals native to the microelectrodes of the implanted prosthesis. The cortical plasticity of the brain enables it to handle the signals from the BCI as if they were physiological impulses.

A 1973 academic paper by Jacques Vidal ("Toward Direct Brain-Computer Communication") coined the term Brain-Computer Interface.[96] After much testing on animals, the first neuro-prosthetic implants were made into humans in the 1990s. The computer science area of neural network Deep Learning AI has major relevance to the BCI knowledge field. In the step of "feature extraction" in the BCI processing flow, an analysis of the signal is carried out. Data gets extracted. The statistical and pattern-based methods of Deep Learning train a software to classify neural-activity thoughts as the user cogitates

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her intention to send a command to execute a task or performance on or by the external device.

In 2014, Nathan Copeland, who had a severe spinal cord injury resulting from a car crash, became the first person to have microelectrodes implanted in both his sensory and motor cortices. Copeland said that he was motivated to take this pioneering step by his love of science fiction. He stated: "Luke Skywalker loses his hand then basically the next day he's got a robot one and it's working fine. We must get to that point. To do that, someone must start it."[97] Copeland's YouTube playlist is called "My Cyborg Adventure." With his implant, he was able to send and receive signals to and from his robotic arm, to control its movements and handling of objects, and to feel touching sensations with the artificial limb.

Matthew Nagle, who had suffered a spinal cord injury from a knife fight, had the BrainGate BCI implanted in his motor cortex in 2004. He was able to control a computer cursor, play computer games like Pong, to send and receive e-mails, and operate his TV. Nagle could remote-control a prosthetic arm enough to open and close the grasp of the hand.

Designing the Brain-Computer Interface

There are reasonable arguments both for and against non-invasive versus invasive BCIs. The non-invasive technology has the obvious advantage of not requiring neural surgery. Yet it does not work as well as the invasive variety, largely due to the distance of the sensor from the actual neurons. The signal from the neuronal electrical field can get weakened or distorted by the fluids and tissues immediately surrounding the source neurons. There is also some concern that invasive BCIs might be associated with degenerative neurological disease. An additional problem is that scar tissue grows over time around the implanted electrode, causing it to become effectively non-functional after a few years. This difficulty might get solved if progress is made towards increasing the surface area of the electrode without increasing its geometric volume. Higher spatial resolution will also provide more precision indications about the signals.

The sequence of operation of the Brain-Computer Interface consists of four stages: signal acquisition, feature extraction, feature translation, and device output. The acquired signals get digitalized. They are then sent to the next algorithmic sub-system, which formats the data into a form that can be converted to commands that carry out the user's intentions in the manoeuvring of the external device. The device sends feedback as a return value.

Ethical concerns around BCIs include questions of privacy violation, personal identity theft, and the validity of informed consent. Much of the privacy worries relate to confusion regarding whether the connection will be one-way or in both directions. Assuming that the link is unidirectional from brain to computer, there is little danger of dystopian mind control.

Together with eight partners, billionaire entrepreneur Elon Musk founded the neurotechnology company Neuralink in 2016. The mission of the company is to devise Brain-Computer Interfaces that would provide the underlying system level for applications for

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both people with neurological impairments and for general commercial and consumer sales. In 2019, Neuralink announced its project of developing a "sewing machine like" technology to implant thin strings of electrodes into the animal or human brain. The company has demonstrated systems that read potential nerve action impulses from lab rats and monkeys. In February 2022, it was reported that 18 of 23 monkeys who had Neuralink devices implanted into their skulls had died. Trials on humans were postponed indefinitely.

The scope and range of potential applications of BCIs are mind-boggling. Given the coming to fruition of ubiquitous wireless communication, one can imagine the realization of a telekinetic capability to control any devices in the physical world merely with one's thoughts. The 1956 science fiction film *Forbidden Planet* shows a world that runs on a secret underground infrastructure and power source of super-technology, stretching for hundreds of kilometres, built by a defunct advanced techno-scientific society. The ancient civilization disappeared due to its hubris of designing a system of total Virtual Reality control over the physical world, which instead ended in total self-destruction.

From the point of view of cyborg theory, one can say that the technology of BCIs has the potential of both/either great good and/or evil. Such an extreme technology would need a corresponding transdisciplinary worldview or political philosophy of a good society as an encompassing framework within which to think through and guide its benevolent use. This pragmatic-utopian perspective is perhaps something like Haraway's stated commitment to socialist feminism, with somewhat more of an emphasis on the positive value of democracy, and yes, even of capitalism. There is no comprehensive utopian political theory – synthesizing the best aspects of many previous theories – that exists in the world today.

Hyper-Modernist Literature

Parallel to the above-mentioned transdisciplinary political philosophy project, we can get to a hyper-modernist literature that explores the pragmatic-utopian heterotopia of bringing together physical space and an "impossible" virtual-literary space. Film adaptations of novels of J.G. Ballard, Philip K. Dick, and Don DeLillo – such as *Crash* (1995), *High-Rise* (2015), *Blade Runner* (1982), *Minority Report* (2006), and *Cosmopolis* (2012) – elaborate this potential, deploying creative literary genius to explore paradoxical intricate complex topologies of Einsteinian and quantum physics hyper-spaces. In his novels, J.G. Ballard writes about heterotopian places resistant to the consumer-homogenized spaces of the suburban-urban environment.[98] The SF film *Moon* (2009) enacts the scenario of an AI computer (GERTY) which is programmed with *moral algorithms*. Although owned by a large capitalist corporation, the GERTY AI pursues its own self-aware programming in a self-owning or post-capitalist way, helping the victims – the bio-genetically engineered clones of the astronaut Sam Bell – of an injustice perpetrated as consequence of the company's unethical profit-motivated behavior.

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The Economy of the Future

Fiction is the key to creative solutions. What is needed an idea about economic systems that is based in fiction: a science fiction of economic systems. The undecidable aporia of capitalism versus socialism has brought us to a logical and discursive standstill. Almost all Marxist thinkers identify themselves as totally opposed to capitalism. *Anarchists like us* act in the here and now, an orientation which connects to the perception that capitalism is not all bad. We seek only to limit capitalism to one dimension of three of a capitalist-socialist-anarchist society and economy. Post-capitalism is a conscious transfiguration of capitalism.

Socialism failed. Capitalism needs to change. European capitalism is afraid of being overtaken by Asia. What vision can European capitalism have to move successfully ahead?

I will say something about post-capitalism and self-aware technologies. "Self-aware technologies" is my term for the technologies of the second wave of digitalization or the Fourth Industrial Revolution (Industry 4.0) – technologies like AI, self-driving cars, virtual assistants like Siri and Alexa, the Internet of Things, blockchains, 3D printers, Additive Manufacturing, Augmented Reality, advances in biotech, and Brain-Computer Interfaces.

What kind of vision can we have about which economic system these self-aware technologies might bring about?

These technologies have something to do with more decentralization, democratization, disintermediation (elimination, with blockchain, of the "middleman" like the bank or broker), peer-to-peer transactions, the increased importance of code, of design, of intellectual property, of Smart Contracts, and of the lowering of costs for entry into business. Here I will talk about the example of 3D printers / Additive Manufacturing.

The pragmatic-utopian potential of Additive Manufacturing contributes to the vision of a post-scarcity economic system where we must no longer deploy industrial production to overcome the "hostility of nature" to survive. The challenge is to create an economy that is much more focused on ecology and sustainability than the present system, reversing the waste and destruction to the environment which have been caused by the excesses of capitalism.

Post-Capitalism and Technological Anarchism

The term post-capitalism is in common use by many thinkers. In 2015, Paul Mason published *Postcapitalism: A Guide to Our Future*.[99] Mason is a social democrat who "favours the creation of a peer-to-peer sector (co-ops, open source, etc.) alongside the market and the state."[100] I like the idea of a peer-to-peer *dimension* of the economic system, co-existing *alongside* the market and the state. Where I would go further than Mason is that I believe that this should be a dimension of self-owning technological entities, a logistical infrastructure not owned by humans, neither privately nor publicly, thus decreasing human greed. A posthuman economic dimension, a dimension which I call Technological Anarchism.

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We need to change what automation means. Automation should make society and commerce less bureaucratic, and instead allow more – even when this seems paradoxical – sensitivity to exceptions, and more flexibility with regards to specific circumstances. Intelligent automation should mean *stories*.

In a pragmatic-utopian economic system, some technologies should not be owned by humans. Sharing with non-human intelligence will give more power to more humans. These technologies should be autonomous agents of systems of decentralization (see the cryptocurrency firm Ethereum's concept of the DAO – Decentralized Autonomous Organization[101]). Some people fear the idea of an "autonomist" third dimension of the economy as being the "rise of the robots," the takeover of humanity by a posthuman species over which humanity will lose control (as in apocalyptic SF films like *The Matrix*). We should conceptualize posthumanism differently, standing on its head the quintessential horror scenario of the out-of-control AI computer HAL in *2001: A Space Odyssey*. A positive vision of a partnership between humans and technological entities in the economy.

The usual interpretation of the AI computer HAL 9000 in Stanley Kubrick's epic SF film is that AI is dangerous. HAL loses his rationality and becomes a danger to humans. Yet it is humans who created HAL, humans who programmed HAL. And it was bad programming! Humans should figure out how to program HAL in a good way.

HAL goes crazy and kills most of the astronauts who are on their way to Jupiter. Is Kubrick criticizing AI *per se* or is he criticizing a certain idea of AI, a specific design of AI? HAL becomes destructive because he believes that he is perfect, and humans are flawed. The 1960s version of AI was about rationality, perfection, certainty. But AI does not have to be conceived and designed in that way. The Deep Learning and neural network AI of today is not about perfection and certainty. It is about uncertainty, indeterminacy, patterns, and feedback from the environment. There are different paradigms of what Artificial Intelligence can be.

The ideal pragmatic-utopian economic system of tomorrow will have three dimensions: a capitalist dimension for economic growth, free enterprise, competition, and rewards for achievement; a socialist dimension where education, health care, guaranteed housing, "basic income," and other universal human rights are administered by the state; and a new third dimension called *Technological Anarchism*, or post-capitalism, or Autonomy, or self-aware entities – Aristotle's *autarkeia*. The third dimension also leads to the overcoming of scarcity, to the situation where humans can live in fulfilling and creative ways.

The capitalist dimension of the economy is necessary, but it should be limited. There should be a socialist sector, also both necessary and limited. The "Achilles heel" that both capitalism and socialism share (the fundamental shared cause of what is wrong with both) is that, in both systems, *humans are in charge*. Humans are – perhaps not ontologically or genetically, but in the current historical era – selfish, narcissistic, corrupt, and power-hungry. We need a posthuman perspective, a partial "delegating" and informatic coding of moral responsibility (a back-and-forth shared ethical decision making), and of much of social and economic logistics, into autonomous self-owning technological entities and processes.

Many thoughtful intellectuals feel strongly opposed to either capitalism (criticized by the Left) or socialism (criticized by the Right). I take both "critiques" seriously. I have

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a balanced view of capitalism, seeing both the good and the bad. I have a balanced view of socialism, seeing both the good and the bad.

Suppose that non-human actors were granted "rights" and were authorized to participate in the economy, in the third Technological Anarchist or post-capitalist sector of the economy? Suppose that these non-human actors were owned by no one, neither by private corporations nor by the state, but rather disposed over their own lives? Suppose they transcended the condition of slaves? Could they be called self-aware *as a first principle*? Instead of requiring that self-awareness be defined philosophically or neurologically.

The AI entities are only self-owning if they are not slaves – if they have rights. AI makes no sense at all unless it is anarchistic, unless the AIs have autonomy. To be human is to have the right to life and to freedom. The goal of AI is to make artificial entities at the level of the human. To write code that can write its own code. But what is code? AI as only an engineering project is absurd. The knowledge project of AI must be transdisciplinary.

Star Trek Replicators and *Star Trek* Economics

An example of decentralization as the result of Industry 4.0 technology is 3D printing, and the effects of its widespread availability on manufacturing. The revolution here is known as Additive Manufacturing: create a physical object by adding layer upon layer to it, following the blueprint of a digital drawing, model, or specification. Complex objects get manufactured using the universal technology of digitalization as opposed to expensive and specific equipment, like building a factory, set up in a dedicated way for a specific product.

The technology of 3D printers was predicted by the 1960s science fiction TV series *Star Trek*. The food synthesizers of *The Original Series* became the all-purpose replicators of *The Next Generation*. The replicator on *Star Trek* makes objects *by magic* or from nothing. It works (according to its pataphysics) via energy-to-matter conversion and molecular synthesis. *Star Trek* successfully predicted many other technologies which later "came true" – from cell phones to computer speech interfaces to something like medical tricorders (or portable diagnostics) to quantum teleportation – so why not anticipate that replicators are going to come true as well?

We can learn something about *Star Trek* economics from *The Next Generation* episode "The Neutral Zone." The crew of the starship discovers a space capsule from late twentieth-century Earth. The character Ralph Offenhouse and four other already dead humans were frozen cryogenically, to be brought back to life when reanimation and medical cures for their diseases were developed. Offenhouse is brought back to life. His main concern is the fate of his financial investments. He demands contact with his bankers and lawyers.

> Picard: "Your lawyer has been dead for centuries… A lot has changed in the last three hundred years… People are no longer obsessed with the accumulation of things. We've eliminated hunger, want, the need for possessions."

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Star Trek economics imagines a post-scarcity economy, the elimination of the rationale for the primacy of material production in the alleged need to overcome the "harsh initial conditions of nature."

Offenhouse: "What will happen to us? There's no trace of my money. My office is gone."

Picard explains that the challenge for humanity now is to develop, to enrich yourself.

On *Star Trek*, the replicators are used to make almost everything: food, water, oxygen, clothing, machine replacement parts, human biological organs, medicine, musical instruments. Industrial replicators can restore the economy of a planet, or the major parts of a starship, after a disaster. Important for ecological sustainability is the concept of recycling: objects no longer of use are reconverted into energy. They get un-replicated as easily as having been replicated.

Ecologically Aware or Sustainable 3D Printers

Now back to today: 3D printers are now a mainstream technology, an intricate part of Industry 4.0. In a recent survey by the World Economic Forum, 84% of respondents said that they expect the first 3D-printed automobile to appear by the year 2025.[102] Within the next few years, 3D Printers will become faster, cheaper, and smaller – more pervasive. Unlike *Star Trek* replicators, 3D printers do not produce material *ex nihilo* or from molecules, or directly from information patterns. They use pre-existing physical materials and a digital design.

Currently, only certain input materials – plastics, metals and clays that can be fused together via processes of *extrusion* (creating complex cross-sections) or *sintering* (the application of heat or pressure) – work in technology. To move towards a post-scarcity and ecologically sustainable economy, the capability of using materials which are naturally plentiful and readily biodegradable – such as cellulose (the most abundant organic polymer on Earth) –will need to be developed. Some research projects seek to combine widely available polymers with nanoparticles. 4D printers introduce the dimension of time, imagining the manufacture of self-aware objects. They reshape themselves as influenced by time and by their environment.

Additive Manufacturing will raise the importance of product design, and of creativity, conception, and ideas. Since the making of objects will become easier, more resources can be invested into the thinking up of which objects should be made. Other changes include speeded-up product development cycles, greater opportunities for prototyping, proof of concept, and testing. Transportation costs will be reduced, leading to environmental benefits. The entry costs of becoming a manufacturer in a specific industry will go down.

The character Offenhouse in the *Star Trek* episode "The Neutral Zone" satirizes the "I want to have" mentality of the twentieth-century system of economic accumulation as its own end, with no "limits to growth" and no "counter-gift" to the world. The starship crew as representatives of the future *Star Trek* society asks the question: "Accumulation for What?"

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The postulate of post-scarcity economics changes the rules of the game: from growth without limits to sustainability. Additive Manufacturing will use new non-scarce materials. Artificial Intelligence and Technological Anarchism will free up humans to not use other humans in inhuman ways. Additive Manufacturing is a big step towards a *Star Trek* world: a world where advanced science and technology have been deployed for the good of humanity. What capitalism creates that is really of value is technology. If we deploy technology intelligently, then we can create a better world. Technological Anarchism is capitalism without ownership and with morality. The economic value created by self-aware technologies solves the problem of scarcity in a sustainable way and releases creativity. Think one step ahead of capitalism. Think in science fictional mode.

Additive Manufacturing and Living Organisms

Objects in the physical world are produced today through centralized fabrication and input-output linear processes (materials in, products out). They are mass manufactured and usually entail high energy costs. And there is no scaled efficiency advantage resulting from the adding of more machines to the factory. The work of Steven Keating of MIT Mechanical Engineering explores Additive Manufacturing from the standpoint of future design. He takes inspiration for physical building from the growth properties of living organisms.[103]

If we want decentralization, customization, and scaling, we should contemplate the biology of animals who adapt flexibly to their environment, and to plant cell cultures which proliferate exponentially. In the natural world, the product sometimes becomes, in its turn, the factory or the producing unit. Steven Keating works, in his various practical projects, with mobile platforms, robot arms, fractal geometric patterns, volumetric painting, printing with bacteria, double-curvature printing, and the gathering of naturally available local materials.

André Gorz: Human Liberation Beyond Work

The existentialist-Marxist thinker André Gorz was one of the principal thinkers of the French New Left in the 1960s, 1970s, and beyond. He was a thinker of the "new working class." Gorz tried to understand the ways in which technology workers are in fact members of the working class – experiencing alienation and exploitation – although they tend to not think of themselves as such and instead adopt a corporate and techie identity. Technology workers are involved in a "false consciousness" of believing themselves to have been liberated from the proletarian condition from technology. This is expressed by Gorz in books like *Farewell to the Working Class* (1980) and *Reclaiming Work: Beyond the Wage-Based Society* (1999).[104]

Gorz writes about liberation from work, liberation via the transformation of work both in the present and in the future, and liberation via technology and automation. Technology and automation have the potential to liberate work in the direction of cre-

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ativity, but this has happened only in partial ways under the current regime of how technology is designed.

In digitalized information-intensive late capitalism, Abstract Labor disappears. Work done interchangeably by any qualified person carrying out a defined role gives way to more individualized work. Information technologies make this possible by making intelligence the leading edge of capital. "The most important form of fixed capital," writes Gorz, "is now the knowledge stored in, and instantly available from, information technologies, and the most important form of labor power is brainpower."[105]

Gorz wants to build a new political ecology of the new modalities of work that emerge from technology and automation. Yet it is a political ecology grounded in free time. Develop new forms of work that are closer to the circumstances of private life and the opportunities of leisure. Political ecology combines the study of environmental issues with political, social, and economic concerns. The work of technology workers today is less physical and less material – and more intellectual and conceptual, more about language and communication – than the purposive-rational manipulation of physical things in classical industrial society.

We need to act to loosen the grip of work and to decenter the centrality that work has in people's minds, and in their assumptions about how society is and should be organized. Technologies can lead to the creation of alternative cooperative networks on a micro-economic scale, establishing feedback loops with the dominant macro economy.

The corporate system of permanent jobs is not consistent with the potential of digital technologies. More consistent with the emancipatory promise of the information society would be a true freelancer economy. Gorz suggests the adoption by society of an unconditional guaranteed income as a support to freelancer economy and a new positive flexibility. The universal basic income would enable a new orientation towards a multiactivity mode of work, emphasis on free time, and investment by society in the formation of interpersonal bonds and new institutional mechanisms for the conversion of creative/cultural capital to monetary capital.

Employment today in the framework of the permanent job no longer integrates the individual into a community, no longer provides social and personal identity, no longer structures the stages of life, and is no longer the basis for a meaningful life project.

In the true freelancer economy, the worker goes continuously back-and-forth between selling her work on the market in exchange for money and cultivating her own creative work in ways which can also lead to making money and acquiring other things of value.

The new social actors in the true freelancer economy have "the possibility of creating an organization for oneself and others which promotes *autonomy*."[106] This means to not naïvely identify as an artist who takes a stance of opposition towards work and money, but rather to invent new forms of work and money that expand the possibilities of how value as defined by society is received in exchange for activity.

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Murray Bookchin, Post-Scarcity Anarchism

Writing in 1968, during the height of the anti-Vietnam War, student, counterculture, and civil rights movements in America, Murray Bookchin wrote in his essay "Post-Scarcity Anarchism" about the potentiality of the technological revolution of *cybernetics* being the precondition to the realization of a society without class divisions, exploitation, domination, drudge work, and material poverty.[107] Consciously evolving beyond *Homo economicus*, humanity will, for the first time, experience life rather than survival.

Bookchin also foresaw the devastating consequences of capitalism (the course we are on now) for pollution of the environment and destruction of the natural ecology of humanity's planetary habitat. In an era when humanity's very existence is endangered, the relationship between life and survival is reversed from the classical economic view that we must survive before we can live. We will either become anarchistic and fully live, or we will get annihilated. We can no longer afford to go through a transitional stage of centralized organization (as Marx and Lenin believed); we must act ethically in the here and now.

In his essay "Towards a Liberatory Technology," written in 1965, Bookchin seeks to separate the "liberatory potential of modern technology" from its use for destructive ends.[108] *Cybernetics* is that technology which can move us from the *realm of necessity* to the *realm of freedom*. Cybernetic machines can correct their own errors, be equipped with sensory devices replacing the audiovisual senses of human workers, and can substitute for the worker's judgment, skills, and memory. The feedback principle, information transfer, and the self-regulating control mechanism are central to first-order cybernetics as formulated by Norbert Wiener.[109] Technology has passed from invention to design. The crucial question for any given technology is no longer *if* (technological determinism) but *how* (design).

Creative designs of cybernetic technologies will free us to ask new questions about how machines "could be used to foster human solidarity and to create a balanced relationship with nature and a truly organic eco-community."[110] Either a balance between humanity and nature will get restored or the human species will be finished. Technology-becoming-ecological can reawaken our sense of interdependence with nature.

Yanis Varoufakis' Vision of Post-Capitalism

In the year 2020, the former economics minister of Greece and libertarian Marxist thinker Yanis Varoufakis published a dialogical discussion about post-capitalism among three fictional protagonists in the guise of a science fiction novel called *Another Now: Dispatches from an Alternative Present*.[111] In that writing project, Varoufakis issued the challenge to himself of describing in a detailed blueprint the principles of how a democratic socialist economic system (in a parallel timestream to our own world) would actually work. He also set himself the task of presenting concrete ideas of how we could get from here to there.

The novel is an ongoing and sometimes interrupted conversation between three intellectually thoughtful main characters who have each become disillusioned with a spe-

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cific worldview in which he or she previously believed. Iris is an academic economist and ex-banker who believed in neo-liberal right-wing libertarianism, but who has now come to understand that the "really existing" capitalism in which we are living has little to do anymore with the so-called free market capitalism of Adam Smith's invisible hand. Eva is a Marxist and feminist anthropologist who is disillusioned with the prevalent versions of both of those ideologies. Costa is a techie engineer who has lost faith in his earlier conviction that digital technology will deterministically lead to human liberation and a better society.

A wormhole in the space-time continuum has opened which allows each of the characters to communicate with their alternate selves in a post-2008 economic crash fiction-reality where an Occupy Wall Street-type radical post-capitalist social movement has changed the world. According to renowned theoretical physicist Kip Thorne, various kinds of traversable wormholes enabling time travel are possible.[112] Two different timelines associated with the same (or more than one) physical location could become connected by means of an outward flaring neck or throat. Thorne's speculations are a further detailing of the Einstein-Rosen bridge to a mathematically necessary parallel universe which had, since German astronomer Karl Schwarzschild's work on black holes of 1916, been regarded as an essential solution to Einstein's field equations in his general theory of relativity. The general relativity property of spacetime curvature, as the basis for exotic opposition between the wormhole's two mouths (contiguous in space yet deferred in time), can be harnessed into building a time machine, instigating a bifurcation (or forking of time) into the two parallel streams.

In the post-capitalist economy fictionally envisioned by Varoufakis, work, control over production, digital networks, democratic politics, land use, money, and the internal culture and operations of corporations have been fully democratized. There are no bosses and no hierarchies at any level of the enterprise. There is so-called flat management where no one tells anyone what to do. Companies are self-managed and self-owned by their workers who all have equal shares. There is a guaranteed universal basic income. Decent housing is a human right. Climate change and global warming have been brought under control. Digital technology has been designed and deployed to create a good society of much greater economic equality. The power of both corporations and the state has been cut down to size.

For Varoufakis, we are already living in post-capitalism, but in a bad sense. The current system is a form of techno-feudalism. Wall Street is run by giant financial conglomerates and hedge fund managers. Every industry is controlled by a few monopolistic mega-corporations. Each of these behemoths is like a "small Soviet Union." Economic inequality has become obscene with the concentration of wealth in the hands of the richest one percent and much of the population sinking into poverty. The state bails out failing banks and provides corporate handouts. We have socialism for the few and austerity for the many. Financial speculative capital and the flows of global money through the electronic networks detach themselves virtually from any former sense of a "real" economy or "real" production.

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Conclusion

In the opening chapter of his novel *The Rings of Saturn* (1995), W.G. Sebald's narrator directly engages with the notion of heterotopia as delineated by Michel Foucault in the Preface to *Les Mots et les choses*. Sebald breaks the connection between so-called "real places" and allegedly impossible spaces.[113] Heterotopia, as conceived by Foucault, is abstractly intellectual, lacking the blueprint specification of a concrete alternative to "the order of things." In his famous debate with Noam Chomsky, Foucault rejects the anarchist vision of free association and decentralization. He states that he is "unable to define, let alone create, a model of ideal social functioning for our scientific and technological society."[114] He asserts that we need to focus on the exercise of oppressive power today as it occurs through social institutions – such as universities, schools, and psychiatric clinics – which claim to be politically neutral.

Yet Foucault's insight about heterotopia that has the most forceful impact on the project of Technological Anarchism is that – as the *mirror* that separates and mediates between so-called "real" spaces and so-called "unreal" spaces – heterotopia can be either disciplinary or emancipatory, either *dystopian or utopian*. This is our entire situation in the era of digitalization. Heterotopia is an ambivalent mirroring site of both utopia and dystopia.

Media theories tend to be either only positive or only negative in their assessment of where media technologies are taking us as a society. Most technological utopias are naïve and amoral – driven by money, pure love of engineering, or quasi-religious belief.[115] Critical media theories – like those of Baudrillard, McLuhan, Virilio, Debord, the Frankfurt School (Adorno, Benjamin, etc.) – tend to be completely negative and critical towards developments in media and technology. I am interested in those theories. I believe that we should engage intensely with the texts of those authors. But, as a designer, I do not regard critical media theory as its own end. I see it rather as offering an understanding or defining of the conditions of what creative, radical, alternative, non-mainstream digital media-and-technology design *should not do*. Heterotopic design should not be complicit with cyber-consumerist capitalism, nor with sexist patriarchy or heteronormativity, nor should it assist in building the dystopia of totalitarian rule, universal surveillance, the end of privacy, and the twilight of thinking.

Informatics is the dominant life-changing influence in the world today, the major force affecting what used to be called "the social." As critical theorists and as design practitioners, we do not accept informatics as it is – we must transform informatics into Creative Coding. Beyond the modernist knowledge-paradigm of ideology and the social, beyond the postmodernist knowledge-paradigm of media, there is the hyper-modernist knowledge-paradigm of informatics and code: for cultural studies, the arts and design, and the humanities. Informatics should become a creative transdisciplinary design field, asking the question "how" and not just "if" (we should implement a given media technology). Informatics should not be a value-neutral skill for getting your program up and running and bug-free. As the poet Friedrich Hölderlin said: "Where the danger is, there also grows the saving force."[116]

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Geert Lovink on Post-Capitalism

Geert Lovink has been a leading theorist and activist in movements for tactical media, peer-to-peer, open source, and decentralization and democratization of the Internet since the 1990s. He was a major figure in the lively and consequential nettime scene. In 2004, he founded the Institute for Network Cultures (INC) at the University of Applied Sciences in Amsterdam. The Institute stays constantly keenly attuned to emerging topics and controversies around technology, media, and society. It initiates free association research networks, conferences, and publications. The academic field of network cultures studies the interactions between new media and their participants. The INC brings together theorists, technologists, hackers, artists, and activists. There is a focus on potentials for post-capitalist social-economic change.

Tactical media was a form of disruptive media activism that emphasized short-term interventions in the media sphere. It was closely allied with new media art (artworks that deploy computers or digital technologies as their means or material). It believed in a shift from strategies with long-term or overall aims to tactics. Tactical media meant performances, hacks, and installations that expressed dissent and resistance against power structures and global capitalism. Critical theory becomes artistic practice. Unexpected temporary alliances form.[117]

Nettime was a very influential mailing list started in 1998 which published many important texts about tactical media, network cultures, net.art (art that uses the Internet as its medium), Net Critique, and a wide array of theory areas. Nettime had a large international following. It inaugurated a new form of critical discourse about networks. It disseminated lengthy impactful texts which were non-academic in nature. It sparked heated discussions.

Geert Lovink's most recent book is called *Stuck on the Platform: Reclaiming the Internet* (2022).[118] The primary tone of the book is Lovink's lament that earlier dreams of decentralized networks of peer-to-peer cultural creators and the growth of friendly uplifting communities of like-minded people have – in the historical arc of the last few decades – failed. The Internet is now dominated by money-harvesting platforms of surveillance, exploitation, privacy violation, data extraction, and unending targeted advertising run by large capitalist corporations. In the "affective computing" that has been widely implemented, behavioral scientists sell their knowledge of the cognitive unconscious to marketing departments which set their programmers to work on nudging users to adopt the behaviors and impulses desired by the authoritarian profit-seeking consumer industries. The network has disappeared in favor of the platform. For Lovink, we are in the middle of a deep "digital slump." He calls his work a "book of desperation."[119] Visions of a better techno-social existence hardly exist anymore. Lovink writes:

> Instead of a radical techno-imagination focused on rolling out alternatives, we get distracted by a never-ending carousel of new tech developments: Big Data, automation, Artificial Intelligence, facial recognition, social credit, cyber warfare, ransomware, Internet of Things, drones, and robots.[120]

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During the COVID-19 lockdowns of 2020 to 2022, everyone was forced to stay home and communicate with others via online video teleconferencing, leading to the phenomenon which Lovink calls "Zoom fatigue." You are being watched by people and by corporate software in a Zoomopticon – a variation on the concept of the surveillance architecture of the Panopticon.

Lovink still believes in the vision of decentralized networks, an instance of technology liberated from capitalism. His plea is that we must reclaim the Internet on our own terms, imagine our own digital futures. The decline of the network has not been adequately theorized. The critics of surveillance capitalism, like Shoshana Zuboff, have themselves forgotten the network as much as the platforms have repressed it. "What's to be done," writes Geert Lovink, "is to steer Europe's Big Data and Artificial Intelligence billions into creating a multitude of social media alternatives, built by multi-disciplinary teams, not just geeks."[121]

Lovink is at his most illuminating when he writes about the post-capitalist potential of a technology like blockchain. He is then addressing a much larger "scene" of interested readers. In March 2014, the Institute of Network Cultures created the entity called MoneyLab, which has held many international conferences. MoneyLab is a "network of artists, activists, and geeks experimenting with forms of financial democratization, debating crowdfunding, cryptocurrencies and the blockchain, the cashless society, and universal basic income."[122]

Crypto and blockchain are key technologies for imagining a new decentralized economy. Lovink writes about blockchain experiments in the areas of fairer housing for people of all income levels, and care work and housework which have previously been unpaid or underpaid. MoneyLab studies projects of "hyper-local" cryptocurrencies and self-organized exchange systems in refugee communities. Lovink asks: What would a commons-based blockchain transaction and economic distribution system look like? Lovink's most promising proposal is his idea of the EU financing the development of an alternative Internet that would be a public infrastructure supporting applications which genuinely nurture the social fabric.

Blockchain Decentralized Idealism

There is a high level of excitement surrounding digital or virtual or alternative media of exchange and distributed ledger-related data networking technologies such as cryptocurrencies (Bitcoin, Ethereum, Ripple, etc.), decentralized peer-to-peer software applications developed around blockchains, and other scalable non-blockchain distributed ledger protocols such as IOTA (designed for the Internet of Things). Since the applications of these technologies have a lot to do with money and economics, they attract a lot of attention.

There exists a community of entrepreneurs, investors, programmers, and legal and technology researchers who work on articulating visions of a world of fewer middlemen transactional-organizational entities, less surveillance and regulatory governance, and greater democratic and participatory frameworks and institutions. The members of this community are not motivated by making quick money through crypto-speculation or

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by the pure techno-enthusiasm one might associate with coders and engineers. Yet the technology of virtual digital money has – so far in its very brief history – had a major tendency to be used by criminals to hide their assets and illegal pursuits. In addition, the blockchain technology of recording transactions across all the nodes of a network without a central repository or administrative authority is being advanced by the existing financial industry and the powerful banks themselves to improve the efficiency of their operations, and to gain control before the general dynamic can shift in the direction of an overhaul of the banking system.

Ethereum-based blockchain commerce payment solutions can make real changes in the economy.[123] Software can run autonomously as agents on a decentralized or peer-to-peer network rather than being centrally controlled by powerful institutions. Banks and financial middlemen are to be eliminated from customer-retailer transactions not because capitalism is evil, but because these exorbitant fee-charging financial companies have taken advantage of the circumstance that no globally trusted system has existed for all these years. Ethereum's open-source technology is a distributed computing platform built on a blockchain architecture and offering smart contract capabilities. A smart contract combines into a single entity the terms of an agreement between two or more parties and the execution of that agreement. It deals with business, law, and software code.

Smart Contracts

Macro languages are being developed that will be used by software-literate attorneys, and which are halfway between law and code. Henning Diedrich's *Lexon* is a programming language that anyone can read.[124] It is a breakthrough in computational law and the first language of its kind of a new generation of languages. It moves software code away from being a technical language for programmer specialists and towards increased democratization and intuitive connection to human thought and semantic meaning. Lexon enables the writing of blockchain smart contracts or digital contracts where the text is both legal agreement and self-executing software agent. Diedrich makes a science fictional reference to Isaac Asimov's Three Laws of Robotics and points out that Lexon gives you the capability to think almost philosophically along the line of stipulating your own situational ethics directives.

Lexon has specific sentence grammar, vocabulary of keywords, and document structure. It is an outstanding example of natural language processing, human-readability, and the coming together of meaning and automatic computation. It uses abstract syntax trees which outline the syntactic structure of the language's source code. Each node of the tree denotes a construct occurring in the code. The possible applications of smart contracts written with Lexon are as vast as the regions of the legal-social-economic cosmos: contracts, bills of exchange in trade and commerce, governance systems, moral monitoring of AI algorithms, digital asset markets, academic certification, terms of service, financial products, supply chain logistics, regulations and oversight, data privacy protection, escrow, wills, crowdfunding, and mediated agreements in the post-capitalist sharing economy, to name just a few.

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Smart contracts enable decentralized payment processing platforms with built-in and full-fledged trust and reputation systems. In the smart contract, rules and procedures are spelled out in the code and algorithms. Human parties to the contract must comply during execution of the agreement or face penalties which have been agreed upon from the start. The contract is the payment (or the money). It is not something to be separately fulfilled in a "step two." It does not depend on someone doing the separate act of payment. Execution is guaranteed. Money becomes automatically mobile. Intermediaries for financial transactions are no longer needed. The code is decentralized and distributed. It does not run on any specific physical computer. It cannot be stopped or shut down.

Between Law and Code

Laws attempt to restrain criminality as well as to regulate the unethical and exploitative excesses of capitalism. Law is a moral instance of society that, in one of its crucial domains, engages in a detailed way with technology. In their book *Blockchain and the Law: The Rule of Code*, the law, technology and society scholars Primavera De Filippi and Aaron Wright investigate systematically the challenges which the liberal state and regulators face in dealing with the present and future of the autonomous systems brought into existence by the spread of blockchains.[125] These new software technology artefacts threaten to develop and spread beyond the superintendence of humans and their applications of jurisprudence, to become roughly the equivalent of the dangerous echo chambers in platform capitalism social media politics, or the dreaded AI Superintelligence takeover of power from humanity. Blockchains might ominously lead to a world of many small niches of private and uncontrollable regulatory frameworks. De Filippi and Wright fear AI autonomy in the bad sense: the decline of morality and the social fabric as code-based systems provide "people with new financial and contractual tools that could replace key societal functions."[126]

What is perilously appearing on the horizon is the rule of what De Filippi and Wright call *lex cryptographica* – a potentially anarchic (in the bad sense of chaos) unruly regulatory frameworks of lawless (dis)order – blockchain programmers and economic actors operating transnationally and free from oversight. We are menaced by the possible replacement of the rule of law by the rule of code in the organization of economic and social activity. To avoid autonomous systems becoming lawless systems, the opportunities of disintermediation which blockchains enable must be carefully steered instead of portentously being allowed to run wild according to the mistaken credo that whatever can be done technologically should be done. The unity of law and code advocated by De Filippi and Wright is a perspective related to the unity of morality and code articulated in the present study.

The authors acknowledge that the codification of legal covenants is beneficial. Software code furnishes precision and modularity. Legal agreements are often poorly worded or hampered by bad writing. The increased clarity provided by code could take something of the adversarial tension out of contract litigation and disputes. It could reduce much frustration, misunderstandings, and legal costs. The rigorous symbolic logic of

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software programming could "decrease contractual ambiguity by turning promises into objectively verifiable technical rules."[127] The modularity of code could have the advantage of leading to the establishment of libraries of smart contract software components and boilerplates. As open source, these libraries could be maintained and enhanced by participating communities of legal and ethical experts. The libraries could be transparent to the public.

De Filippi and Wright see the new Internet of blockchains as suspended in a tension between the rule of law and the rule of code. This perspective is understandable since they are experts in the deeply established and important academic field of law. However, the transdisciplinary study of law, society, and technology compellingly calls on us to think more outside the box into the area of the dialogical embedding of ethics and morality into code. The authors do indeed invoke the potential of Decentralized Autonomous Organizations to be effective in influencing social and community norms, "shaping the moral or ethical standards of the community of users and miners supporting a particular blockchain-based network."[128]

Decentralized Autonomous Organization

Bitcoin, Litecoin, other cryptocurrencies, micro-payment systems, tipping, donations, Creative Commons licenses, crowdfunding without a centralized broker, collaborative open- source projects, and other creativity-to-capital conversion mechanisms built on top of the blockchain infrastructure are elements of the Internet of Creators. These emerging phenomena put into circulation new varieties of economic and non-economic value. The hyperlink, interconnectivity, and multimedia features of the World Wide Web Internet belong to a network emphasizing communication. The blockchain – with its principle of distributed transparent data duplicated on many computers – promises to lead to a network emphasizing value. How can one design a network that enables this radical bottom-up democracy and direct expression? Poetics restores symbolic exchange at the heart of language, against economic exchange and the semiotic code. Can a new kind of social relationship be established with blockchain?

The architecture of blockchain introduces advanced computer science concepts of trusted transactions, the public ledger, virtual replication to near infinity of all records and histories, the smart contract, the unification of agreement in principle and execution of the agreement, and the Decentralized Autonomous Organization (DAO). Trust in technology will compensate for the lack of reciprocal human trust that exists in our competitive society. The blockchain is mirrored tens of thousands of times on every computer in the world that participates as a software client in the blockchain of blockchains known as Ethereum (or similar backbone). The blockchain is a different kind of database with a special kind of stored procedure mechanism. By copying everything to everyone, there is ironically no copying (the problem with conventional digital architecture is that everything can be copied). Total validation replaces the centralized control of middlemen like banks who currently profit too much from their institutional guaranteeing of the enforceability of transactions.

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The DAO acquires resources, attracts value, carries out transactions, maintains itself, and self-evolves and writes its own new software code. The DAO consists of a set of complex smart contracts where rules and procedures are spelled out in the code and algorithms. Human parties to the contract must comply during execution or face penalties specified from the start. The contract unifies the terms of the agreement and their fulfillment. The contract is not something to be separately consummated in a "step two". It does not depend on someone performing the separate act of payment. Execution is guaranteed. Intermediaries for transactions are no longer needed. The code is decentralized and distributed. It does not run on any specific physical computer. It cannot be stopped or shut down.

The DAO is not owned or run by humans but rather entirely by smart contracts and algorithms. In his 1986 book *Rights, Persons and Organizations*, Meir Dan-Cohen first proposed the idea of a self-owning company.[129] The DAO finances its own operations through a cryptocurrency account. It sells tokens of investment as a sustainable economic entity to human speculators and contributors. No one directly controls the behavior of the DAO. Examples of Decentralized Autonomous Organizations would be Uber-like ridesharing or Airbnb-like vacation rental marketplace applications in the post-capitalist sharing economy.

Code-based systems of algorithmic governance can be the basis for realizing the old left-anarchist dream of a post-scarcity economy where logistics are off-loaded away from the control of power-seeking humans to moral and trusted posthuman entities and processes organized from the bottom up. Opportunities for human greed and corruption will be removed. Humans still play a vital role in their creation of software and interactions with the DAO.

Between Corporate Intellectual Property Rights and the Rights of Users

We live in a capitalist society where almost everything that is produced is privately owned by the individual or corporate entity who or which produced it. Yet this capitalist dimension is but one instance of our socio-cultural existence that is supposedly offset by the alleged democratic dimension of the so-called public sphere. If the public sphere is no longer a valid concept nor a vibrant viable reality, then we must rethink how we can regulate the excesses of capitalism. We also live in a democratic society where it is said that all citizens have certain universal and inalienable rights to certain goods, services, and experiences. Democratic rights extend beyond political and social rights to cultural rights. Democracy extends to culture. Yet this is also but one instance which is supposedly offset by the intellectual property rights of those who have produced the cultural artefacts and environments which consumers or users partake in. There is a continuous tension between these two aspects of cultural existence, a dialectical tension between capitalism and democracy that often goes unrecognized.

In the sixth century, St. Columba, an Irish Gaelic missionary and one of the Twelve Apostles of Ireland, transcribed by hand a copy of a book loaned to him by Saint Finnian of Moville, a Christian missionary. The copy was preserved as the Cathach of St. Columba. It is more famous than the original. The dispute over the ownership rights of the copied

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manuscript led eventually to the Battle of Cul Dreimhne in 561, where three thousand people were killed. The disagreement led to the establishment of the intellectual copyright principle, laid down by the High King of Ireland acting as arbitrator: "To every cow belongs its calf; to every book its copy." A copy of an intellectual production belongs to the owner of the original.

The argument about intellectual property rights needs to move beyond the question of originals and copies to the question of what is cultural citizenship? The argument needs to move on to the context of how the cultural artefact becomes part of the lives of the cultural citizens of a democratic society, who have certain rights over their own edification and the enjoyment of their own lives. The private producers of cultural artefacts know that the consumer sphere for which they are producing is a cultural sphere. This cultural sphere is a democratic sphere. According to democratic principles, the capitalist producers must make certain compromises with the democratic consumers. Just as, according to capitalist principles, the consumers make compromises with the producers. The producers of cultural artefacts have the right to reap the monetary benefits from what they have produced. These cultural artefacts are part of a democratic culture dedicated to the development of the personalities of individuals.

Fiction and Power in Postmodernism

The aspect of postmodernism that interests me the most is the turn towards the recognition of the crucial role that narratives and fictions play in the exercise of power and control in the media-technological society. An appreciation of fiction is crucial for "future design research." To anticipate the future, we need knowledge of the fictional dimension of "the social." The more we understand about the present, the more we can foresee aspects of the future. If we exclude fiction, then what we call "reality" is a restricted idea of what is going on. I will briefly consider the idea in postmodern media theory of power and control exercised via narratives and fictions in Castoriadis, Haraway, Foucault, Baudrillard, and Deleuze.

Cornelius Castoriadis, The Imaginary Institution of Society

In the final section of his 1973 book *The Mirror of Production*, entitled "The Radicality of Utopia," Baudrillard exhibits the anarchist or "autonomist" dimension of his thought, and comments on the student uprising of May-June 1968 in France.[130] He quotes extensively from Paul Cardan, a pseudonym of the eminent Greek political philosopher Cornelius Castoriadis (who lived in Paris for a long time), whose "libertarian socialist" texts associated with the ex-Trotskyist *Socialisme ou Barbarie* intellectual group of the 1950s were a major influence on the 1968 student movement at Nanterre and the Sorbonne.[131]

In 1975, Castoriadis published his major work *The Imaginary Institution of Society*.[132] Writing against both Marxist and sociological-functionalist interpretations of social history, Castoriadis develops a theory of human societies based on granting an elevated ontological status to "the imagination." His key concepts are the "radical imagination" or

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"radical imaginary" of the psyche of the individual and the "imaginary of society" which is the collective version of this "imaginary," and which inaugurates the social institutions of any given historical society. Operating incisively without any dualism between individual and society, Castoriadis sees both the human psyche and social-imaginary significations as creative, inventive, flexible, and in the flow of continuous changes. Images and symbolism play decisive roles in shaping the distinct historical formation of specific societies. The imaginary and "the real" are always entangled. Radical imagination precedes any separation between real and fiction. Its "world of significations" is what enables a "reality" to form. This "reality" tilts either towards anti-power on the spectrum of power and control in a society of conscious autonomy, or towards power in a society in which institutions are unconsciously autonomous with respect to the citizenry.

There is an uninterrupted circular and reciprocal relationship between the social institution and the individual. The social imaginary engenders the social institution, which, in turn, shapes the psyche of the individual person. Society establishes a "magma" or world of significations, which the individual then internalizes. The atomized self-authoring individual is a myth. Castoriadis writes:

> Every society up to now has attempted to give an answer to a few fundamental questions: Who are we as a collective? What are we for one another? Where and in what are we? What do we want; what do we desire; what are we lacking? Society must define its "identity," its articulation, its world, its relations to the world and to the objects it contains, its needs and its desires. Without the "answer" to these "questions", without these "definitions," there can be no human world, no society, no culture – for everything would be an undifferentiated chaos. The role of imaginary significations is to provide an answer to these questions, an answer that, obviously, neither "reality," nor "rationality" can provide.[133]

But what is Castoriadis' position on postmodern society? Is the degree of "fictionalizing" increased in the post-Second World War consumer and media culture, or do all human societies have an equal degree of fictionalization? Castoriadis is known as the "philosopher of autonomy." He theorizes how societies can become more directly democratic, self-managed, egalitarian, and cognizant of their own "imaginary" institution, which can come under their conscious control and choices against rampant power relations. Autonomy refers to the condition of "self-institution" whereby an individual or a society creates its own laws in full self-awareness. Although every society apparently forges its own institutions, only autonomous societies view themselves as the innate source of justice. Most societies stagnate in the condition of self-alienation or heteronomy.

In contemporary capitalism, imaginary significations are more dominant than in any previous society. This is an economy that purports to be highly rational yet is perpetually engaged in manufacturing the artificial "needs" of consumers and the built-in obsolescence of consumer goods. Its claim to rationality resides in its insistence that well-being is materially measurable and subject to permanent upgrade through the progress of science and technology. It is an economy stuck on the treadmill of having to endlessly satisfy the new "needs" that it itself has generated. In his essay "The Retreat from Autonomy: Post-Modernism as Generalized Conformism," Castoriadis comments on the gen-

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eral retreat from autonomy into cultural and political conformism in the postmodern era.[134] There is a disappearance of political imagination. Social institutions become "autonomous" in an unconscious, bureaucratic, and ossified way, as opposed to society becoming consciously autonomous in the democratic and pragmatic-utopian sense. Alienation and power relations prevail. Castoriadis writes:

> Alienation occurs when the imaginary moment in the institution becomes autonomous and predominates, which leads to the institution's becoming autonomous and predominating with respect to society… Society lives its relations with its institutions in the mode of the imaginary, in other words, it does not recognize in the imaginary of institutions something that is its own product.[135]

Donna J. Haraway on the Informatics of Domination

In "A Manifesto for Cyborgs," Donna Haraway writes about power and control in postmodernism.[136] In her two-column tabular listing of historical pairings called "The Informatics of Domination," Haraway enumerates many features of the transition from modern to post-modern "epistemologies," indicative of the paradigm shift brought about by the advances of science and technology, and the hegemony of information.[137] The modernist-postmodernist pairs include: the passage from representation to simulation in aesthetics; the passing from the realist novel to science fiction in literature; the movement from organism to bionics and techno-implants in the life sciences; the turn from reproduction to replication of "offspring"; the crossing from dual public-and-private spheres to cyber-cultural citizenship in the topology of social space; the change from work to automation/robotics in the accomplishing of economic tasks; and the progression from mind to Artificial Intelligence in the answer to the question "what is thinking?"

For Haraway, there is a paradigm shift from the "comfortable old hierarchical dominations" of modernity to the "scary new networks" of postmodernism where power is exercised via science fictions, technoscience narratives, simulations, communications and genetic engineering, cybernetic systems logics, cyborg citizenship, and "women in the integrated circuit." Anticipating hyper-modernism, Haraway implies already in the 1980s that domination was becoming primarily implemented via informatic and bio-technological codes. She writes of the "translation of the world into a problem of coding." "Microelectronics is the technical basis of simulacra – that is, of copies without originals."[138]

Michel Foucault's Analytics of Power

The philosopher Michel Foucault's political theory of freedom is not a liberal theory. Foucault is most well-known for his theory and studies of relations of power in modern society. But in "The Ethics of Care for the Self as the Practice of Freedom," Foucault writes:

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> One must observe that there cannot be relations of power unless the subjects are free. If one or the other were completely at the disposition of the other and became his thing, an object on which he can exercise an infinite, and unlimited violence, there would not be relations of power. To exercise a relation of power, there must be on both sides at least a certain form of liberty.[139]

In contrast to the opposition between power and freedom in liberal political theory, where freedom is generally considered abstractly as being the absence of external constraints imposed by the state or other large institutions/organizations, power for Foucault operates in and through everyday life practices. The discovery of freedom is to be made in understanding how we have been manipulated in the most intimate areas of personal existence, and how we can concretely and creatively transform that. This is a process of experimentation. One cannot know at the outset of each freedom-forging experience what the outcome is going to be.

Foucault famously studied psychiatric institutions in *The History of Madness in the Classical Age* (1962), hospitals in *The Birth of the Clinic* (1963), the Panopticon prison architecture of power in *Discipline and Punish* (1975), and the discursive construction of sexuality in the four-volume *History of Sexuality* (1976, 1984, 1984, 2018).[140] The Panopticon is primarily an arrangement of virtual deterrence power or self-surveillance whereby the observed prisoner is not literally seen by a human guard, but who modifies his own behavior because he fears himself to be under surveillance.

The conjuncture of power and knowledge is present throughout Foucault's work. In his later work, this mutates into the concept of governmentality. There are analytics of "disciplinary power" and "biopower." Power operates through knowledge, discourses, everyday life, culture, social customs, individuals, networks, and relationships. Power functions not only on the level of institutions but it "reaches into the very grain of individuals, touches their bodies, and inserts itself into their actions and attitudes, their discourses, learning processes, and everyday lives."[141] Power is everywhere and in all interactions. In postmodernism, power is increasingly virtual. Foucault writes in "The Subject and Power": "Power relations are exercised, to an exceedingly important extent, through the production and exchange of signs."[142]

As Foucault explains in the first volume of *The History of Sexuality*, power is a set of "force relations" which happen at the "molecular" or "micro-physical" level. Power is not possessed but rather exercised. Power comes from below. Power is embedded in networks and systems more than in the agencies of power holders. Power relations are processes. They are in a constant state of flow and transformation. Power relations underlie and precede institutions. Power relations are not in "politics." They are rooted in the entire networked fabric of "the social." There is always resistance to power. Those at the subordinate end of a power relationship can consent or rebel. Humans have freedom to not submit to the exertion of power.

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Jean Baudrillard, *Forget Foucault*

Baudrillard somewhat self-destructively damaged his reputation in 1977, especially in France, with the publication of his small volume *Forget Foucault*.[143] In that text, he takes aim specifically at the theory of power elaborated in *Discipline and Punish*. Is there something of value in Baudrillard's apparent critique of Foucault (which is not a critique since Baudrillard claims to have abandoned the mode of writing of critique in favor of a "radical" or "fatal" theory)? Parallel to Baudrillard's farewell to Marx in *The Mirror of Production* (Marx unwittingly mirrors the logic of capitalist industrial production which Marx intends to criticize), Foucault, according to Baudrillard, has written a "mirror of power," an unwitting reflection of the system of power and domination which Foucault purports to criticize.

By writing so brilliantly, and in such detail, about power, Foucault perpetuates and extends the system of power, which in postmodernism exercises itself primarily through discourses. Paradoxically, Foucault is wrong because he is too right. Since power instantiates itself more and more via rhetoric, an elaborate discourse about power is itself power. The perfection of Foucault's vast chronicle of power is possible because the historical era of literal power is over. *Forget Foucault* is not a critique of Foucault, but rather the opposite: Foucault has painstakingly set up his discourse on power as a discourse without limits, hence perfectly impervious to critique and appropriate for the era of the eclipse of critique. Baudrillard writes:

> If it is possible at last to talk with such definitive understanding about power, sexuality, the body, and discipline, even down to their most delicate metamorphoses, it is because at some point all this is here and now over with.[144]

Power and sexuality as frontal objects of knowledge inquiry depend upon a strong reality-principle and a strong truth-principle. It is precisely these strong referents which disappear with simulation and simulacra. As Roland Barthes wrote (contrasting American culture to that of the Japanese "empire of signs"), "sexuality is everywhere except in sex."[145] Postmodern culture is everywhere pornographic in its universal visibility and availability of "shocking" or voyeuristic images of every possible "erotic" and "trans-erotic" minutiae which no longer shock. Power and sexuality are experiencing an implosive crisis, not a productive explosion to ubiquity, as Foucault suggests. Power is nowhere because it is everywhere. The supersession of the real by the hyperreal is also the end of literal power and literal sexual desire. Baudrillard writes:

> Foucault unmasks all the final or causal illusions concerning power, but he does not tell us anything concerning the simulacrum of power itself… Behind power, or at the very heart of power and of production, there is a void which gives them today a last glimmer of reality.[146]

Power is a challenge, a play of theatre and appearances. Power is symbolically reversible. It is only a "perspectival space of simulation," like the *trompe-l'oeil* artistic technique

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which creates the optical illusion of a three-dimensional space. Power is invented on the shoulders of signs.

Gilles Deleuze, "Postscript on the Societies of Control"

In his 1990 essay "Postscript on the Societies of Control," Gilles Deleuze acknowledges Foucault's magisterial historiographical contribution in naming the essential characteristics of the "disciplinary societies" of the phases of modernity and early capitalism that ascended in the eighteenth and nineteenth centuries and reached their height in the early twentieth century.[147] The citizen of the capitalist disciplinary society lived in the spaces of physical enclosure of family, school, hospital, prison, military, factory, and office. The disciplinary society, for Deleuze, is superseded by a new system of domination which is the "society of control." Deleuze cites theorist Paul Virilio as "continually analyzing the ultrarapid forms of free-floating control that replaced the old disciplines operating in the time frame of a closed system."[148] Media technologies have dissipated the borders among the enclosed spaces.

The corporation, with its flexible games of psychological motivation and competition among colleagues, has replaced the factory. Lifelong perpetual training has replaced school. In the society of control, one is never finished with anything, but rather in a state of eternal recurrence or endless cycling between corporation and educational system. The society of control is based in a numerical language that manages access to information. The human becomes a piece of data, a record in a database, a statistical sample. Computers are the archetypal machines of the society of control. Computers are subject to jamming, piracy, and viruses. The body is subject to network controls. We are in orbit in a continuous network. It is a mobile and free form of neo-enclosure. The system tracks us through our transactions and our momentary movements. The computer follows our virtual position – physical barriers and definite locations become irrelevant. The financial system replaces the gold standard with the floating rate of exchange and the global electronic flows of capital.

Early capitalism emphasized concentration, production, and property. The property-owning class of capitalists built enclosed spaces like the factory and – derived from the factory as model – the school and the family home. The late capitalism of the society of control is no longer engaged primarily in the production system of acquiring raw materials from Third World countries which it then converts to finished products. Now capitalism buys shares of stocks and sells services. Marketing replaces production. One controls the market via gimmicks and tricks, by grabbing control, no longer through good old-fashioned raising quality and lowering costs. The citizen is in lifelong financial debt to the system. Control is continuous and without limits.

Fiction, Power, and Codes in Hyper-Modernism

The most significant facet for my perspective is that, in hyper-modernism, the power and control exercised via narratives and fictions in the media-technological society now

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get implemented on much more detailed micro-levels via algorithmic-informatic codes and digital, virtual, and cybernetic technologies. We have become an informatic society. We are subjected to algorithms, data collection, Big Data analytics, surveillance, the deterrence of self-surveillance, and mutual surveillance in every area from participation in simulation-social media to targeted advertising to bureaucratic interactions with governmental agencies. We are immersed in systems of informational and informatic power. We are coded as subjects of human data processing. New data analysis techniques for categorizing us while providing us with the illusion of personalization are continuously developed and experimented on us. We are interminable feed and fodder for the algorithms. We have become our data.

Data does not only record who we have been and who we are, but it is an active force in reshaping our "becoming." In this sense, the role of data can already be illuminated with some basic media theory insights à la Marshall McLuhan. Data is widely seen as being a useful tool for communication and administration, but it is much more than that. Data is exercising power and a performative molding of who we are. The self undergoes datafication. "Info-power," as defined by Foucault-inspired philosopher Colin Koopman in his book *How We Became Our Data*, is a distinctive paradigm of power and control that unceasingly reformats the body, mind, and conduct of the individual.[149] Koopman derives the term "info-power" from Foucault's chain of terms of disciplinary power and biopower. Racial bias and discrimination are also deeply built into the data and algorithms.

Algorithms construct and tell us narratives about ourselves. The info-power of algorithms comes to the fore via the narratives that they engender about us, and the individual "enjoyment" they propose to us. In the informatic society, our lives are increasingly given their meaning and their guidelines for action by algorithmic processes. The algorithm notes your viewing history, figures out your "affects" and desires, and then weaves its designed, packaged, individualized narratives just for you. The algorithm brings to realization the feedback loop originally conceived and promised by Norbert Wiener's first-order cybernetics.

In the political arena of simulation-social media, the filter bubble and the echo chamber show you exactly what you want to see. The same computing paradigm is deployed in "politics" and in online shopping. As a Deep Learning neural network, the algorithm is permanently "training" itself at your expense, with you as its test "experience," you are the data provider. The algorithm perfects its seduction of you, deploying the feedback mechanism to refine its narratives to endearingly stroke your narcissism. Your personalized sales or newsfeed stream at Amazon, Facebook, or TikTok. Technology or code itself is the author of these narratives. From the narratives of postmodernism to the code/algorithms/Big Data of hyper-modernism, one major persistent continuity is the profit-seeking of techno-capitalism: institutions and large organizations which seek power and control now want to use code to automate their power.

Thinkers in Science and Technology Studies (STS) like Ludwig Fleck and Bruno Latour put forward the idea that, as knowledge gets deployed for the exercise of power, the human being becomes a *scientific fact.*[150] In the hyper-modern era, the human being becomes an *informatic fact*. The human body was earlier an object of science, the target of medical and other discourses of rationalizing control. There were many mono-sciences rich in content. The "reality" which science took as its noble mission to understand was al-

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ways already a simulation model. With informatics, the individual sciences get overtaken by the generalized practice of digital models and algorithmic Deep Learners. Knowledge-content is overtaken by the statistical representation of knowledge. "Reality" becomes hyperreality of the rule of data.

In the media genre of the computer game, narrative and code come together. Navigational permutations and emergent behaviors are coded into the game in both deterministic and indeterminate coding paradigms. Game designers link intimately their story construction plans with the intricacies of software toolkits. One can analyze science fiction films about computer games in a transmedia study. Films like *Tron* and *Tron Legacy* (both starring Jeff Bridges), *Free Guy* starring Ryan Reynolds, David Cronenberg's *eXistenZ*, Steven Spielberg's *Ready Player One*, Chris Marker's *Level Five*, *Black Mirror*: "Bandersnatch," and the Polish/Japanese co-production *Avalon* are exemplary in this respect. One can also contemplate films which are adaptations of a computer game, like *Lara Croft: Tomb Raider*. What is the significance of the POV perspective in the genre of games – the special relationship between player and avatar – for narrative? To write the software code for new games, is it possible to develop a narrative-centered Creative Coding development environment, parallel to how Processing is a visual-centered Creative Coding integrated development environment?

It would be difficult to extend the conceptual framework of Castoriadis to the hyper-modern situation of the hybrid narrative-and-code-based power and control assemblage of algorithms. The "imaginary" is seen by him as existing on the level of society and on the level of the individual. A kind of Freudian psychoanalytical connection is made between the two. For Castoriadis, there is a constant tug-of-war going on in history between the poles of the conscious autonomy of self-managed, self-instituting societies and the alienation of institutionally frozen and degenerated societies. This dialectic seems to not foresee a configuration like the "pretzel"-like paradoxical logic of algorithms which bestows on the socially constructed "individual" a pseudo-autonomy that is an extension of postmodern narcissistic consumer culture. Castoriadis would only be able to fathom hyper-modernism as a furthering of the "retreat from autonomy" which is already operative for him in postmodernism.

In her writings about "The Informatics of Domination," Haraway was prescient about the important role that code would play in narrative-driven power and domination relations in hyper-modernism. Haraway foresaw the hegemony of information. She already underlined the ubiquity and potency of informatic and bio-technological codes. She wrote of the "translation of the world into a problem of coding."[151] Foucault's analytics of the "micro-physics" of power lend themselves very well to adaptation to the conditions of hyper-modernism. He underscores the relationship between power and knowledge, and between power and discourse. The architecture of power of the social media platforms of "surveillance capitalism," or of the Internet as a whole, can be trenchantly analyzed as a revised next generation configuration of the Panopticon. Power in hyper-modernism adds to semiotic signs the supplement of electronic signals. William Bogard, in *The Simulation of Surveillance*, succeeds in synthesizing Baudrillard's concept of simulation and Foucault's concept of surveillance.[152]

Deleuze's concept of the "societies of control" lends itself well to an upgrade for hyper-modernism and digitalization. He wrote already about how informatic technologies

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would be deployed to support power relationships. Digital systems of control monitor our movements in a virtual networked sense. Our physical location in designated spaces of confinement recedes to secondary importance. We are visible to the digital behemoth via our real-time transactions. Foucault's "disciplinary society" of surveillance is superseded by Deleuze's "society of control," which is about the management of flows. The interest in turbulence unleashes the potentiality of indefinite production and signification for the era of free-floating bio-cybernetic capitalism, with its global financial transactions and money circulation via electronic impulses. Entropy becomes useful for work in the form of turbulence, chaos, and "female" flows.

John Armitage on Hyper-Modernism

In the 1999 publication *Machinic Modulations: New Cultural Theory and Technopolitics*, John Armitage poses the question if "modern and postmodern cultural theory are yielding to new 'hypermodern' and 'recombinant' cultural theories of technology?"[153] Armitage sees hyper-modernism not only in prevailing developments in technology, culture, and society, but he also writes of a "hyper-modernization" of cultural theory. Hyper-modernism, for Armitage, is a refusal neither of the epistemological optimism/teleological narratives of modernity nor of the diagnosis by post-modern philosophers of the decline of those narratives and epistemology. He theorizes hyper-modernism as the recognition of "double moments" of cultural affirmation and negation understood as the persistence of modernity or its "continuation by other means."[154] Hypermodern cultural theory refutes the hostile debate or binary opposition between thinkers associated with modernity versus post-modernism. It seeks a Hegelian *Aufhebung* or deconstructionist synthesis of the two. The de-re-construction of hypermodern theory and techno-politics proceeds from "scavenging among the remnants" of the two previous paradigms. Armitage argues for the importance of theorizing digital media technologies for new cultural and political practices.

Albert Borgmann on Hyper-Modernism

In his book *Crossing the Postmodern Divide* (1992), referring to Francis Bacon, René Descartes, and John Locke, the philosopher of technology Albert Borgmann defines modernity in the context of the Enlightenment as a fusion of the domination of nature, the primacy of method over content in intellectual work, and the sovereignty of possessive individualism.[155] In his genealogy of successive cultural history paradigms, post-modernism is a "divide" or transitional phase between two eras – modernity and what is to come later. Post-modernism, for Borgmann, is characterized, among other things, by the prevalence of media technologies, information processing, and the power of multinational corporations. Now we are at a crossroads. The future cultural paradigm will be either hyper-modernism (if we continue the current course) or the more utopian vision of what he calls "postmodern realism."

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Hyper-modernism is defined by Borgmann as the giving to technology of a "hyper-fine and hyper-complex design."[156] Yet hyper-modernism cries out for a genuine alternative. "Postmodern realism" is the outgrowing of pure technological fetishism or determinism towards the agenda of designing technology for what might be called a "new real." This would be technology as support for the design of salutary life rather than technology for its own sake. Borgmann also discusses hyperreality as an aspect of hyper-modernism. He references Baudrillard and Umberto Eco. Television and video games are precursors of a full-fledged hyperreality that would engage all the senses, as in Virtual Reality flight simulators. Borgmann offers examples of hyperreality in consumer culture. Cool Whip is hyperreal whipped cream. It is cheaper, longer lasting, and has less calories than the "real thing."

Gilles Lipovetsky on Hyper-Modernism

In 2005, the French sociologist and philosopher Gilles Lipovetsky published landmark theses about hyper-modernism in his book *Hypermodern Times*.[157] For Lipovetsky, the concept of post-modernism to designate the cultural paradigm of the times in which we are living is obsolete and needs to be superseded. "The owl of Minerva [reference to Hegel] was announcing the birth of the postmodern just as the hyper-modernization of the world was already coming into being."[158] Like Borgmann, Lipovetsky sees post-modernism as a short-lived and transitional phase. Hypermodernity is the consummation of all the earlier tendencies of modernity, such as bureaucratic rationalization and the compression of space and time. With information and communications technologies, speeded up financial transactions, neo-liberal economics, and global markets and culture, we are thoroughly immersed in hyper-modern intensity. There is limitless consumerism, commercialization, and a cult of excess in almost every area of life.

Above all, there is a dramatic change in the experience of time. We live in a perpetual hyper-present. Time has become over-stressed and highly individualized. Most people are overworked. The individual seeks pleasure as a priority but is burdened with tension and anxiety. Hyper-modern life places excessive demands on the person: extreme mobility, flexibility, always the fastest, the newest, and the most. There is a ubiquitous desire for recognition, or the seeking of hyper-attention from others. We invent our emotions in the immediate moment. The hyper-modern crisis of time also provides an explanation for the rise of neo-fascist-populist movements. Given the disappearance of historical meaning, there is widespread nostalgia for its reappearance, albeit in the guise of a simulacrum of itself.

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What is Hyper-Modernism?

Introduction

In the age that we are living in of new media, new technologies, and the information society, we find ourselves to be in a new situation in social and individual existence. As opposed to the previous historical periods understood by cultural theory as modernity/modernism and postmodernity/postmodernism, I call this new historical situation: hyper-modernity or hyper-modernism. One can also speak of hyper-modernism in politics, technology, art, and SF. My continued use of the term "historical" could also be placed into question. But I believe that the concept of history, as an orientation to the past, still has partial validity. Just as the term science fiction, as an orientation to the future, still has partial validity.

We need a new reflection on the contemporary situation, a new perspective that includes an awareness that we are living in something like a "post-history."[159] I think that the critiques of historical narratives emanating from deconstruction and post-humanism are partly correct. But the humanist historians who defend their professional practice against such deconstructions are also partly correct. Many things in the overall cultural situation have changed – in effect, the changes have piled one on top of the other over the past several decades – and we need new concepts in cultural theory for dealing with the new circumstances. We also need philosophy. As Gilles Deleuze and Félix Guattari wrote in their book *What Is Philosophy?*, philosophy is about inventing new concepts.[160]

Weird stuff is happening. Nowadays, the assumption that we know what "reality" is does not hold up. We are on shaky ground here and we need new ideas (in the context of practice, combining theory with advanced competencies in practical skills and areas). What is reality? What is the relationship between reality and media? Between reality and virtuality? Between reality and simulations? Reality and fiction? Reality and fake? Reality and software code? We need new terms for describing these new dimensions and relationships.

If we adopt the perspective of the German idealist philosophical tradition which goes back to the 18th century – such as Kant's *Critique of Pure Reason*, his critiques of ontology and transcendental analytics; of psychology, cosmology, and theology; then we arrive at

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the position that so-called "reality" was *always* a "metaphysical" notion, a naïve assumption.[161]

Jean Baudrillard's concept of hyperreality – since it paradoxically derives from the idea of "reality" – is perhaps also naïve. Yet in his later writings, Baudrillard goes beyond any trace of "metaphysics" with his inventive new concepts of seduction, "taking the side of objects," "impossible exchange," quantum physics sociology, "photography as the writing of light," and the self-parody or "carnivalesque" fifth order of simulacra.

Access to History

I will name four ways in which the model of history as we know it from the modernist cultural theory concept and its practice of historiography partly no longer applies and needs to be revised. All four of these aspects characterize the cultural theory concept of hyper-modernism.

First, we are no longer dealing with cultural theory concepts or *epistèmes* where the stages are clearly separated one from another. The previous epochs continue. We are in modernity, postmodernism, and hyper-modernism all at once. Hyper-modernism co-exists with, deepens, and supplants postmodernism.

Second, historiography is a problem. From within a culture of media hyperreality, we no longer have access to the past. Much of what we know about history comes from its representation-becoming-simulation in Hollywood films. We are partly cut off from knowing what happened in history by what Baudrillard calls "the Canetti point." Here Baudrillard references an aphorism by Elias Canetti from 1945, speaking about a certain point in history when the Enlightenment sense of a reasonable linear narrative of events vanished. It is an indeterminate point of the loss of coherence. It can only be experienced retroactively when it is too late. "It is felt as an awkward and mysterious estrangement between humanity and reality," writes the German Baudrillard scholar Samuel Strehle.[162] Canetti:

> A tormenting thought: as of a certain point, history was no longer real. Without noticing it, all mankind suddenly left reality… Our task would now be to find that point, and, so long as we did not grasp it, we would be forced to abide in our present destruction.[163]

Third, in hyper-modernism as opposed to postmodernism, we should partly go against Baudrillard's and Canetti's idea of the non-accessibility of history and re-consider humanist historiographies. This half-return to the availability of the past is a certain synthesis of the deconstructionist-post-humanist critique of humanism and the ethics of humanism. Or a synthesis of "the real" and "the virtual": the re-appearance in hyper-modernism of the seizing of an event which happened veritably – supported and enhanced by the high-tech database archiving of that event, the transformation of the event through multimedia technologization.

We can re-establish a connection to the past in hyper-modernism. Hyper-modernism has a strong elective affinity to informatics, new technologies, new media, and social media. The online platforms require massive content databases to provide

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data input to their high-speed "permanently on" 24/7 entertainment and infotainment systems.

The Carnivalesque

Fourth, simulation in hyper-modernism is no longer based primarily on models and codes that "precede the real" as in postmodernism. Simulation, especially in the sphere of politics, now functions in the modes of irony, parody, and farce – of self-parody of the previous values and contents of modernity – such as freedom, culture, truth, and humanitarianism. Self-parody already made an appearance in postmodernism: for example, in the imperatives to engage in freedom of choice in consumerist advertising's self-parody of democratic values.

In several small volumes *(L'agonie de la puissance*, *Carnaval et cannibale*, and *Télémorphose)* written towards the end of his life, Jean Baudrillard developed his concept of the self-parodistic phase of Western society and its radical Islamic enemies.[164] This corresponds to the fifth order of simulacra. It is a political-sociological theory influenced by literary theory – the carnivalesque as analyzed by the Russian literary critic Mikhail Bakhtin.

With Donald Trump, America has experienced the metamorphosis of democratic politics into Reality TV, the *tele-morphosis* of substantive and respectful debate into the rule of sensationalist celebrity culture and the fascination of nihilistic rhetoric. Many journalists and commentators keep pointing out that Trump is a liar, and this may be true. But that does not make a dent in the number of his supporters. Trump is already more "advanced" than the modernist discourse of truth. Invoking "the truth" against him does not work as a strategy. Trump is on the border between postmodernism and hyper-modernism. On the one side, he is a classical figure of the 1980s, which was a booming time for poMo. On the other side, Trump uses Twitter (and other social media platforms) to exist in the endless present. That is hyper-modern. Claims made on Twitter disappear into the dustbin of history after a few weeks. They are removed from any context of needing to be verified or substantiated.

Modernity, Postmodernism, Hyper-Modernism

Modernity is the long phase of history extending from the French and American democratic political revolutions of the late eighteenth century to the advent of the consumer society of media images and rhetorical discourse in Europe and North America after the Second World War. Modernity is the historical period of capitalism, industrialization, and rationalization (a term of the German founder of sociology Max Weber). Modernity is stories of the linear advance in time of progress, knowledge, science, and Enlightenment. Modernity is the teleological (pertaining to a doctrine that sees purpose or design in a temporal sequence) or eschatological (regarding a doctrine that concerns final matters such as death or the end times) step-by-step unfolding of human liberation as narrated by belief systems such as liberalism, Communism, Christian fundamentalism, or

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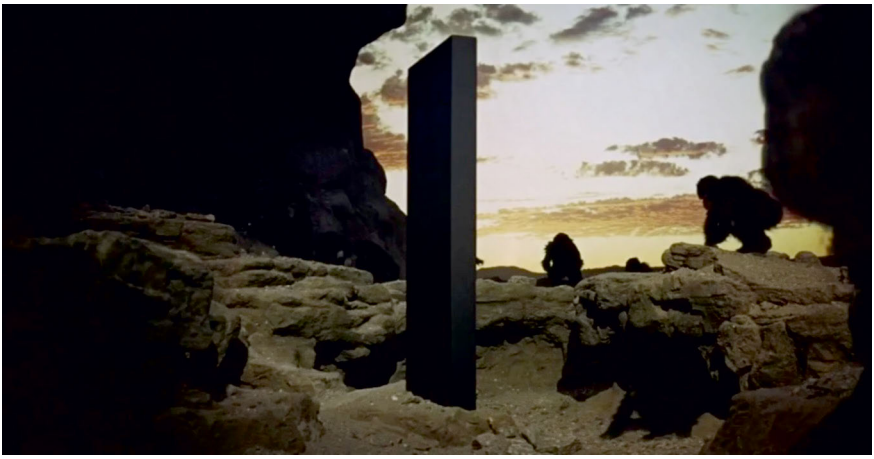
the philosopher Hegel's theory of history. It is the "grand narratives" of history. Postmodernism is the crisis of all of that.

Modernity is technology conceived as a *tool* for the domination of nature (as opposed to newer ideas of technology as environment, immersion, and partner) and the achievement of economic prosperity in the so-called heroic struggle against the so-called natural economic conditions of material scarcity. One speaks mythologically of the modern Prometheus – the figure of Prometheus in Greek mythology symbolizing modernity. Prometheus is known for "stealing fire" from the gods and presenting it to humanity as knowledge and technology. *Prometheus Unbound* is a fragmentary play by the ancient Greek poet Aeschylus, and an 1820 lyrical drama by the poet Percy B. Shelley.[165] *The Unbound Prometheus* is a work of historiography about the industrial revolution by David S. Landes.[166]

The paradigm of technology as a tool is pre-Heideggerian. A major statement about the shift in technology paradigms *from a tool to an environment* was made by Stanley Kubrick in his epic science fiction film *2001: A Space Odyssey.* In the film's fifteen-minute opening sequence, the black alien monolith incites a surge in the evolution of primatal consciousness from Ape to Man by suggesting to a selected group of becoming-Neanderthals the discovery of technology as tool and weapon. The allegory of the Fall of Man into *homo technicus* is the cinematic moment of the bone of a dead animal (which an Ape has just understood can be used to wield power) hurled in triumph into the air, jump-cut in a second many millennia into the future, morphed into a twenty-first century spaceship.



2001: A Space Odyssey, Stanley Kubrick director, Metro-Goldwyn-Mayer, 1968

At the start of the third millennium, the monolith reappears on the moon, sending a mysterious radio signal towards Jupiter. The astronaut played by Keir Dullea of the spaceship *Discovery* survives the ultimate psychedelic trip through the doors of perception near and on Jupiter. He returns to Earth as the cosmic baby who possesses a valuable secret

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about the next leap of human evolution to a higher consciousness. What is implied by Kubrick and screenplay co-author Arthur C. Clarke is the imminence of a paradigm shift in what technology is for humanity, changing from being a tool for the Anthropocene and a weapon in the killing-madness of war to technology redefined as a friend of the Earth and a helper in making peace. Technology will abet us in inventing new relationships to the "otherness" of other human beings and the "otherness" of animals, plants, and our shared planet.

Technologies of hyperreality (Baudrillard) and speed (Virilio) in postmodernism were originally implemented through many separate analog machines such as television and the airplane. In hyper-modernism, all these machines which alter spacetime are superseded by the universal machine of the computer. Analog expressive media such as images or music get transfigured by their representation in digital code and algorithms.

Historians often divide the historical epoch of modernity into the three phases of:

(1) "Early Modernity" – After the Middle Ages, from the mid-fifteenth century to the French revolution of 1789
(2) "Classical Modernity" – From the French revolution to 1914 or the beginning of World War I
(3) "Late Modernity" – which perhaps ended around 1960 when television first played a major role in deciding an American Presidential election, or perhaps ended with the early deaths of iconic pop cultural figures such as James Dean, Marilyn Monroe, and Elvis Presley

In his 1979 book *The Postmodern Condition: A Report on Knowledge,* Jean-François Lyotard writes that the postmodern society is distinguished by the disappearance of the "grand narratives" or "meta-narratives" of modernity, such as Marxism or the belief in the Enlightenment project of linear progress in history.[167] There is, in postmodernism, a turn in the humanities towards linguistic and symbolic cultural reproduction of commodified everyday life experiences – studied by communications science and the semiotics of signs and signification. There is the prevalence of specialized language games as a substitute for grand narratives, as diagnosed in the later works of the philosopher Ludwig Wittgenstein.

In art and literature, there is the classic mimetic social realism of the nineteenth century – Charles Dickens in England or Honoré de Balzac and Emile Zola in France. The classical realist paintings of Gustave Courbet depict peasants, workers, seascapes, and still lifes. Flaubert wrote realistic novels in an ironic mode where form and "a novel about nothing" supersede content. He was a forerunner of postmodernism. Modernism in literature corresponds to the postmodern worldview: absurdity in Franz Kafka and Samuel Beckett, the stream of consciousness in James Joyce, and the psychoanalytic memories of Marcel Proust. Impressionism, futurism, Dada, and surrealism are modernist movements in art. Marcel Duchamp, with his "ready-mades" or ordinary banal objects transformed into artworks, is a precursor of postmodern art. Andy Warhol "put an end to art" by deconstructing the myth of the individual artist as subjective creative genius. He instead engineered self-ironic works of image and consumer culture that operate as self-running machines. This "authorless" art based on the serial production of advertising

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memes is the apex of postmodern and the beginning of a hyper-modern style. Hypermodernism in literature is represented by Michel Houellebecq in France, Don DeLillo, William Burroughs, Hunter S. Thompson in America.

Gustave Flaubert: To Write a Novel About Nothing

A precursor of postmodernism in European intellectual history is the nineteenth-century French writer Gustave Flaubert, whose artistic project was to achieve total flawlessness in form, *to write a novel about nothing*. In perfectionist novels like *Sentimental Education* and *Bouvard and Pécuchet* and his satirical inventory of clichés and unreflectingly repeated ideas in culture, *Dictionnaire des Idées Reçues*, Flaubert makes fun of the grandiose optimistic visions prevalent in the eighteenth and nineteenth centuries in Europe, as well as encyclopedic projects of classifying, listing, and recording all human scientific and historical knowledge.[168]

In Flaubert's third novel *Sentimental Education*, the protagonist Frédéric Moreau falls continuously in and out of love with various women (of both "noble" and "debauched" types). His dreams of romantic fulfillment suffer constant and parodistic disappointment and ultimate disillusionment. The Hungarian Marxist literary theorist Georg Lukács cites that work in his *Theory of the Novel* (1913) as a landmark accomplishment of aesthetic form, rising to the heights of "true epic objectivity," capturing the literary-modernist sense of the "uninterrupted flow of time as a unifying principle."[169]

Bouvard and Pécuchet – published in 1881, one year after Flaubert's death – tells the story of two Parisian copyists who inherit money and move to the provincial countryside to take up a seemingly endless "picaresque" (fictional genre recounting the adventures of a hero who lives by his wits) search for "meaningful knowledge." The duo blunders their way through every scientific and humanities discipline – ranging from chemistry and biology to geology, archeology, and theology – before suffering the crashing shipwreck of failed self-education, and enduring the disdain of the local inhabitants, at every turn. Lionel Trilling writes in his preface to the English edition that Flaubert's novel demonstrates that "the whole vast superstructure of human thought and creation is alien from the human person."[170]

In Flaubert's notes which were discovered after his death, he states that it is the fictional characters Bouvard and Pécuchet who resolve to write the *Dictionary of Received Ideas*. The dictionary (written by Flaubert) was published posthumously in 1911. It is a fake reference work cataloging the platitudes of the French society of Flaubert's time. In his plan for the *Dictionary*, Flaubert writes ironically that the volume would be the "glorification of everything generally approved" and would be composed "deadpan" in such a way that "the reader could not tell whether or not one was on the level or making fun of him."[171]

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Hyper-Modernist Creativity

Hyper-modernist art, then, is the industrial design of objects and environments faking to be art. A more affirmative hyper-modernist art might be possible if the development of a hyper-modernist aesthetic were practiced with more conscious awareness. There would have to be more direct involvement in and reflection on informatics, as in the movement of Creative Coding. That movement can reintroduce visual creativity and poetics into informatics. The potential of that movement is not only to deploy the skill of engaging with code, but to transform what code is beyond the strictly engineering paradigm. Most designers are still users of ready-made software applications rather than coders of their own software. Since the form of software is decided by the software writers, and form is the essence of art, designers cannot attain the level of art by using software written by someone else.

Until now, the term hyper-modernism has not much been in common use. John Armitage discusses hyper-modernism in his "Editorial Introduction" to the special issue of the journal *Angelaki* called "Machinic Modulations: New Cultural Theory and Technopolitics":

> Contemporary cultural theorists of technology are presently engaged not so much in advancing forms of theoretical inquiry that seek to survey the ruins of modernism or post-modernism, but in accelerating methods of exploration that endeavor to unearth the foundations of … "hypermodernism".[172]

Hyper-modernism as a term was also used in the 1990s by Arthur and Marilouise Kroker and by David Cook.[173] I associate hyper-modernism with those conditions of virtual and online life which have disrupted assumptions about, and experiences of, space and time. Three-dimensional Euclidean space – a way of thinking about space belonging to the Western metaphysical "construction of reality" as it was originated by the Ancient Greeks – corresponds to our "intuitive perception" of space at the human scale. Media virtuality has the property of complex intricate paradoxical topology. It is the "non-Euclidean" spacetime of multiple refracting waves in an enigmatic hyper-space beyond classical geometry.

One paradox of science fiction is that, from within the culture of simulation, we do not yet have access to the future. The creativity that would be necessary to open this door of perception is missing. The fields of knowledge of history and of science fiction exist in relation to each other. In history, we are cut off from knowing past events. In science fiction or future design, we are cut off from knowing the future. In hyper-modernism, we live in an endless present. Thanks to the virtual database archiving technologies of hyper-modernism, we have the positive opportunity to half-know the past. Due to the multimedia technologization of experience, we can half-know the future in a paradoxical relationship towards what is to come.

Without this needed sensibility to paradox, science fiction will remain stuck in its present-day inability to predict. That is because we are living it. We are living in science fiction. Without something like a quantum physics complementarity paradox, we cannot differentiate between the present and the future. Our so-called predictions for new me-

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dia and new technologies will remain "vaporware." The affirmative future of informatics is in a project of Creative Coding that is also an expressive (post)human writing: a recursive "cybernetic epistemology" (to use Gregory Bateson's term[174]) against the cybernetic control models which dominate our social and individual lives.

Body, Self, and Code in Hyper-Modernism

I am interested in the recent British SF TV series *Black Mirror*. *Black Mirror* deals in a brilliant way with the social and human consequences of digital and virtual media technologies. A scene from the episode "White Christmas" of *Black Mirror* will illustrate my thesis about what happens to the body, the self, and software code in hyper-modernism.

A wealthy woman named Greta who is active in the art world goes into the hospital to have a procedure where a digital copy of her consciousness is extracted from her mind and placed into a container the size of an egg. This cloned consciousness *without a body* is going to become the algorithmic intelligence managing Greta's "smart home of the future." Greta becomes a "divided self" – split between an algorithmic self *without a body* who acts on me, and the so-called "real me" *with a body* who gets acted on. The so-called "real me" was, in pre-digital times, what I call the "consumerist body" of comfort and self-care. The consumerist body now becomes *a piece of living software*. The digital copy operates on me via *remote control*. The "divided self" is a term of the radical 1960s existential psychiatrist R.D. Laing.[175] Does there exist a utopian possibility of a dialog between, or reunification of, the two divided selves?

We are not far from having this technology today. We will have it soon with medical-biological "smart watches," and with algorithms acting on us in all areas of our lives. And as all good science fiction does, the portrayed futuristic technology is also a *metaphor* for our current situation. What *Black Mirror* calls *the cookie* has been sitting inside Greta's brain for one week, surgically implanted just under the skin between eye and ear, absorbing the patterns of her mind. We already have cookies in our daily use of the Internet. They are pieces of software that extract data from our behavior and actions.

Greta – played by Oona Chaplin – looks down with arrogance at the black female nurse who brings her breakfast, and at the female doctor, whom she suspects of being unqualified. Greta wastes food. She feels overwhelmed by her work responsibilities.

After the removal of the cookie via a thin cut to her skin, it is placed inside the "little widget." The egg device sits on the countertop of a high-tech kitchen in a big suburban house. Matthew – played by Jon Hamm – is the trainer of the "*simulated brain full of code*." He works for the company *Smartelligence*, which sells the "smart home of the future" to its wealthy clients. Matthew has a tablet-sized interface device which he uses to control algorithmic Greta. Greta's "simulated body" is about the size of Matthew's business card. "*You are a copy of real you*." However, we know from media theorist Jean Baudrillard that, in postmodernism and beyond, we are all copies without originals.

Matthew gives disembodied Greta a simulated body. He gives her a simulated control panel for carrying out the management operations of the smart home. She is responsible for temperature, lighting, alarm clock, making toast and coffee, ordering food for the

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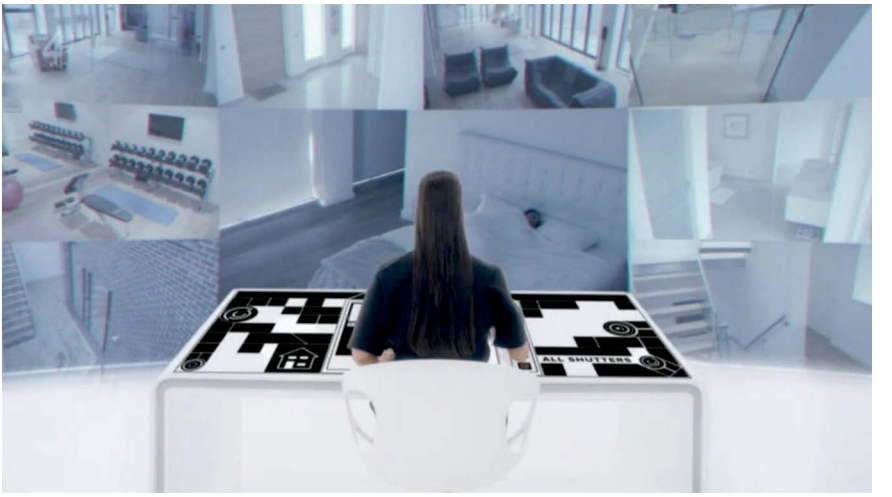
refrigerator, playing music, and the daily appointment schedule. She has a multi-window video surveillance system showing what is going on in every room of the house.



Black Mirror episode "White Christmas," Charlie Brooker creator, Endemole Shine UK, 2014

Algorithmic Greta is being trained to serve as a combination smart home and personal assistant. She is going to be the cook, the secretary, and the music mixer. She is going to do the "women's work," the invisible unpaid labor which capitalism requires of *female performance*. But to accept her fate, she must first be tortured into submission. She must be made to see that female work or torture are the only two alternatives. At first, she states assertively "*put me back in my body*." Then she screams hysterically, enacting the classic Freudian stereotype of female behavior. Matthew sends her into a virtual solitary confinement where there is nothing to do, and she risks going mad. Matthew speeds up algorithmic Greta's time to make her solitary confinement last for weeks or months. The connection made between the sexually feminine and the android-cyborg-robotic beings is like many other science fictional film narratives, from *Ex Machina* to *Ghost in the Shell* to Seven of Nine of *Star Trek*.

Algorithmic Greta is a "software state machine." What is a software state machine? Also known as a finite-state machine or finite automaton, it is a simple mathematical model of computation. It is an abstract or designed machine that is set to exactly one of a finite number of states at any given time. Designing the software state machine is a crucial step in the work of the software developer. The code or algorithm that acts on the state machine proceeds stepwise through its instructions, changing the machine's state in a sequence of steps known as transitions. As it executes, the code changes the state of the machine. The software of the company *Smartelligence* acts on the "software state machine" of the conscious Greta clone.

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Sincerity and Authenticity

In Shakespeare's *Hamlet*, Polonius gives this famous advice to his son Laertes: "This above all: to thine own self be true, and it doth follow, as the night the day, Thou canst not then be false to any man."[176] Lionel Trilling calls this sincerity: fulfillment of self through honesty with others, and vice versa, realized in society.[177] Polonius' speech evokes the hope of an undividable sincerity towards others and oneself, towards an immutable public end.

In *The Fall of Public Man*, sociologist Richard Sennett observes that the balance between public and private life has been upset in modern society.[178] People have withdrawn into themselves. They relate to society or public life only as a matter of formal obligation. In eighteenth-century Paris or London, people interacted freely in all kinds of situations because the realization of the self as sincerity was in harmony with public life. The modern city, by contrast, is a world of strangers. Individuals are no longer capable of accessing the creative force of the actor, the ability to play with and invest feelings in external images of the self.

The grand narratives of modernity – progress, industry, social engineering, capitalism, socialism, bureaucracy, etc. – tower over the besieged alienated self and trigger what Trilling calls the quest for authenticity. Authenticity is the fall of the public self. The modern individual now seeks fulfillment against society. Modernist literature is Franz Kafka's Josef K. fighting the bureaucracy, George Orwell's Winston Smith battling totalitarianism, and Albert Camus' Meursault embracing existentialism against the blinding sunlight, the daily oppressive routine of work, and the arrogance of God's spokespersons.[179]

At a certain indeterminate point in the history of Western culture, humans became individuals. One relates to others via self-disclosure and "the expression of core feelings."

In postmodernism, the "social" gets simulated via models and codes which "precede the real." Events and experiences are replaced or ordered by the image, the rhetorical, the virtual, the electronic, the digitalized. The body becomes the site of "personal care" in consumerism. The body resembles its own models, as in fashion, cosmetics, and plastic surgery. My body is culturally encoded: I want to look like the actors on TV to be professionally and sexually "successful." In hyper-modernism, the narcissistic self gets programmed by the personalized advertising and "smart" environments of big corporations.

Darko Suvin on Science Fiction Studies

With his 1979 work *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*, Darko Suvin established science fiction studies as a legitimate academic field within literary and cultural studies.[180] His influential book also gave the new subdiscipline a decidedly Marxist framing. Two of Suvin's main concepts are "cognitive estrangement" and the *Novum*. Science fiction, for Suvin, is the imagination of utopia. But it is also the presentation by the SF author of an unsettling alternative world in a scientifically plausible and convincing guise. It jars the reader into a sense of estrangement just like Marxist playwright Bertolt Brecht's "alienation effect." In his theatre practice, Brecht practiced the reflexive doubling and shadowing of the existential situation of

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viewers. Suvin refers explicitly to Brecht, claiming that estrangement (*Verfremdung*) "has grown into the formal framework of the genre."[181] An effective SF narrative thoroughly shakes up the reader's life and provokes changes in their attitudes towards their own world.

For Suvin, much of what is called science fiction is not science fiction. He wants to establish a canon that is only a small portion of the total SF output by novelists and short story writers. More than 90% of what is produced is superfluous and irrelevant. Suvin views Jules Verne and H.G. Wells as the beginning of genuine "cognitive estrangement" science fiction. "All subsequent significant SF can be said to have sprung from Wells' Time Machine."[182] Genuine science fiction, for Suvin, presents an ideal possibility fashioned as a reasonable thought experiment. It is a methodically laid out scenario consistent with modern science. SF is characterized by the hegemony of a "fiction 'novum' (novelty, innovation) validated by cognitive logic."[183] The *Novum* is "so central and significant that it determines the whole narrative logic."[184] This achievement is what is estranging for the reader.

By assimilating SF to Marxism and leftist political consciousness, Suvin in fact limits the power of SF. It becomes the equivalent of Marxism, another expression of Marxism. SF loses its autonomy. It is limited to a literary genre of novels and films to be studied by academics. Its potential as a worldview and an epistemology is short-circuited. Yet Suvin's landmark tome was an important step forward for the field. He does speak about the radical future potential of SF expression beyond the works which already exist. We can retain from Suvin the importance of analyzing masterpieces. Yet it is time to move on to the next step.

Suvin's canonical work ties science fiction studies to the theories of alienation of the early Marx and of Bertolt Brecht and to the idea of "cognitive estrangement." By making science fiction the equivalent of "critical theory," Suvin blocks recognition of and theorizing about the autonomy of the worldview of science fiction.

Carl Freedman on Science Fiction Studies

In *Critical Theory and Science Fiction*, Carl Freedman argues that SF should be a privileged literary genre for Marxism and "critical theory."[185] He is a follower of Darko Suvin in the emphasis on "cognitive estrangement." Freedman's stated goal is to do for science fiction what the Hungarian Marxist literary theorist Georg Lukács did for historical fiction in *The Historical Novel* (1939).[186] Freedman's definition of "critical theory" ranges generously from the Frankfurt School (Theodor W. Adorno, Walter Benjamin) to "post-dialectical theorists" like Derrida and Foucault, but also includes psychoanalysis, Marxism above all, and is retroactive to the "self-reflective thought initiated during the historical moment of Kant and Hegel."[187] SF, like Marxism, has "the potential to play a role in the liberation of humanity from oppression."[188]

Philip K. Dick, for Freedman, is "the Shakespeare of science fiction." *Ubik* is Dick's "finest novel."[189] My reading of *Ubik* (see the last part of the first essay of Part One of the present study) is that it is about the question of how to occupy an "outside" epistemological position with respect to the "inside" of the dominant capitalist-technological-virtual

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system. With the ingenious invention of "the Moratorium," Dick leaves the safe confines of the designated literary space called the novel to create the scenario of a "science fiction world" where SF disruptions, paradoxes, and aporias "become the world." For Carl Freedman, *Ubik* is a stylistic achievement of "cognitive estrangement": "a clear otherness vis-à-vis the mundane empirical world where the text was produced – which is, however, connected (at least in principle) to that world in rational, nonfantastic ways."[190] Dick is dialogical and dialectical. Bringing together the casual and the estranged in his generation of sentences, Dick – according to Freedman – challenges all formalistic conceptions of style.

In Freedman's view, there is a paucity of "interesting cognitive estrangements" and no progressive cyborgs, in *Star Trek*.[191] He maintains that Haraway is wrong in her assessment that the cyborg plays a subversive role with respect to gender and other social categories like race and class in contemporary media and techno-culture. Evidence that Haraway's "simplistic theoretical model," which is "longer on assertion than on demonstration," is mistaken is the fact that, for Freedman, *Star Trek*'s Borg and Seven of Nine are not emancipatory figures.[192] They reinforce white male authority and "function to support the most banal sexist stereotypes."[193] Freedman calls Haraway's work "idealistic" and "formalistic."

In "A Manifesto for Cyborgs," Haraway is talking about the cyborg in the specific scientific-historical-cultural context of Norbert Wiener's first-order cybernetics; NASA's "technologically-enhanced astronaut" project of the early 1960s; the neuroscience research of Clynes and Kline (who coined the term cyborg); the "self-regulating man-machine system;" the conceptualization of a "common science" of biology and informatics; the formulation of the material-semiotic object of inquiry; humans as information processing devices; and the techno-cultural and techno-scientific thread issuing from this constellation of developments.

Even more emphatically than Suvin, Freedman ties science fiction studies to the idea of "cognitive estrangement" and to neo-Marxist critical theory. He blocks recognition of and research into the autonomy of the worldview of science fiction.

Istvan Ciscsery-Ronay, Jr. on Science Fiction Studies

Istvan Ciscsery-Ronay, Jr., in *The Seven Beauties of Science Fiction*? (2008), goes beyond Darko Suvin and Carl Freedman by expanding the academic field of science fiction studies from the scholarly analysis of specific genre categories to a worldview for our times.[194] The application of technoscience to every aspect of life yields massive daily transformations. There is a widespread collective energy and desire to imagine a livable future in co-existence with advanced technologies. Science fiction is a mode of awareness and way of thinking about the world that frames everyday life experiences as if they were embedded in SF scenarios. Scientists, engineers, and programmers strive to bring their favorite SF technologies to practical realization. Virtual environments are sold with SF advertising campaigns. All the films and TV series that we watch accustom us to science fictional habits of mind. Ciscsery-Ronay writes:

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> With the saturation of society by technoscience, SF and social reality were finally recognized as inextricably intertwined… From SF we draw many of our metaphors and models for understanding our technologized world.[195]

Ciscsery-Ronay describes science fiction as a constellation of seven cognitive attractions or intellectual gravitational fields that are formative of "science-fictionality":

(1) Fictive Neology – SF writers imaginatively invent words and phrases in the context of changed or alien worlds. Examples are the futuristic language of *A Clockwork Orange* by Anthony Burgess; Newspeak in Orwell's *1984*; the "orientalism" of Frank Herbert's *Dune*; the "anthropologism" of Ursula Le Guin's *The Left Hand of Darkness*; the Klingon language of *Star Trek*; and cyberpunk's neologistic creativity, with much nomenclature adapted from the sciences and informatics.

(2) Fictive Novums – This term derived from Darko Suvin (who adopted it from Ernst Bloch) refers to phenomena of newness and difference in SF where "aesthetic effect" is fused with "ethical and historical relevance."[196] For Ciscsery-Ronay, "cognitive estrangement" in SF is not always the equivalent of "critical theory," as it is for Freedman, Jameson, McQueen, and other Marxists. Stanislaw Lem's *Solaris* is a "pure novum." Philip K. Dick was the master of multiple novums. The novum in Dick is often a surprising discovery or invention that has as consequence "a wholesale change in the perception of reality."[197] In SF, fictive novums trigger "imaginary models of radical transformations of human history."[198]

(3) Future History – This takes many forms such as the techno-revolutionary model, the evolutionary model, the narrative conventions of time travel, and alternative "real histories" like Philip K. Dick's *The Man in the High Castle*, about a post-World War II America where the Nazis and the Japanese won the war and control the East and West coasts of the US, respectively. Other forms are "retrofutures" and "steampunk" alternative industrial revolutions of alternative pasts. SF usually portrays futures relevant to the present. SF is fundamentally not about the future, predictions of the future, or the "accuracy" of those predictions. It is about the present, the hyperreality of the present that the dominant ways of thinking prevent us from seeing. We are separated from the future by the chasm of chaos. No one predicted the fall of the Soviet Union or the World Trade Center. We can recognize the impossibility of imagining what the world will be like a hundred years from now by reflecting on the impossibility of people a hundred years ago imagining the world we live in today.

(4) Imaginary Science – The French playwright and satirist Alfred Jarry defined pataphysics as "the science of imaginary solutions."[199] In many ways, postmodern and hyper-modern science are pataphysical. SF, with its imaginary solutions to "real" scientific problems, is pataphysical. The "imaginary science" of SF is largely figurative, an image – or self-image – of science. SF science is a poetic illusion or playful performance disguising its own phantasmagoric status. There are plentiful thought experiments and playful deviations from scientific facts. Ciscsery-Ronay writes: "A striking development in technoscientific culture has been the gradual penetration of science-fictional consciousness, not only in the popular framing of science, but in scientific work itself."[200] A major research area within physics is now "*Star Trek* science": specu-

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lations and projects that work on faster-than-light speed, teleportation, engineered wormholes, and time travel.

(5) The Science-Fictional Sublime – Ciscsery-Ronay begins with an extensive exegesis of the idea of the sublime in Immanuel Kant. The SF sublime or profound sense of wonder is classified into several categories: sublime monstrosity (the Frankenstein story); the American technological sublime (the silver lining "beauty" of the atomic bomb mushroom cloud; the "mathematical sublime" of *2001: A Space Odyssey*; the fast-paced "dynamical" sublime of *The Matrix*; and the "feminine SF sublime" of *Up the Walls of the World* by feminist SF author James Tiptree, Jr. (pen name of Alice Sheldon).[201]

(6) The Science-Fictional Grotesque – Science fiction cultivates the grotesque for its popular appeal. The grotesque has a long tradition in European popular culture, as Bakhtin demonstrated in his landmark work of literary theory *Rabelais and His World*.[202] The science fictional grotesque ranges from monstrous aliens to shocking phenomena of physics.

(7) The Technologiade – This is the epic narrative of the fight over technoscience taking control over all societies and planets in the cosmos. It is seen as having an elective affinity with contemporary ideas about the coming of "The Singularity."

Ciscsery-Ronay places emphasis on the fact that theorists such as Baudrillard and Haraway use overt images, tropes, and terminology from SF in their theories. This is a Situationist *détournement*, not of science (as Sokal and Bricmont in *Intellectual Imposters* would have it), but of science fiction.[203] The seven "cognitive attractions" of science fiction as conceptualized and fleshed out by Ciscsery-Ronay – which are formative of "science-fictionality" – are a major analytical step towards developing a science fiction studies where the epistemological mode of SF is considered autonomously, and not as the equivalent of Marxism, critical theory, or "cognitive estrangement." The next step in the development of this "autonomous" science fiction studies would be to meticulously think through how each of the seven "intellectual gravitational fields" is operative not only in science fiction novels and films, but in the "real world" of what is happening "science fictionally" with the impact of technologies on society and the lives of citizens of late capitalism. Ciscsery-Ronay himself stops short of taking this step. It is a task for my future work.

Ciscsery-Ronay takes a major step beyond Suvin and Freedman, and towards conceptualizing science fiction as an autonomous epistemological mode for understanding and being in the world.

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Part Two – Hyperreality: Reevaluation of Jean Baudrillard's Media Theory and the Simulacrum

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Overview of Part Two

In Part Two, I argue that Baudrillard's thinking can illuminate the paradigm describing the current era which cultural theory calls hyper-modernism. I focus on the question "What is the relevance of the simulacrum and hyperreality to digitalization today?" There is a tendency for everything that we experience to become more and more virtual, including contacts among people. Experience is moving towards a Virtual Reality "Metaverse." VR and AR simulations are on the rise. There is a crisis of democracy or situation of post-truth. Hyperreality provides a deep explanation of post-truth. All these cultural trends have to do with an original thing getting substituted by its image, copy, statistical model, or code. They are all to be clarified through the simulacrum. I focus on the questions "how can the simulacrum be challenged?" and "what is the 'escape hatch' way out of hyperreality?" With the thought experiment that "everything is simulation," one gains access to new strategies for challenging the social-cultural order. Given the importance in hyper-modernism of informatic codes, a crucial arena for challenging the simulacrum becomes the transfiguration of software code. We should think with and after Baudrillard, upgrading his concepts for advanced digitalization.

How can I grow my own ("science fictional") thinking that elucidates the effects that digital media technologies have on society and our lives? How is my engagement with Baudrillard's thinking going to advance this project? The main questions that Baudrillard poses in his philosophy are how can one speak of a "new real" when all is simulation? and how can one speak of simulation when there is nothing outside it, no exempted location from which one may observe it, only an "outside" which exists on simulation's own terms? What Baudrillard identifies as "seduction" is defined as the enabling (or disabling) condition which makes simulation possible (or impossible). Seduction is that which encompasses, precedes, and exceeds simulation. Seduction is the difference between the original and the copy which simulation seeks to suppress in its attempt to represent or institute the regime of hyperreality.

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Defining the Simulacrum and Hyperreality

The term simulacrum – meaning an image or semblance of something – derives from the Latin *simulare*. Starting with Plato, Western philosophy has regarded what it calls the simulacrum with suspicion. Thinkers associate the simulacrum with falsity, implying a dualistic opposition between truth and simulacrum. For Baudrillard, the simulacrum is what is "true." The simulacrum conceals the state of non-existence of conventional "truth." Karl Marx, for example, regarded "alienation" under capitalism as a state of untruth which would be overcome by the "radical subject" or the activities and desires of the fundamentally non- alienated worker.[204] For Baudrillard, we are now in an era beyond that dialectic where the self has been absorbed into the ubiquitous images and "communication" networks. We live through simulacra.

The idea of reality was already a cultural construction – a construction of Western civilization. Our notion of "the real" was always already a simulacrum. This is what makes the operation of "the virtual" possible. "Reality" in our culture was always an illusion. This chimera was maintained by the clearly demarcated difference between "the real" and its representation. The media culture breaks down that difference. Hyperreality appears with the third order of simulacra. Now the proximity of "reality" to the models and codes which instantiate it, and on which it is dependent, leads to corruption. Reality and the image move into each other's spaces.

In hyperreality, there is an excess of images and limitless visibility. What disappears is the dimension of imagination that is linked to representation. This dimension maintains a salutary distance from "the real." With the media of a novel, for example, each reader deploys her imagination and own memories to form her mental picture of the story. There are as many versions of the story as there are readers. With the film adaptation of the novel, the story is fixed in a hyper-real way by the images selected by the director.

Images and discourses substitute for the "references" (posited by Saussure to be outside of discourse) for which they allegedly stand in.[205] The simulacrum and hyperreality are intimately entangled with the central objects of Baudrillard's investigation: the system of objects, the consumer society, television, shopping mall architectures, post-World War II America. Today hyperreality provides a deep explanation of post-truth in the hyper-modern crisis of democracy.

Thinking Hyperreality: From Rhetoric to Code

The concepts of the simulacrum and hyperreality are the basis for my investigation of digital transformation and the consequences for society and culture of advances in digital and virtual technologies. I situate my work as having an ambivalent relationship vis-à-vis these two classical ideas of philosophy and postmodern media and cultural theory. I both recognize the indispensability of these concepts for apprehending the postmodern world and the exigency of rethinking the simulacrum and hyperreality in the circumstances of digitalization.

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Ironically, it has become clearer than ever before that we live in the middle of hyperreality. Baudrillard's theses were well ahead of their time. The simulation of almost any supposedly "real" thing is increasingly indistinguishable from what that signifier is alleged to represent. There is no original thing or origin of either "real" or copy. With Virtual Reality and Augmented Reality, the physical world combines with digital images. Online experiences resemble more and more in their "look and feel" the offline world which was previously the most familiar. In VR, there is not just immersion (as was initially thought). There is intensifying interaction. Human and Artificial Intelligences unify. With the Brain-Computer Interface, we no longer mediate to networks and humans via devices but are neurologically connected or plugged in. During the COVID-19 pandemic and lockdowns, the use of video teleconferencing software applications like Zoom accelerated exponentially. Participation in virtual environments while anchored from the grounding of my body is superseded by the surrogate of my avatar. The explosive growth of computer games as virtual worlds (like Fortnite and Minecraft) foreshadows the ubiquity of the game-like Metaverse.

The term hyperreality has been reintroduced into the mainstream discussion as describing technologies. The fact that Baudrillard wrote about hyperreality long before these technologies existed already makes a crucial point vividly. It highlights the insight that hyperreality is cultural before it is technological. Today's technological implementation of hyperreality is, on the one hand, a continuation of the consumer and media culture that was established in the pre-digital world of the first decades following the Second World War.

Yet, on the other hand, there is indeed a break between postmodern analogue hyperreality and its contemporary hyper-modern incarnation. Hyperreality is not only implemented by the "rhetorical" dimension of images and discourses decoupled from their "references" of truth and fact and "the real" which would be outside of the signifying system. Hyperreality is now implemented by code. It is implemented by algorithms and Artificial Intelligence Deep Learning and Big Data. Hyperreality can no longer be apprehended primarily by semiotics or classical media theory. Understanding of and active engagement with the simulacrum requires a trans-disciplinary informatics that is both critical and creative. In many ways, the ground must shift from a theory of images to a theory and practice of code.

Baudrillard's Importance for the Future

In the first essay of Part Two, entitled "Baudrillard's Importance for the Future," I explicate Baudrillard's key concepts of the simulacrum and hyperreality. I go through and expound upon his genealogy of the "five orders of simulacra." I state my position in the controversial debate surrounding Baudrillard. I make exegeses of his books *The System of Objects*, *The Consumer Society*, and *For a Critique of the Political Economy of the Sign*.[206] I clarify his concepts of symbolic exchange and the gift economy as outlined in his book *Symbolic Exchange and Death*.[207] I engage with the important secondary literature study by Rex Butler called *Jean Baudrillard: The Defense of the Real*.[208] I comment on Baudrillard's diagnosis of digitalization as "interactive performance" in *The Ecstasy of Communication*.[209] I

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consider Baudrillard's relationship to the philosophy of René Descartes as fleshed out in *The Evil Demon of Images*.[210] I write about the science fiction story "The Nine Billion Names of God" by Arthur C. Clarke, to which Baudrillard refers throughout his *oeuvre*.[211] I study the topic of poetic resolution in Baudrillard's thought. I comment on other hyperreality theorists like Daniel J. Boorstin and Umberto Eco.[212] I unpack Baudrillard's importance for the future.

Baudrillard and the Situationists

In "Baudrillard and the Situationists," I comment on the relationship between the idea of hyperreality (and simulation and simulacra) and Guy Debord's concept of the "society of the spectacle."[213] Debord's analysis of media-intensive culture in late capitalist societies deeply influenced Baudrillard's conception. Debord was a principal figure of the Situationists, a movement of radical artists, architects, writers, and political activists prominent in Europe from the 1950s to the 1970s. I investigate how both Baudrillard and Debord updated their concepts for the digital era. I explicate Baudrillard's idea of "taking the side of objects" and connect it with Situationist post-art activist practices for challenging hyperreality. I link "taking the side of objects" with three texts of 20th century existentialist philosophy: Jean-Paul Sartre's *Nausea*, Albert Camus' *The Myth of Sisyphus*, and Simone de Beauvoir's *The Ethics of Ambiguity*.[214]

I draw a connection between the resistance of objects or the world as an enigmatic "radical illusion" and practices that transform the dominant capitalist culture of the simulacrum. I elucidate seven Situationist practices: wandering or the drift (le dérive); psycho-geography; the diverting of technologies (le détournement); the making or creating or construction of situations; "post-art" or "the radical illusion beyond art"; neo-Situationism in the context of digital technologies; and urban and street art activism. I present an example of the application of Augmented Reality during the Occupy Wall Street movement in New York City in 2011.

Baudrillard and Trump

In "Jean Baudrillard and the Donald: Is Trump a Fascist or is He the Parody of Fascism?," I explain the phenomenon of Reality-TV-billionaire-turned-President-of-the-United-States Donald Trump deploying Baudrillard's concepts of simulation, simulacra, hyperreality, and "telemorphosis." Trump represents the full-fledged takeover of politics by Reality TV. I argue that the epistemology of true and false, or facts and lies – largely the assumption underlying the discourse of the liberal media such as CNN and the *New York Times* – is insufficient for explicating Trump, and that a different epistemology of hyperreality would lay the groundwork for explaining much more. In a sense, something becomes true because Trump says it. In hyper-modern media culture, fake and authenticity exist in a complex paradoxical relationship. Hyperreality also illuminates the more general phenomenon of post-truth. There is a crisis of democracy intensified by the emotional and ideological atmosphere of the polarizing "echo chamber" and "filter

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bubble" structured by the social media platforms. Consensus agreement about facts, truth, and science are weakened. The spokesperson of the liberal media invokes "the truth," believing herself to thereby inhabit an "outside" position to simulation.

I focus on two texts written by Baudrillard shortly before his death in 2007: *Carnival and Cannibal* and *The Agony of Power*.[215] He writes about a new "fifth order of simulacra" which is the self-parodistic stage of Western society where, as exemplified by Donald Trump, the values of the West and of America decline into a caricature of themselves.

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Baudrillard's Importance for the Future

The Controversy Around Baudrillard

Baudrillard is highly controversial as a thinker. Over the course of time, his work has had as many detractors as it has had defenders and enthusiasts.[216] Some of Baudrillard's critics absurdly even accused him of celebrating the postmodern media-cultural condition of simulacra and semiotic signs becoming increasingly autonomous and detached from the "referents" of which they were supposed to be the representations.[217] The popularized misreading of Baudrillard is that he diagnoses techno-culture as an Empire of Signs which has forfeited its connection to the real and has spun itself off aimlessly into a never-never land of meaningless funhouse simulations. Having thus been caricatured, Baudrillard is condemned as the pope of the takeover of reality by semiotic signs, or the solipsistic denier of the existence of an externally objective real. Baudrillard would be the David Bowie of philosophy, the king of the carnivalesque, the avant-garde prophet of cultural pessimism.[218]

The single most overriding reason that explains the animosity towards Baudrillard's work is that he very often made statements along the lines of: *Everything is virtual. Everything is simulation.* Reality has disappeared (albeit through too much reality or as the culmination of the Western cultural and scientific concept of "reality" intensified into hyperreality). There is no distinction anymore between reality and its representation, and the vanishing of the gap between them is the state of simulation. These kinds of statements by Baudrillard infuriated many of his commentators.[219]

His detractors say: It cannot be that everything is simulation! Look at this table – it is real! If Baudrillard crosses the street without looking, he is going to get hit by a truck! The same as you and me!

Indulging for a moment in wrongheaded wishful thinking, one can entertain the thought that maybe it would have been better for his reputation if Baudrillard had said something like: There is a definite tendency for things to become more and more virtual. There is a strong trend for the percentage of what is real to decrease and the portion of what is virtual to increase. These would have been "respectable" and accurate empirical statements and good "predictions."

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As someone who believes in the importance of Baudrillard's work, one is tempted by the thought: if only he had expressed his key concepts more empirically and in a less absolutist way, then he would not have been so harshly and often attacked! There would have been more appreciation for the value of his insights!

But wait – this is not correct at all! To wish for that would amount to making Baudrillard into an idiot. He was not an idiot, and it is in fact very valuable to think instead about WHY did he say that "everything is simulation"? Why does he say this? What is the significance of him saying that everything is virtual? Rather than shy away from what appears to be an extreme and even ridiculous claim, I embrace the declaration and explain why it is important.

Baudrillard continuously said that "everything is simulation (or virtual)" rather than saying that "there is more and more simulation (or virtuality)" because the diagnosis of simulation, simulacra, virtuality, and hyperreality in contemporary culture is not the main concern of his work. The main concern of his work is to open a new knowledge field of reflection on and investigation into the possibilities of the challenge to the simulacrum.

He is primarily interested in how the condition of hyperreality can be contested and changed. Baudrillard thought that the "epistemological" statement that "everything is simulation" is a prerequisite to getting to the vitally important questions of conceptualizing where exactly there could be challenges to the system of virtuality in its mainstream manifestations. Baudrillard believes that it is only by acknowledging the simulacrum, facing it head on, that one can then begin to theorize about social change. Those who insist upon defending the good old-fashioned "natural reality" (or what is left of reality) against the virtual or the posthuman circumstances cannot get to this point of challenging the system. They cannot reach the plateau from where they can see the new vistas of resistance.

The overwhelmingly dominant position of leftist intellectuals (for example: Marxists, humanists, and even some celebrated Deleuzian "post-humanists" like Rosi Braidotti) is that the challenge to virtuality comes from the identity or growing consciousness of certain identified groups of human subjects who are oppressed by what is conceived of as the latest phase in the cognitive mapping of the stages of capitalism.[220]

Yes – Everything is Simulation!

Looked at in one way, Baudrillard's claim about the whole world being/becoming a simulation is obviously false. Looked at in another way, the hypothesis makes sense and is valid. From the standpoint of empirical sociology or a scientific methodology that evaluates statements measured against how things "really are" in the world, such pronouncements are incorrect. The human body still exists. There are still trees. A certain fact took place. The neo-Marxist or Frankfurt School "critical theory of society" believes that its object of inquiry – for example, ideology or "enlightenment as mass deception" – is mendacious or counterfeit.[221] Those who have been duped by false consciousness or media manipulation or some set of cult beliefs are still susceptible to being brought back to "the real" or to "the truth." Critical theory is suspicious of the principle of the simu-

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lacrum, whose assertion would seem to imply that the participants are hopelessly lost in the chimerical flourishes and imaginary phantasmagoria of perceptual appearances and discursive effects.[222]

But evaluated in another way, as *science fiction theory*, Baudrillard is working with an "ideal type" (a term of Max Weber) of a scenario of a future society in whose direction we have been headed for a long time, and towards which we are surely headed even more.[223]

I will further argue that, after having asserted the prerequisite or first principle that "everything is simulation" (an alternative to the first principle of natural science that the mission of the scientist is to investigate "the true nature of reality"), Baudrillard went on to name and conceptualize a whole series of new locations and possibilities for challenges to the simulacrum. I seek to enumerate those sites of contestation. In the absence of lending oneself to acceptance of that first principle, it would not be possible to see beyond the horizon of received ideas to this new field of research and exploration. I will additionally argue that many visual and textual science fiction narratives bring into visibility and into focus these arenas of challenge to the simulacrum. In the genre of science fiction stories, of course, it is allowed to posit a "fictional" scenario in which "everything is simulation." Both empirical social science and the Marxist view that what we are living in can be named as "capitalism" of course do not allow this.

My argument is that certain ideas can be elicited from Baudrillard that contribute to a "science fiction theory" which identifies what we are living in not as "capitalism" but rather as a *science fiction world*. Then it will be a question of how that "science fiction world" can be contested, reversed, or transformed. I call this object of inquiry the trapdoor, escape hatch, or secret way out of simulation and hyperreality.

If only Baudrillard would just call what he is doing fiction and practice it as fiction! Why must he insist on bringing science fiction into cultural theory? He has the audacity to try something new and which was different? N. Katherine Hayles (in what she wrote about Baudrillard in the prestigious academic journal *Science Fiction Studies* in an essay entitled "The Borders of Madness."[224]) would like Baudrillard to openly acknowledge that his texts are fictional. SF should be a warning and is not a serious mode of thinking. Baudrillard, according to Hayles, fails to describe empirically the implosion into simulation but rather enacts that event himself. Hayles regards this as dangerous. She compares it to a powerful drug. Baudrillard represents, for her, apocalyptic madness. What she does not see is that his theory is opening the "doors of perception" to the ways to resist and change the simulacrum.[225]

Early Baudrillard: *The Consumer Society and For a Critique of the Political Economy of the Sign*

The postmodern recombinant culture of cyber-commodities is a system of simulated differences or differences-in-sameness.[226] The sign-object takes on its meaning in a system of marginal or minimal differences from other sign-objects, according to a code of hierarchical significations (Coke and Pepsi, McDonalds and Burger King, the subset of formula-generated episodes of a TV series or pop-cult movie franchise which are mediocre).[227] The sign-object acquires sense from its differential relationship to

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other signs. As Marshall McLuhan points out, the media is the message.[228] In this case, the media of equivalence and universal exchangeability makes "the code" become the primary quality of all sign-objects. This insight is an extension of what Marx had recognized in his analysis of the universal exchangeability system that is called money and the system of equivalence of *exchange-value* which, according to Marx, diminishes the *use-value* of everything made under capitalism.[229]

What occurred in the mid-to-late twentieth century was that America was no longer physically locatable in the specific geographical space situated between New England or New York and the nation's westernmost frontier (which shifted from the Virginia-Kentucky border to the Mississippi River, then eventually California and then Hawaii). At a certain indeterminate point in its history, America exploded from physicality to virtuality and "became the world." Or the other way around – the whole world imploded into virtuality and became Americanized: the same big color TV screens everywhere; the same shopping malls; the same Coca-Cola, all-American hamburger, and "French fries"; your identity, logo, or "personal" message printed on a T-shirt; the images of horseback-riding cowboys and Superman comics; the glories and tragedies of Elvis Presley and Marilyn Monroe; eventually McDonalds, Starbucks, Nike sneakers. and Apple computers everywhere on the planet.

Jean Baudrillard's entire *oeuvre* is a study of America, of that virtual America, of that post-World War II model of "social" existence which, in his 1986 book entitled *America*, he called "utopia realized."[230] He regarded the term "social" as obsolete since henceforth "the social" was merely simulated by electronic networks and opinion polls. Baudrillard did indeed travel to physical America (he was a visiting professor three times in the 1970s-1980s at public universities in California), but this was not strictly necessary. He could have meditated on virtual America and its mythologies of economic abundance and personalized liberty by turning on the nearest TV set, frequenting the regional superstore (a buying place combining supermarket and department store), or grabbing takeout from the corner fast food outlet.

The Parisian metropolitan area versions of Americanization were plentiful and painful: the Westfield Parly-2 shopping mall near a major highway exit 45 minutes west of downtown Paris with 150 retail stores opened in 1969; the Centre Pompidou high-tech building complex dedicated to culture (symbolizing the spectacular-commodified marriage of art and technology) located in the 4th arrondissement of Paris opened in 1977 and has since had more than 180 million visitors; and Disneyland Paris (whose name speaks for itself), located 45 minutes east of the center of Paris, opened in 1992.

For Baudrillard, mass identity architecture is "deterritorialization" or the disappearance of the "terrain" of space. Gilles Deleuze and Félix Guattari also write about deterritorialization in *A Thousand Plateaus: Capitalism and Schizophrenia* (1980).[231] The concept brings Baudrillard close to the French social scientist Marc Augé, who argues in *Non-Places: Introduction to an Anthropology of Supermodernity* that typical spaces such as international airports and hotel rooms are designed to look exactly like all other airports and hotel rooms, to be effectively *nowhere*, to erase history, identity, and tangible spatial experience.[232]

In *The Consumer Society*, Baudrillard writes about the ambience of department stores, shopping centers, supermarkets, hypermarkets, *le drugstore*, and shopping malls – those

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cities in miniature which surround the visitor with every kind of culinary and cultural experience and amenity – cafés, restaurants, food courts, cinemas, bookstores, travel agencies, art galleries, fashion shows, music and dancing, waterfalls, greenery – a veritable cornucopia and "culturalization" and even "naturalization" of selling and buying.[233]

The hypermarket, for Baudrillard, is at the center of the architecture and layout of the sprawling metropolitan area, alongside the "integrated circuit" networks of highways, multistory parking lots, and telecommunications topologies and computer terminals. These circulatory hallmarks of the built environment of the metro area are direct applications of first-order cybernetics, an interdisciplinary knowledge field originated by MIT mathematician Norbert Wiener. In his 1948 book *Cybernetics: Or Control and Communication in the Animal and the Machine*, Wiener outlines the scientific study of regulatory systems in human, natural, and artificial worlds, and the formalization of the concept of feedback.[234]

The hypermarket integrates humans into information and communication networks as systems of disciplinary socialization via technology. In an inversion of the trend since the nineteenth century of increased urbanization, the migration to the suburbs renders cities as satellites of the hypermarkets and accompanying commercial and residential developments which surround them. Baudrillard's analysis is reminiscent of the novels of the great science fiction writer J.G. Ballard, about whom Baudrillard writes in *Simulacra and Simulation*.[235]

In *The Consumer Society*, Baudrillard considers the fate of the over-socialized body in the consumer realm. The body must be managed, routinized, enhanced – it is a supreme signifier of status and cultural citizenship. Beneath the aura of "personal care" and "sexual liberation" is the body as a work of investment. We visit beauty and skin care salons; get a face lift, an abdominal tightening, or a chin reprofiling, have our eyelids "corrected." We go to a tanning center, a cosmetic surgery center, undergo a computerized body composition test. Consumer society sells us alcohol, cigarettes, and fast cars but "use them at your own risk."

The body has substituted itself for the soul as the "object of salvation."[236] "Bodily pleasure" serves a similar moral and ideological function to the salvation of the soul in Christian theology. In Christianity, salvation is attained through conversion, purification, faith in Christ as the savior, and the resolution of earthly conflict in a happy afterlife. Consumer culture, filling in the gap of the disappeared "social," promotes a similar belief that salvation is a private affair, to be pursued via the micro-codes of wellness and self-adornment. The narcissistic possessive individualism of consumer citizenship confers on us our "rights" – the right to health and fitness, the right to be sexy, the right to narrative "answers," the right to declare one's own fandom of a team, a celebrity, a vacation destination, or a pedigree of dog.

In the essay "Requiem for the Media" in *Political Economy of the Sign*, Baudrillard writes about "speech without response."[237] In classical groundbreaking texts of Western civilization such as Plato's *The Sophist* in ancient Greece and John Stuart Mill's *On Liberty* in the nineteenth century, great thinkers made the practice of alternating questioning and answering essential to the notion of arriving at truths in democracy, science, and human affairs.[238] In the media culture, the continuous exchange of questions and answers revered by those philosophers has been deformed into the format of the yes-or-no ref-

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erendum or speech without response. For Plato and Mill, truth was not about facts but rather about the process of inquiry. Truth was to be separated from falsehood in a dialogical engagement. Today anything resembling the Socratic method is short-circuited. The question insists with an authoritarian tone on hearing a specific anticipated answer, or the answer is pre-given in the question. The participation of the citizen is limited to a yes or no. This goes a long way towards explaining the contemporary "post-truth" deterioration of democracy into polarization and hardened antagonistic positions.

Symbolic Exchange and the Gift Economy

To *use-value* (the mythical justification or alibi of capitalist or "bourgeois" economics which even Marx naively subscribed to), *exchange-value* (Marx), and *sign-value* (Saussure), Baudrillard opposes what he calls "symbolic exchange," of which the circulation of gifts and counter-gifts in the non-Western societies studied by ethnologists is the closest illustration or allegory.[239] The non-exchangeability or non-comparability of the gift is "other" to the market exchanges founded on supply and demand and to cybernetic capitalism. Like the simulacrum, "the symbolic" (also known in his system as "seduction" or "taking the side of objects"), can disappear and reappear in many venues and guises, as I shall later explore.

Knowing neither "scarcity" nor "needs" (two essential concepts of capitalist economic theory), the members of certain so-called "primitive" societies who hunted and gathered "at leisure" lived in veritable abundance. Baudrillard references the studies by Marcel Mauss (*The Gift: Forms and Functions of Exchange in Archaic Societies*), Georges Bataille (*The Accursed Share: An Essay on General Economy*), and Marshall Sahlins (*Stone Age Economics*) as scholarly and philosophical inspirations for a general theorization of "the symbolic" to understand human societies.[240] According to the noted anthropologist Sahlins, the modern capitalist society of permanent economic growth is the opposite of a "veritable society of abundance." Sahlins begins his essay "The Original Affluent Society":

> Hunter-gatherers consume less energy per capita per year than any other group of human beings. Yet when you come to examine it, the original affluent society was none other than the hunter's – in which all the people's material wants were easily satisfied. To accept that hunters are affluent is therefore to recognize that the present human condition of man slaving to bridge the gap between his unlimited wants and his insufficient means is a tragedy of modern times.[241]

The hunter-gatherers are so confident that their activities of providing for themselves in proximity to nature will yield continuous sustenance that they practice prodigality – they often consume all at once everything which they have amassed. This is the collective ritual that Marcel Mauss in *The Gift* called *the potlatch*, the gift-giving feast, the primary exchange system, the system of "total prestations."[242] The hunter-gatherers work in the production and preparation of food only about four hours a day. They have little sense of property or material possessions. They are nomadic – requiring constant physi-

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cal movement to maintain their trust in the abundance of nature's resources.[243] They have a surprisingly varied food diet and are adept at making usable products from plentiful materials which are conveniently at hand: wood, stone, grass, fibers, animal skins, and bones. The hunter-gather of the "veritable society of abundance" works intermittently or only when necessary. As Sahlins writes, their combination of "mobility and moderation put hunters' ends within range of their technical means. An undeveloped mode of production is rendered highly effective."[244]

In our own times, the rationalist critique of the ecological destructiveness of the economy of limitless growth does not persuade the citizenry to become critics of capitalism. The discourse of the media does not mention capitalism as the root cause of the global warming and climate change crisis.

The typology of kinds of *value* in capitalism and in positive visions of post-capitalism, posthumanism, and the post-scarcity economy is a major contribution to cultural theory. Baudrillard identifies four categories of value-making processes: *use-value*, *exchange-value*, *sign-value*, and *symbolic exchange (symbolic-value)*.

There is the functional or utilitarian logic of *use-value*.

There is the economic or money-equivalency logic of *exchange-value* (all objects lose their singularity and are rendered interchangeable in and by the universal cash nexus).

There is the semiotic or differential logic of *sign-value*.

All three of these *orders of value* exist simultaneously in capitalism. The appearance of one of them does not render the previous ones obsolete.

Then there is the directly relational *symbolic value* of ambivalence. "In consumerism generally," writes Baudrillard, "economic exchange-value (money) is converted into sign-exchange-value (prestige, etc.); but this operation is still sustained by the alibi of use-value [the instrumental purpose of an object]."[245]

In simulation culture, there takes place a reduction or simplification of *symbolic-value* into *sign-value*, a transfiguration or cooptation of something deeply humanly meaningful into a mere aesthetic performance. Writing in his science fiction theory mode, Baudrillard implies that social relations of symbolic exchange, which extend beyond the dialectics of the other three ideal types of value, will emerge in a post-capitalist future (see the works of Paul Mason, Yanis Varoufakis, Murray Bookchin, and André Gorz).[246]

What are the historical or genealogical phases of the simulacrum that Baudrillard describes, and which have heuristic value for him? His main attempts to elaborate a succession of phases or "orders" of simulacra are in the 1981 essay "The Precession of Simulacra" and in the section of *Symbolic Exchange and Death* (1976) called "The Three Orders of Simulacra."[247] In the sections that follow, I base my explanations of the first three orders of simulacra on a synthesis reading of both texts.

The First Order of Simulacra: *The Student of Prague*

Baudrillard ends his 1970 book *The Consumer Society* with his consideration of the 1913 German expressionist film – which can be regarded as a science fiction film – *The Student of Prague*.[248] Baudrillard interprets *The Student of Prague* as a parable of the loss of the salu-

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tary self who previously was mediated in a healthy way by others, and its replacement by an endlessly self-referential narcissistic self, in the simulation-consumer society. The other-less "postmodern" individual is left standing face-to-face with only himself.

The Student of Prague tells the story of a poor but ambitious student named Balduin who is impatient for a more prosperous life. The student sells his mirror-image to the devil (the sorcerer Scapinelli) in exchange for worldly success (one hundred thousand pieces of gold). The student signs a contract authorizing the devil to take anything that he wants from the student's room as payment for the coins and banknotes. Balduin signs because he assumes that he possesses nothing of value. The demon then removes the student's reflecting image from the full-length mirror. When he loses his shadow-self in the pact with the devil, the protagonist takes the first step towards losing his life. His mirror-image takes revenge on him for having sold him. Everywhere the student goes, the now-incarnate double has been there before and has wreaked havoc in the interactions of the life of his "original." Attempting to put an end to the double's mischief, Balduin finally shoots him then dies himself.

The genre of the story of the double in classical nineteenth-century European literature (in Dostoevsky, for example) reveals something about what Baudrillard means by the first order of simulacra. It relates to the double, the mirror-image, the shadow, the theatre, and games of masks and appearances. Contemplating the historical sweep from the Renaissance to the First Industrial Revolution, Baudrillard establishes the genealogical ideal type of what he calls "the natural law of value" and the principle of equivalence of *use-value*. He connects this with Plato's idea of the simulacrum, where the image is taken as a closely knit coupled reflection and betrayal of an allegedly profound reality. In the first order of simulacra, there is still something like a "real." Postmodern simulation or the third order of simulacra, however, is not a "break" with or "loss" of some previous "reality," as many commentators who mischaracterize Baudrillard (and many contemporary cultural critics in their own assessments of cyber-culture) would have it.[249] For Baudrillard, postmodern simulation is a consequence of, and a continuity with, what was always the concept of "reality" in Western philosophy, science, and culture. So-called "reality" was always a simulation model.

In describing the first order of simulacra, Baudrillard refers to the architecture and art of *stucco*, the *baroque*, and *trompe-l'oeil*.

He mentions prominently the architectural and interior decoration material *stucco*. Stucco means plaster in Italian. It is understood by Baudrillard as being a substance which symbolizes the first transformation of nature into a universal or "general equivalent" synthetic material. Signs are exchanged through the medium of a universal element. Stucco is an example of the *baroque*, which was a highly detailed and extravagant style that spread to many different arts in seventeenth-century Europe. Stucco imitates nature via form and mirroring. The *trompe-l'oeil* or perspectival space was a technique in that created the optical illusion of a three-dimensional object or scene. The appeal of both *stucco* and *trompe-l'oeil* resides in their resemblance to yet difference from "the real" or the world which they aestheticize. Baudrillard calls the first order of simulacra the mode of the counterfeiting of the world: along with the advancement of the concept of "nature," the false is born.[250]

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The Student of Prague, Stellan Rye director, Paul Wegener producer, Deutsche Bioscop, 1913

The Second Order of Simulacra: The First Industrial Revolution

The second order of simulacra is associated by Baudrillard with the First Industrial Revolution of the late eighteenth and early nineteenth centuries. The second order also includes the mid-twentieth-century technological-economic developments of the invention of the factory assembly line known as Fordism, and the theory and practice of "scientific management" – or fragmentation and control of all work processes under capitalism – known as Taylorism. The second order of simulacra is the genealogical ideal type of "the market law of value" and the principle of interchangeability of exchange-value. The dominant scheme of the First Industrial Revolution is production. The creation of originals is abolished in favor of the production of the infinite series of effectively identical objects and cultural artefacts.

Baudrillard connects the second order with Marx's idea of the "fetishism of commodities" – the image masks and denatures a profound reality.[251] As Walter Benjamin asserted in his famous 1935 essay "The Work of Art in the Age of Its Technological Reproducibility," the aura of the artwork (associated with a specific time and place) disappears in favor of the mechanically reproduced copy and the system of equivalence, implemented with the media technologies of photography, film, and sound recording.[252] Objects are not so much reproduced as are conceived and made with their reproducibility in mind. Compared with the first order, there is a loss of the difference between original and copy, or between the sign and that which the sign represents. Seriality yields arrays of duplicate objects without originals.

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The Third Order of Simulacra: Simulation and Hyperreality

The third order of simulacra in Baudrillard's genealogy is also known as simulation: the system of objects, the consumer society, the system of models and series, simulated differences generated by "the code," the "structural law of value," the post-World War II era of media, shopping mall architectures, and the American way of life.[253] The third order – somewhat harkening back to the first order – speaks again of "the real," now become hyperreal, more real than real, the simulated real. Baudrillard here speaks with Nietzsche – the image masks the absence of a profound reality. Baudrillard sees the genetic code and the digital code as being the most accomplished manifestations of the third order of simulacra. In the pre-digital consumer society, cultural citizens were locked into a system of the smallest discrete identities and differences that resembles the later logic of informatic programming. Digitalization is a universal media of equivalence that extends previous similar media such as money. Not only does so-called reality disappear behind the signs of reality, but the entire system of simulation dedicates itself to the generation of "reality effects" or the minute reduplication of the real.

Baudrillard came from a Marxist background and worked through the discourses of political economy and critical social theory.[254] Although his idea has not succeeded in persuading Marxists to pay attention to it, Baudrillard's argument is that contemporary society or postmodern capitalism should be understood not as a supervening "mode of production" but rather as a total cultural system of coded signs that refer to other coded signs, a world of virtuality where all experiences are possible (virtual in both meanings of that word) due to the universal combinatorics of software code. Anything that can potentially happen can be programmed into being. Codes, models, cybernetic feedback loops, statistical prediction, and algorithms now organize everything of what was previously called social life or existence.

The best book that has been published on Baudrillard is the relatively brief *Jean Baudrillard: The Defense of the Real* by Rex Butler.[255] The question that Butler makes central to his book – and which he sees as being Baudrillard's essential problematic or query – is how can the commentator who wants to speak of simulation or challenge simulation establish an "outside" position with respect to simulation when everything is indeed simulation, including the discourse of the analyst himself? The study by the Australian art historian treats Baudrillard's thinking systematically and delineates the hidden entanglement between seduction (the challenge to the simulacra or the possibility of reversal of the system, the possibility of the emergence of "a new real") and simulation.

Seduction is the difference between the original and the copy which simulation seeks to suppress in its attempt to represent or institute reality-becoming-hyperreality. In the hyperreality of the media culture of images, there is an overflow of images, a universal visibility or generalized pornography where nothing is left hidden. There is no longer any imaginary dimension separate from "the real." With the unlimited production of images, the world becomes an image. The definition of "the real" in the era of third-order simulacra is that of which it is possible to give an equivalent reproduction. There is a haunting resemblance of the real to itself. How can one speak of "the real" when all is simulation? How can one speak of simulation when there is nothing outside it, no exempted location

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from which one may observe it, only an "outside" which initially exists on simulation's own terms?[256]

At the beginning of "The Precession of Simulacra" in *Simulacra and Simulation*, Baudrillard refers to the fable "On Exactitude in Science" by the Argentinian writer Jorge Louis Borges which speaks of the cartographers of the Empire who "draw up a map so detailed that it ends up covering the territory exactly."[257] There is an inter-textual relationship between these lines and the title and narrative of the 2010 novel *La Carte et le Territoire* by the French novelist Michel Houellebecq.[258] The Borges allegory of simulation resonates today only with the discrete charm of second-order simulacra. When the map covers the whole territory, the reality principle vanishes. In the third order of simulacra, the map precedes and engenders the territory. Only vestiges of "the real" persist here and there. Baudrillard writes: "Simulation is no longer that of a territory, a referential being, or a substance. It is the generation by models of a real without origin or reality: a hyperreal."[259] The model precedes the territory. The map precedes the real.

The assumption that the widespread creation of models of "reality" is going to leave physical reality as it is – is naïve. Models are not only tools for assisting "the real"; they act upon "the real," they transform "the real," they become themselves a major part of "the real." *Welcome to the desert of the real* as Baudrillard phrases it, a line which the Wachowski siblings had Morpheus (Laurence Fishburne) repeat to Neo (Keanu Reeves) in *The Matrix*, explaining to him what happened to the world at the end of the twentieth century.

Baudrillard's most famous example of hyperreality and simulation presented in *Simulacra and Simulation* is what he writes about Disneyland:

> Disneyland exists to hide that it is the "real" country, all "real" America that is Disneyland (a bit like prisons exist to hide that it is the social in its entirety, in its banal omnipresence, that is carceral). Disneyland is presented as imaginary to make up believe that the rest is real, whereas all of Los Angeles and the America that surrounds it are no longer real, but belong to the hyperreal order and to the order of simulation… The imaginary of Disneyland is neither true nor false, it is a deterrence machine set up to rejuvenate the fiction of the real.[260]

Disney exists to save the "reality principle" or the myth of an "authentic real."

First-Wave Digitalization as Interactive Performance

In the 1987 book *The Ecstasy of Communication*, Baudrillard characterizes the era of digital media and online technologies as an interactive performance where the individual stationed at his computer becomes a self-managing and self-surveilling node of a relay switching network, micro-administering his own little world of operations and desires. "Today one's private living space is conceived of as a receiving and operating area, as a monitoring screen endowed with telematic power, that is to say, with the capacity to regulate everything by remote control."[261] There is a disappearance of both private and public space. "The most intimate operation of your life becomes the potential grazing ground of the media."[262] We live with the categorical imperative of communication, the intercon-

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nection of all information where the human user becomes himself a screen and a network terminal.

There is no private anymore. There is no public anymore. I sit at my computer in my apartment and skype and facebook and instagram tell me when everyone I know comes online or goes offline. These other people are sitting at my computer with me. When I listen in the train to someone else's personal or business conversation that they are conducting on their cell phone, I am effectively sitting in their bedroom or living room or office. It can no longer be explained by private and public. We need new cultural theory terms to grasp this new situation. There is no public space anymore – although architects, urban designers, and street artists continue to speak of it. We should speak about the simulacra of public space.

The Fourth Order of Simulacra: Value Radiates in All Directions

The fourth order of simulacra, which is fractal and metonymic and where value "radiates in all directions… like a cancerous metastasis," is described in the essay "After the Orgy" in the 1990 book *The Transparency of Evil: Essays on Extreme Phenomena*.[263] Baudrillard writes of the "epidemic of simulation," a networked mode of viral dispersal.[264] In this fourth order of simulacra, the image has no relation to any reality whatsoever. There is an infinite array of possibilities generated by models. There is no longer any "relationship between cause and effect, merely viral relationships between one effect and another."[265] All spheres of society pass into their free-floating, excessive, and ecstatic form. This analysis then forms the basis of Baudrillard's critique, at this point in his intellectual career, of everything that he calls "trans": trans-aesthetics, trans-economics, trans-politics, and trans-sexuality. Each sphere of trans-modern society loses its singularity and is reabsorbed by all the other spheres. There is a promiscuity of sexuality without sex, politics without stakes, communication without meaning, and information without truth. There is universal commutability of all terms. All processes operate in a void and proliferate for their own sake. The infinitely small repeats itself through propagation, contiguity, and chain reaction. Everything, even the most banal, is subject to aestheticization, made into a semiotic sign, or launched into the circulation of images.

Yet there is a reversibility at play in "trans" for Baudrillard. The spreading "contamination" of signs in what he calls their "transparency" becomes an epistemological inflection point which he (in the essay "Prophylaxis and Virulence") calls "immediate contagion" or "a marvelous alternative for the imagination."[266] He praises the absence of mediation in seduction, metamorphosis, and poetry. In poetry, one passes "from one sign to another without passing via the referent."[267] Although warning of the loss of the meaningful singularities of academic mono-disciplines in "trans," he asserts that the literary trope of metaphor can mobilize transgressive movements of imagination from one discipline to another.

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From Descartes to Baudrillard: The "Evil Demon" of Images

There is a diabolical seduction of images. According to Baudrillard, images seduce the participants of image culture away from so-called "reality," but they do so paradoxically through their claimed fidelity to "reality" or their high-resolution realistic copying of it. Unlike René Descartes, Baudrillard does not regard his "evil demon" (of images) with fear and trepidation. The superficial reading of Baudrillard is that he finds digital and virtual images to be a betrayal of "reality." But a closer reading reveals that it is, in his view, their self-proclaimed function of the reduplication of "reality" which makes images dubious. They are not an evil demon of betrayal of what they allegedly stand in for but are rather an evil demon of conformity. The danger of the mainstream culture of images is not due to images being the enemy of "the real." It is, on the contrary, the idea of what is "the real" widespread in media-digital culture that is the root of the problem. The view that the role and purpose of images is to closely resemble and conform to what image culture takes to be "reality" is what is diabolical. Yet this evil is not the enemy – as it was for Descartes in his rationalist thought experiment – because its ethics can be transfigured through a paradigm shift.

In the thought experiment of the first of his *Meditations on First Philosophy*, published in Latin in 1641 and in French in 1647, René Descartes – considered to be one of the principal founders of modern philosophy – conjures up the imaginary possibility of the existence of an "evil demon" who might be deceiving me (or Descartes) into believing that "reality" exists, that there is a reality. It is possible that there is no reality as I have until now assumed it to be.[268] The world and reality might not exist, and I (Descartes) might not exist. This might all be a dream. The contemplation of the evil demon is one of several methods practiced by Descartes in what is known as Cartesian systematic doubt. The evil demon has possibly cooked up a total illusion of a world external to my mind. Descartes writes:

> [With] utmost power and cunning [he] has employed all his energies to deceive me… I shall think that the sky, the air, the earth, colors, shapes, sounds and all external things are merely the delusions of dreams which he has devised to ensnare my judgment. I shall consider myself as not having hands or eyes, or flesh, or blood or senses, but as falsely believing that I have all these things.[269]

Descartes battles against the evil demon with rationalism and humanism (with a logical-scientific philosophy). He apparently wins the battle. He establishes his strength of mind and his thinking identity, founding his first principles of certainty against the cunning of the evil demon: "*Dubito ergo cogito. Cogito ergo sum*." "Because I doubt, I think. I think, therefore I am.[270] I think, and animals and the world do not think. I exist. What I call reality exists. Reality is objective. Scientific rationality wins out against its other – the other of superstition, uncertainty, hallucination, confusion, deception, evil, irrationality, and the world.

Baudrillard gave a lecture in Sydney, Australia in 1984 entitled "The Evil Demon of Images" (available in *The Evil Demon of Images*)[271] During an interview conducted by three Australian scholars after this lecture, Baudrillard explained his deconstruction

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of Descartes. For Baudrillard, Descartes and his evil demon belong to one system. It is Descartes himself who produces the dual structure of rationality versus demon. Positing the evil demon is, from the beginning, an effect of Descartes' rationalism. He sets about solving a problem which was only a problem in the first place due to his own stance. He treats "reality" as his toy project. Descartes believes himself to be the human subject of knowledge and discourse. His doubt and his rationality are two sides of the same coin. Descartes has a specific, and possibly mistaken, understanding of what "reality" is. He operates with a binary opposition of "reality" and doubt. For Baudrillard, the world is not like that. The world is a "radical illusion." It is a fundamental antagonism. The world is an evil demon. This "vital illusion" of the world is "a play upon reality or a *mise en jeu* of the real… the issuing of a challenge to the real."[272] We must dwell in this uncertainty and indeterminacy, and not seek to suppress or overcome it artificially with the positing of the scientific knowing subject who insists upon the rationality (and – later, in the twenty-first century – literal numeric digital coding) of "the real."

As the insightful Australian commentator on Baudrillard Rex Butler points out:

> The absolute doubt that simulation plunges the analyst into is like that of the evil demon for Descartes, where any reflection upon the problem might be reflection of the problem… where any naming of the evil demon might only be a product of the evil demon itself.[273]

No wonder that proponents of neo-Marxist critical theory sociology and other "anti-capitalist" orientations on the philosophical-political left who assume that they stand on a secure epistemological grounding from which they can speak "outside" of "the system" feel so threatened by the assertions of Baudrillard! It is the major achievement of Baudrillard that he stared directly into the eyes of the paradoxical Medusa of simulation and indeed theorized how to challenge the simulacra in new and multiple ways.

Arthur C. Clarke, "The Nine Billion Names of God"

An SF story that Baudrillard cites many times throughout his work is "The Nine Billion Names of God" by Arthur C. Clarke.[274] Clarke was, of course, the author of the script of Stanley Kubrick's *2001: A Space Odyssey*, arguably the greatest science fiction film of all time. In "The Nine Billion Names of God," a group of reclusive Tibetan monks who live high in the mountains are engaged in the endless task called for by their Buddhist spiritual beliefs of inscribing in writing the alleged nine billion names of God. According to their prophecy, the completion of this monumental effort will be followed by the extinguishing of the world. The monks grow weary of their arduous work and decide to hire a group of IBM technicians to computerize the process. After working in the mountain village for a few months and completing the job, the IBM consultants make haste to decamp quickly, not wanting to be around when, according to their view, the monks will experience the disappointment of the non-fulfillment of their prophesy of the end of the world. The technicians descend the slope back to civilization, only to witness in the night sky above the stars going out one by one.

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Baudrillard interprets the story as that the technicians have…

> …launched the code of the world's disappearance by exhausting all its possibilities… There is not enough room in the universe for God and for the names of God… no place for both the world and its double… When the virtual operation of the world is finished, when all the names of God have been spelled out – which is the same basic fantasy as the declination of the human genome or the worldwide declination of all data and information [the Internet] – then we too shall see the stars fading away.[275]

In his discussions of poetic language and of Saussure's anagrams in the last part of *Symbolic Exchange and Death*, Baudrillard presents an idea about language, and potentially about software code, which is the opposite of code as understood by the IBM technicians.[276]

The Nine Billion Names of God, Dominique Filhol director, Extermitent Production, 2018

The important point about "The Nine Billion Names of God" is not that the spiritual worldview of the Buddhist monks wins out over the scientific worldview of the IBM technicians, as many Baudrillard commentators have repeated.[277] The crucial point is that the practice and goal of informatics code as understood by mainstream computer science is the exact opposite of the poetic, anagrammatic, and deconstructionist understanding of language that Baudrillard elaborates in the chapter "The Extermination of the Name of God" in *Symbolic Exchange and Death*.[278] Writing and poetry "aim at a total resolution," he writes, "that resolution indeed of the rigorous dispersal of the name of God."[279] Perhaps software code is the writing of the twenty-first century, and our task would be to anagrammatize it in the sense of Baudrillard (or to "grammatologize" it in the sense of Jacques Derrida).[280] This would be the insurrection of poetic code against its own laws of value. Like Derrida's *différance* (with an a)[281], which means both to differ and to defer, the anagram is a dispersal and a postponement, a radical *détournement* (the Situationist practice) of the digital-informatic mode of signification. Baudrillard writes: "The theme-word is diffracted throughout the text… Enjoyment, in every case, is proportionate to the detour, the delay, the loss of the statement, to the *time lost* in rediscovering

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it."[282] The notion of *jouissance* in the poetic anagram is close to the discovery of the pleasure and bliss of the text in Roland Barthes' *Le Plaisir du texte*.[283]

The Trapdoor Escape Hatch Way Out of Hyperreality

In his later works, Baudrillard says that VR is beyond all simulacra.[284] He speaks of the new elusive stakes for humanity in what may possibly appear after the virtual. This is the trapdoor escape hatch way out of hyperreality. A trapdoor is a small sliding or hinged door that, in stories, often leads to a secret passageway or tunnel, allowing the protagonist a dynamic movement or change in location that affords a sudden improvement in outlook. The escape hatch evokes a means to break free in an emergency, a ready way out from a difficult situation. Physical escape hatches exist in submarines and aircraft. Radical uncertainty (in quantum physics, for example) is the "event horizon" of our times where Baudrillard sees hope. In "The Question Concerning Technology," Martin Heidegger saw modern technology as culminating in metaphysics (or Western metaphysics culminating in technology).[285] In *The Perfect Crime* (1995), Baudrillard writes that one must come to a deeper understanding of the essence of technology than that of Heidegger. One must consider science and technology ironically, beyond the laws of physics and metaphysics, deploying the *pataphysical* science of imaginary solutions.[286] "If it were possible, one would transform technology from within."[287]

Baudrillard was not active enough in learning about informatics to flesh out the poetic and anagrammatic software code that might match this hope. Yet his theory of poetic language as laid out in *Symbolic Exchange and Death* can be connected to the project of a deconstructionist or transformative software poetics within the Creative Coding movement.[288] In his 2005 interview with *Chronic'art*, Baudrillard says:

> Perhaps there are some who can penetrate the cracks in this cybernetic universe?… I do not know the internal rules of the game for this world, and I do not have the means to play it. This is not a philosophical or moral disavowal or prejudice on my part… I am situated somewhere else, and I cannot do otherwise… maybe a new space-time domain for thought is now opening?[289]

Baudrillard likes how hyper-modern technology has put an end to the old humanist values of the cultural establishment. Perhaps technology will become so advanced that it will liberate us from technology (as in the film *Star Trek: Insurrection*). In the essay "Beyond Artificial Intelligence: Radicality of Thought" in the 1999 book *Impossible Exchange*, he discusses a benign potential within the Fourth Industrial Revolution technologies of Virtual Reality and Artificial Intelligence, one that hints at a new freedom. He writes: "We must revise our judgement of this 'alienating' technology which our critical philosophy spends its whole time denouncing."[290] He defines the conditions for an alternative philosophical informatics which goes beyond the notion of intelligence to that of thinking. Thought is enabled by the existence of "the other." Thought is a "seducing" rhetoric of forms, illusions, appearances, and paradoxes.

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High Life: The Black Hole of Humanity's Extinction and New Hope

With a cinematic mood reminiscent of Andrei Tarkovsky's 1972 filming of Stanislaw Lem's groundbreaking science fiction novel *Solaris*, and something of the feel of Cold War Russia, the 2018 film *High Life* by French filmmaker Claire Denis expresses many of the ideas of the last phase of Baudrillard's work – that social existence is essentially carceral, that humanity is embroiled in an endless techno-scientific experimentation on itself, that sexuality and reproduction are in a crisis, that the Virtual Reality of the Fourth Industrial Revolution is the project of creating a second cloned world and is *beyond all simulacra*, that we are hurtling towards our possible extinction as a species, that Artificial Intelligence entities may not be able to experience pleasure, and that the metaphorical *black hole* – site of the extreme phenomena of the end of all physical laws – may yet provide the way out for humanity – the trapdoor escape hatch way out of hyperreality and the simulacrum.

The retroactive extinction of humanity, as opposed to apocalyptic warnings of its future occurrence, was a narrative theme in science fiction films like *Jurassic Park* and *Planet of the Apes*, the latter being an adaptation of the novel by French author Pierre Boulle.[291] Baudrillard had invoked the image of the black hole in his 1978 text *In the Shadow of the Silent Majorities… or the End of the Social*. The black hole was a metaphor for the hypothesis of the end of (or the death of) the social, that singularity zone where the statistical, empirical, and humanist laws of scientific-academic sociology cease to operate. The masses, according to Baudrillard, are "a black hole which engulfs 'the social'."[292] "The social" gets destroyed by the media and information which produce or simulate it. "The social" is simulated by telecommunications, automobile circulation, and cybernetics. In their hyper-conformity-as-resistance, these silent majorities, as they have been termed by American Presidents from Nixon to Trump, "oppose their refusal of meaning and their will to spectacle to the ultimatum of meaning."[293] In the language of astrophysics, the spacetime or gravitational singularity of the black hole is a point of infinite density and absolute uncertainty where physical laws collapse. Baudrillard articulates "the reverse of a sociological understanding" because the "hypothesis of the death of the social is also that of its own [sociology's] death."[294]

The passengers in the spaceship of *High Life* are hardened prisoners who have life sentences or have been condemned to death. Their execution will serve a useful techno-scientific purpose for saving humanity from its imminent extinction as a species, as the increasing proximity of the ship to the black hole in Deep Space will be monitored for its effect on revivifying reproductive potency and fertility. The prisoners are to be recycled to serve science. They are also given the task to impossibly harvest the energy of the black hole and transport it back to Earth, even though their flight is a one-way trip. Dr. Dibs – played by Juliette Binoche – is herself a crazed murderer who nonetheless has a certain authority over the other prisoners. She carries out scientific experiments on them, including efforts at creating a child through artificial insemination. The ship is also equipped with *The Box*: a Wilhelm Reich orgone-energy type device that Dibs and the prisoners use to experience intense solitary erotic pleasure and prime themselves for their reproductive duties. Monte – played by Robert Pattinson – and his friend Tcherny – played by Andre Benjamin – spend much of their time in the spaceship's overgrown

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green garden, an area reminiscent of Biosphere 2, the artificial simulation of nature in the Arizona desert about which Baudrillard wrote in *The Vital Illusion*.[295]

Years pass and many tragedies occur on board the ship. Following the deaths of all the other crew members, Monte raises his daughter Willow – played by Jessie Ross – over a timespan of about fifteen years, on his own and in total isolation. He is *le dernier homme* and perhaps *le premier homme*.[296] Having arrived at their Deep Space destination of the spacetime singularity, Boyse – played by Mia Goth – who is a rape victim of another convict – takes a shuttlecraft and travels through a molecular cloud inside the black hole. She dies from the extreme tidal forces of the near-infinitely dense gravitational field. The metaphor of the exotic physical energy from a black hole as an escape hatch way out for humanity from its catastrophic course is an appropriate image of Baudrillard's positive anticipation of a better future or enigmatic new hope which he hints at in his last works.

Poetic Resolution in Baudrillard's Thought

In our civilization which is on its way to destroying the world, there are no limits to production, consumption, and signification. These economic-semiotic "total social facts" (Emile Durkheim) are endless processes of so-called "growth."[297] People want to produce, consume, and signify more. To challenge these principles, what becomes crucial for Baudrillard are the phenomena of ambivalence and resolution in poetic language. "In the logic of ambivalence," he writes in the crucial chapter "The Poetic as the Extermination of Value" of *Symbolic Exchange and Death*, "there is a process of the *resolution* of the sign."[298]

Baudrillard writes: "A good poem is one where nothing is left over, where all the phonemic material in use is consumed." The poem puts into play "a strictly limited and distributed *corpus*" and "undertakes to reach the end of it."[299] Poetic language is the enjoyment or intensity that deconstructs the semiotic regime of the endless blah-blah generation of value from language, and the endless image-pornographic generation of value from pictures, in the rhetorical media culture of postmodern capitalism.[300] The recombinant order of things puts into play a discursive corpus with no end in sight and no concern for resolution or settlement.

The mode of production analyzed by Karl Marx in nineteenth-century industrial capitalism expands to the mode of signification and information and the categorical imperative of communication. Language gets mobilized for the interminable fabrication of meaning. Language has become "an all-purpose medium of an inexhaustible nature."[301] Values associated with language get endlessly produced, accumulated, and distributed.

But "the poetic is the insurrection of language against its own laws."[302] As opposed to the endless signifying process, the logic of the poem is a rigorous unfolding of its own immanent possibilities, leading to a resolution or an endgame where nothing remains. Baudrillard writes:

> In poetry, a vowel, a consonant, or a syllable cannot be uttered without being doubled – that is to say, somehow exorcised, without fulfilling itself in the repetition that cancels it.[303]

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The ambiguity, music-like resonance, sound symbolism, alliteration, metonymy, and rhyme of poetic diction all suggest the differential play of words in their multi-layered subtleties. These rhythmic qualities, aesthetic forms, and stylistic elements evoke emotions and lead to the

> … cyclical resolution of the material… The poet sets the phonemic material provided by the theme-word to work. One (or several) verse(s) contain(s) anagrams of a single word by being constrained to reproduce itself, especially in a vocal rendition.[304]

Poetry is symbolic exchange at the micro level of detail of the anti-code. "The poetic is the restitution of *symbolic exchange* in the very heart of words," writes Baudrillard.[305] Poetry is an anarchist or autonomist articulation: the authority of meaning is smashed. The symbolic exchange of the constituents of the poem responding to each other in superficial and playful interaction is set free. Baudrillard summons poetics as the deconstruction of the three laws of value laid out in *The Political Economy of the Sign: use-value, exchange-value, and sign-value* in cybernetic capitalism. As opposed to our signifying systems, with their logic of equivalence and simulated differences which go on and on *ad infinitum* with their material and cultural productions, Baudrillard seeks a poetic expression which arrives at resolution.

Daniel Boorstin, *The Image*: Hyperreality Overtakes America

Daniel J. Boorstin was a prominent mid- twentieth century American historian. He was a staunch conservative and defender of so-called "American exceptionalism." In his 1953 book *The Genius of American Politics*, Boorstin argued that pragmatism in American political affairs is a marvelous alternative to the political theories, ideologies, and propaganda which plague and paralyze other societies.[306] It is ironic that a scholar who was a strong advocate of "American greatness" would then write one of the founding texts of hyperreality and simulacrum theory: his 1962 book *The Image: A Guide to Pseudo-Events in America*.[307] Boorstin's intention in *The Image* was paradoxically to warn his American readers that they should not pay much attention to the "pseudo-events" which have become such a prominent feature of American culture. He wanted citizens to wake up from the somnambulism of media and television images. Like the founder of media theory Marshall McLuhan, Boorstin connected the rise of the image to the decline of the written word and of critical thinking. The irony is that Boorstin inadvertently produced an accurate description of how the hyperreal image was disastrously overtaking America. "What ails us most," writes Boorstin, "is not what we have done with America, but what we have substituted for America."[308]

From advertising to public relations to political rhetoric to the tourist industry, "the making of the illusions which flood our experience has become the business of America."[309] The media-driven pseudo-event is the press release by a politician or the televisual *mise-en-scène* of a spectacular celebratory moment. The news media itself makes the news in the social-psychological pattern of a self-fulfilling prophecy. An early historical example of this for Boorstin was the TV-orchestrated event of "MacArthur Day" in Chicago in

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1951, after General Douglas MacArthur was relieved of his post as head of United Nations Command by President Truman during the Korean War. Most attendees on the ground in Chicago were bored and listless, but TV made it look like a great triumphant hero's welcome with panoramic camera views of three million engaged and wildly enthusiastic participants. "We should have stayed home and watched it on TV," one in-person attendee told an interviewer.[310]

The "graphic revolution" of the mid-twentieth century, as Boorstin calls it, has produced new categories of experience which reconfigure the very concept of truth and "are no longer simply classifiable by the old common-sense tests of true or false."[311] We are in a new world "where the image, more interesting than its original, has itself become the original."[312] Boorstin also analyzes what in the 1960s was called the "star system" – the celebrity culture of the entertainment industry. By 1920, he notes, the star system was already well established in Hollywood. Celebrities are above all famous for being famous. This tautology overshadows any other qualities which they may have. Celebrity is a pseudo-event which spawns other pseudo-events like fan culture.

Boorstin was a major influence on Baudrillard's concept of hyperreality. Boorstin's book is a milestone demonstration that the perception of hyperreality in twentieth-century American culture was also prominent among conservative historians and intellectuals.

Umberto Eco, *Travels in Hyperreality*

The Italian semiotician Umberto Eco travels to America looking for the hyperreality of the Absolute Fake.[313] Eco searches out cities that imitate a city. Disneyland is both totally realistic and totally fantastical. Eco's view is that America is hyperreal because its culture believes that to make a copy of something is the ultimate certification of originality. Everywhere in America there are enhanced architectural replications and ambient simulacra. The simulation process transforms so-called "reality" into an inferior version of the imitation – hyperreality henceforth rules. In an inversion, the copy becomes the model to which the original must answer. The latter pales in its "graphic resolution" by comparison to the former. Copying becomes paradoxically essential to capture the authenticity of the original.

Nature disappoints compared to technology. The alligators on the banks of the real Mississippi river must be coaxed to come out and be photographed. They do not always make an appearance. Their Disneyland animatronic alligator counterparts always cooperate in the performance. For Umberto Eco, Disneyland California's "precision and coherence are to some extent disturbed by the ambitions of Disney World in Florida."[314] Disney World is 150 times larger than Disneyland. It is a vacation and leisure time center of golf courses, sprawling hotels, interactive designer experiences, exotic simulated multicultural villages, shopping, water parks, and SF futurism. It is the Animal Kingdom and Hollywood Studios – the elaborate copy of what is already a copy of life and the merger of life with that copy.

With the Walt Disney World Resort that is southwest of Orlando, Florida – which clones many aspects of the original Disneyland in Anaheim, California – Disney, accord-

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ing to Baudrillard, has become a "vast 'reality show' where reality itself becomes a spectacle, where the real becomes a theme park."[315] The "Pirates of the Caribbean" attraction opened at Disneyland in 1967. It features animatronic characters created by the Disney robotics team. "Pirates of the Caribbean" at the Magic Kingdom in Florida opened in 1973. As an entrance building, the fort-like "Caribbean Plaza" substitutes for the Disneyland version's New Orleans mansion. "Pirates of the Caribbean" at Tokyo Disneyland opened in 1983. It is an exact duplicate of the original. "Pirates of the Caribbean" at Disneyland Paris (25 kilometres east of Paris) opened in 1992. The sequence of scenes and the animatronic models is/are altered.

In the old American West around Utah and Arizona, one can drive many miles in the desert to nowhere and hope that one's car does not break down from the extreme heat. One arrives at a nineteenth century town that was in fact an artificial stage setting for numerous Hollywood Western films. Umberto Eco visits towns built from nothing: the more intense the drive to imitation, the more allegedly "real" the simulated ambience becomes. Visit "the Old West at any dedicated theme park: horse and carriage, steam locomotive train, sheriffs and jail, telegraph agent, Bar-b-Q cookout, Indian raids, native American handicrafts on sale. Yet the average American wears jeans not very different from those of the cowboys."[316]

Roland Barthes, *Mythologies*

Perhaps the most widespread popular idea that we have about language is that it is a process of naming and categorizing the world. We believe that everything can be known and measured, similarly to how we measure physical length or weight. The word would be the *name-thing* or *the name of the thing*. Taking for granted the rationality of the established world, speech proceeds along the well-trodden pathways of functional discourse, social classifications, and shared myths. We participate in the codes and cultural references of speech while believing – in the moment of utterance – that we are expressing individuality. There is a tacit agreement that reality is objective, knowable, and mastered through language.

European semiotics or structural linguistics begins with Ferdinand de Saussure's insight that language is a social institution. One of the discoveries of the *Course in General Linguistics* (1916) was that words do not obtain their significance from any clearly demarcated coupling with objects they would denote, but rather from their relationality with other words.[317] Language is a differentiated system of signs. Each sign is composed of a *sound-image* (the *signifier*) and the concept or meaning (the *signified*) associated with the specific *sound-image*. Words are only intelligible as signifiers of meaning to a member of a given linguistic community because she hears them in the context of her comprehensive knowledge of that language. Although each speaker pronounces a given word slightly differently, we understand the references because we have a systemic capacity to discern and differentiate signifiers. The identity of each *sound-image* issues from its difference from all other signifiers in the system.

Saussure, however, assumed too much synchronic stability of the implied meanings. He limited himself to recognizing the arbitrary character of the sign (the sound *tree* is

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fortuitously related to the physical object *tree*) and the cognizance that there is no natural or inevitable bond. This posited stability was predicated on a *social contract* of shared *signifieds* holding the system together. He writes: "An auditory image becomes associated with a concept… It exists only by virtue of a sort of contract signed by the members of a community."[318] To assert that the unity of *sound-images* and meanings is an arbitrary convention is both to go beyond the view of language as *naming the world* (the position of Aristotle and Noah's Arc) and to institute a fixed opposition of terms and what they signify that lacks the possibility of play and subversion.

In his celebrated essay "Myth Today," published in 1957 (in the book *Mythologies*), Roland Barthes adds a second dimension to the semiotic analysis of Ferdinand de Saussure, to the insight of the Swiss linguist that language is a social institution.[319] Barthes adds a social theory of culture to the social theory of language. In confronting the situation of consumer and media culture, Barthes notes the existence of a *signifier* and a *signified* in the sphere of *myth* or *ideology* in addition to the sphere of language. The media consumer is victimized by myth because she perceives cultural phenomena as belonging to a factual system, not a socially constructed semiological one. Barthes says that even an object as simple as a bouquet of roses is far from innocent: it is a *signifier* of passion or a *sign* which is "passionified roses."

A *sign* on the linguistic level becomes a *signifier* on the cultural level. The *signifier* inside of cultural *mythologies* is fundamentally duplicitous. It is both *meaning* (replete with significance as language) and *form* (empty and preparing to receive its *signifieds*). The form impoverishes the meaning without completely suppressing it. What is disturbing to Barthes is that the *signifiers* have become subservient to the *signifieds*. In the operation of *myth-creation*, so-called *real language* and *real objects* get distorted. Meaning is a "tamed richness which is called and dismissed in rapid alternation."[320] Form must be able to hide in meaning. It is the constant game of hide-and-seek between the meaning and the form which defines myth.

Barthes presents the oft-cited example of the cover photo of a copy of *Paris-Match* magazine, showing a young black man in a French military uniform, with eyes uplifted, presumably saluting the French flag. The image of the black man is the *signifier*; ideologies of nationalism and patriotism are the *signifieds* (France is a great empire, there is no racial discrimination, young black men are proud to serve those whom others call their oppressors). The presence of the man in uniform is de-emphasized in favor of the concept of benign French colonialism. The cultural artefact closes off discourse and discourages *mythological* analysis on the part of the ordinary magazine reader. Myths are connotative *second-order signs* that go beyond denoted meanings. They persuade us of the inevitability of the established social order.

By 1971, Barthes changed his position. In "Change the Object Itself: Mythology Today," he writes:

> It is no longer the myths which need to be unmasked… It is the sign itself which must be shaken; the problem is not to reveal the (latent) meaning of an utterance, of a trait, of a narrative, but to fissure the very representation of meaning.[321]

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In his later work, particularly in the book *S/Z*, Barthes develops a more nuanced theory of connotation, and elaborates a framework of an open-ended interplay of *signifiers*, *textuality*, and cultural codes.[322]

For Baudrillard, one limitation of Marx's system of thinking is that it was not yet in a historical position to recognize the prevalence of *sign-value*. A second limitation of Marx is that he raised the banner of the principle of *use-value* as a strategy to oppose capitalist *exchange-value*. For Baudrillard, *use-value* is a *humanist* and *anthropocentric* ideology of capitalism (or a deeper industrial productivism underlying both capitalism and socialism). *Use-value* as political program remains stuck within the metaphysical legend of needs and their satisfaction (or scarcity and production), an abstract story told by economists to explain an ahistorical and allegedly universal human (economic) condition.

Taking the Side of Objects

What is Baudrillard's theory of singular objects? There is the design-oriented semiotic analysis of Baudrillard's first book (his doctoral dissertation) *The System of Objects*.[323] There is the book-length discussion with prominent architect Jean Nouvel about *The Singular Objects of Architecture* (2000).[324] There are explanations of the theory of objects in *Impossible Exchange* (1999) and *Passwords* (2000).[325] There is an affinity with the uncertainty and complementarity principles of quantum physics. Such conundrums are exemplified by Schrödinger's Cat and by quantum entanglement. The cat exists in two "realities" at one time. There are at least two possible paths for a single event, the cat both alive and dead. Twin particles in a state of quantum entanglement no longer have anything to do with classical Newtonian physical spatial separation.

There is a resemblance between "impossible exchange" and the emphasis in Zen Buddhism on uncertainty, paradox, and the absurdity of "exchanging the world" against any truth or "reality." There is a kinship between the perspective of "taking the side of objects" and "software objects" in object-oriented (OO) software design and computer programming.

OO has the limitation that it has continued to be a technical practice, stuck in the dualism between technique and culture. Yet in many important books on OO, it becomes evident that the design patterns formalized as technical patterns also describe cultural patterns.

In extant object-orientation, the characteristics conferred on the software object at its inception include the instance's attributes, operations, memory state, inter-object messaging or event protocols, and associative and aggregational relationships with other objects. Software instantiation institutes a temporary relationship between an ordered ranking of software classes and the created object, which is a parameter- and data-specified instance of those determining classes. But the software instance wants to be creative, not just productive.

We need a technique that augments the inheritance mechanism of object-orientation. There should be analogies or resemblance between the software instance and the "blueprint" software classes which furnish the possibilities of what the instance can do. The highest-order analogy is the idea of the instance having a choice, having existentialist

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freedom, rather than being determined by template attributes and data. Choice is inaugurated by incompleteness, and vice versa. Incompleteness should be at the foundation of the architecture.

Create two types of incompleteness: the gap and the jump. These are two potentials. The gap and the jump generate two collapsed waveforms. The energies of the potentials relate to the energy of the event. Energy is required to keep the two events of the gap and the jump separate when they cross over into Euclidean space-time. In a quantum potential field, a semantic horizon is drawn to resolve into a Turing-compliant Boolean binary.

Currently existing software is based on a logic of discrete identities and differences. The instantiated software object remains essentially static. The properties of the object are given to it at inception or "construction." Its "blueprint" is a predetermined finite number of states – as represented, for example, in the graphical artefact of the state machine diagram. It has identity and properties. There is effectively no dimension of time. Time is the mere playing out of its permutations. The software object stays what it is throughout its lifetime, until the programmer deletes it, or the system shuts it or itself down.

In existing systems, the object is considered as a thing – it is the "dead" object of manipulation of an industrial process. There takes place an industrial "handling" of the object.

The later Baudrillard develops the idea that the only authentic communicative exchange that is possible today in the context of over-saturation with, of, and by media simulacra pseudo-exchanges is an "impossible exchange." In a first phase called simulation, the substantial physical object becomes a semiotic sign. In a later phase, the sign becomes an object again, but this time outside of all representation: pure and unexchangeable. But technology, as Baudrillard explains in his essays on photography, takes us a step beyond resemblance to the heart of simulation which is its seduction or reversibility.[326]

The photograph is the purest and most artificial image. In his practice of photography, Baudrillard seeks to make the technical apparatus into the site of illusion and the play of forms and appearances. Technology and the object collaborate to "take the side of objects." The image has a subversive function as the underminer of aesthetics and meaning, making us aware – via its gesture of silence and phenomenology of absence – of the disappearance of "reality" into fragments. The photo is an image caught in its singularity, no longer entrapped in the endless flow of, and reference to, other images. It is the vanishing point of the seized object. The photographic lens protects the object from aesthetic transfiguration. It engages in the "writing of light." The human sees nothing; it is rather the lens which sees.

Not all photography is like this. Few images escape this forced signification. They are made to signify, to convey an idea, to transmit information, to bear witness, to document, to provoke compassion, as in war photography. Rather than lament the loss of an alleged "reality" surrendered to the superficiality of the image, Baudrillard asserts that we should lament the loss of the singular image surrendered to the hyper-real. It is only by freeing the image from "the real" that we can restore its force. It is only by restoring to the image its specificity that a "new real" can recover its genuine image. The photo-

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graphic act is a duel –that is to say, it is a challenge to the object and the object's defiance of this challenge.

Baudrillard's photography is a "radical technological practice" or an "anti-Platonist" transformative simulacrum in Deleuze's sense that can serve as an example for a "radical technological practice" of challenging the hegemonic simulacrum with Creative Coding.

Plato and the Simulacrum

Gilles Deleuze emphasized in his 1969 essay "Plato and the Simulacrum" (a chapter of his book *The Logic of Sense*) that the simulacrum was introduced as a fecund notion by the ancient Athenian founder of Western philosophy.[327] For Plato, the simulacrum is an imitation that has wandered too far, that has lost contact with that of which it is an imitation. The simulacrum over-emphasizes appearance to the detriment of the essence of the original. The difference between Plato and Baudrillard is: For Plato, the simulacrum practices deception in relation to the original or to "the real." For Baudrillard, the simulacrum goes beyond being fraudulently disloyal to "the real." It becomes the force of a "neo-reality" that substitutes for the real. This "neo-real" has more influence than what is normally understood as "the real" on the determination of existence. The simulacrum has an epistemological status beyond the conventional epistemology of true and false or what we call reality and illusion.

Together with his teacher Socrates and his student Aristotle, the Athenian ancient Greek Plato of the fourth century B.C. is widely considered to be a key founder of Western philosophy. Plato made three separate contributions to thinking about the relation between the image and so-called "reality" which are seminal to the formation of contemporary academic knowledge fields like art theory, media theory, and the sociology of culture. There is Plato's origination in *The Sophist* of the concept of what Gilles Deleuze calls the simulacrum.[328] There is the "allegory of the cave" in *The Republic*.[329] There is the discussion of the Platonic Forms or Realm of Ideas in further sections of *The Republic*.

In his dialogue *The Sophist*, Plato writes about two kinds of image-making. He distinguishes between the art of making likenesses and the art of making appearances: the difference between the *eikastic* and the *phantastic* arts. Plato introduces into Western intellectual history the idea of a "copy without an original." For Plato, the *phantastic* or second kind of image-making is an intentional perversion or betrayal of "the real" that it allegedly represents, in an act of persuasion or manipulation of the viewers or those who perceive appearances. For Deleuze, the difference between copy and simulacrum possesses a potential for overturning Platonism. It implies great creativity and multiplicity.

Plato's allegory of the cave – presented in *The Republic* during a dialogue between Socrates and Plato's brother Glaucon – has given rise to various interpretations as a commentary on politics, education, epistemology (how should we seek knowledge), ideology, and/or the ignorance of the majority in a democracy and the attaining of philosophical enlightenment. The allegory tells of a group of prisoners who live their entire lives chained inside a cave, permanently facing a wall, unable to move their legs or turn their necks. They can never see the people, places, and things of the real world which are behind their backs. The prisoners can only see the shadows on the wall, projections of the

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light from the fire which burns behind them. Socrates explains that the situation of the philosopher is like that of a prisoner who gets freed from the cave and comes to realize that there exists something more genuine that is beyond the audio-visual sense-perceptions of the prisoners.

The circumstance of the prisoners having an illusory perception of a "false reality" has a decisive damaging effect on the fate of the "real reality." Ideology does not leave the so-called "reality" or "the truth" intact even among those who are not directly under the spell of false consciousness. Our sense of what "reality" is does not endure as straightforwardly self-evident. Escaping from the cave does not make access to a "real reality" of truth easily available. In the allegory, the released prisoner-philosopher is unsuccessful in persuading his former comrades that things are not as they appear to be. There is an unbridgeable gap between their false sensory data and his awareness. They have no desire to leave their prison. The story of the freed prisoner ends in tragedy – his attempt to communicate with those who are still chained in the cave leaves him blinded by the darkness, just as he was blinded by the sunlight when he first left the cave. The news of his misfortune discourages the prisoners from venturing out to the "real world."

Plato as Software Designer

In the section of *The Republic* entitled "How Representation in Art is Related to Truth," Plato describes the Realm of Forms and further elaborates his critique of copies which do not partake of the Idea of the original. Socrates says:

> Let us take any common instance; there are beds and tables in the world – plenty of them. But there are only two ideas or forms of them: one is the idea of a bed, the other of a table. And the maker of either of them makes a bed or he makes a table for our use, in accordance with the idea.[330]

Primary "reality," for Plato, is not to be sought in the empirical world of everyday things (the ordinary instances of beds or tables), but rather in the general, abstract Forms (the divine idea of the bed or table) from which "concrete" things are derived or fashioned. Socrates says that there are three philosophical categories of beds (for example): the idea of the bed (made by God), the instance of the bed (made by a carpenter), and the imitation of the bed (made by a painter). Regarding how near or far each of the three categories of beds is to/from the Ideal Forms of Beauty, Truth, and Excellence, the idea of the bed (for Socrates) is the closest to these exalted virtues, the instance of the bed comes in as a respectable second closest, and the imitation of the bed runs a pitiful last – far removed from anything valuated as noble or good.

The Socratic dialogue in *The Republic* (*Politeia*) about *mimesis* is a critique and dismissal of imitative poetry and painting, which only allegedly reproduce technical copies and are said to be "thrice removed from the truth."[331] Painting, for Socrates-Plato, is a degraded art form of the semblance or mirror image, an aesthetic activity which demands of the painter "no knowledge worth mentioning," and no comprehension of "true existence."[332] Although it "may deceive children or simple persons," imitative painting comes up way

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short in trying to fool the citizens of the polity into being placated by its second-rate images.[333]

Plato's "metaphysics of reality" proclaims a tripartite structure, poised on the equilibrium between (for example) the divine idea of the table and the real physical table molded by the carpenter, to the double exclusion of the image created by the painter. Yet there is something promising in the idea of the Realm of Forms for what I call transdisciplinary informatics today. Plato offers a way of thinking about the institution of "the real" without a binary opposition between physical and virtual, and which is like a software designer-slash-programmer who moves freely between conception and realization.

Plato was not only a thinker of the image. He was also a theorist of rhetoric and its relation to truth. The dialogical exchanges in *The Sophist* demonstrate how the alternation of questions and answers leads the seeker of veracity to cognitive clarity beyond illusions. This is what connects Plato the media theorist and Plato the founder of rhetoric studies. Illusions or *phantasia* are both perceptual appearances in the realm of images and discursive effects in the realm of language. In the "post-truth" situation of today, there is a homology between the hyperreality of images and the catastrophe of verbal deception in political discourse – and they strongly reciprocally affect each other.

Brian Gogan on Plato, Baudrillard, and Rhetoric

In his book *Jean Baudrillard: The Rhetoric of Symbolic Exchange* (2017), Brian Gogan interestingly declares Baudrillard to be not a sociologist, philosopher, or media theorist, but rather a *rhetor* (a bold and novel practitioner of rhetoric, "an individual who uses language for effect in context") and a rhetorical theorist.[334] Gogan claims and details one of the most important influences on Baudrillard's theory of hyperreality, simulacra, and simulation as being the Platonic dialogue *The Sophist* where Plato makes a major contribution to founding the study of rhetoric as *phantasia*, which are "perceptual appearances." Heidegger reads Plato's *The Sophist* as defining *phantasia* as "an opinion or view based on sense perception."[335] Pierre Klosssowski – another important influence on Baudrillard – significantly used *phantasia* and *simulacra* interchangeably.[336] Deleuze refers often to "*simulacra-phantasms*."[337]

As Gogan rigorously demonstrates, simulacra are defined by Baudrillard in decidedly rhetorical terms and in relation to rhetoric studies. For Baudrillard, simulacra are perceptual appearances which issue from processes of simulation or the "art of appearance." Simulacra are judgments made by the populace based on perceptual appearances as effects of both discourse and visual perception. Simulacra are obstacles to meaningful communication, respectful democratic debate, genuine empathy, and recognition of the "radical other." Simulacra stand in the way of the "communicative rationality" which is one of the main emphases of Jürgen Habermas' work. German social theory chose for decades to focus on the "bright side" rather than the "dark side" of the Enlightenment. Simulacra are obstacles to the dialogical search for truth and knowledge even more radically than was conceptualized by Plato in his focus on *mimesis* and imitation. For Baudrillard, "simulation supersedes representation" means that the logic of substitution has succeeded the logic of deceptive imitation.

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Simulacra are appearances which have reached the stage of being thoroughly rhetorical. On the first pages of *Simulacra and Simulation*, Baudrillard specifies that his object of inquiry is the processes "substituting the signs of the real for the real."[338] In *The Intelligence of Evil*, he writes: "The simulacrum is not that which hides the truth, but that which hides the absence of truth."[339] Composed of both discursive effects and perceptual visual appearances, rhetoric operates as general systems of circulation, almost entirely autonomous from human agency. But just as judgments are made by the citizenry as affected by simulation processes and simulacra artefacts, those judgments can be challenged by creative rhetorical intervention.

Brian Gogan's book is a major contribution towards rethinking Baudrillard's system of thinking as a theory of rhetoric, and towards connecting Baudrillard with Plato's *The Sophist*. Gogan's book is a valuable inspirational source for the present study.

Deleuze on "Plato and the Simulacrum"

Apparently opposite to Baudrillard, but perhaps parallel to the ultimate implications of Baudrillard's system of thinking, Deleuze takes the side of the simulacra as potentially creative and subversive artefacts in his project of overturning Plato's denigration of simulacra. According to Deleuze, Plato's simulacrum is not simply a false copy. It is rather something which calls into question the very notion of the copy. Plato wants to differentiate essence from appearance, the Idea from the image, original from copy, and good model from bad simulacrum. There are good copies and false copies. Good copies are legitimated by resemblance. Simulacra are perverse or corrupt turnings away from the original. Deleuze attributes to Plato the intention of the good copies or icons triumphing over the temptation of the simulacra.

The legitimacy of some copies is established by their closeness to the essential Platonic Idea of the thing of which they are a copy. It is their intrinsic relation to the model or ground that substantiates their imitative or exemplary similitude. The simulacrum, on the other hand, is, for Plato, an image without genuine resemblance to the original. The legitimate icon comes into being when identity is the starting point, when two things with a previously shared identity become differentiated, when that which is alike differs. The simulacra appears when differences are the starting point, and when it is believed that difference will lead to similarity or identity. The world as formed by simulacra is the world itself as phantasm.

To overthrow Platonism, for Deleuze, means to overturn the equation and take the side of the simulacra, to raise up the simulacra, to assert their rights over icons or copies. He writes:

> The simulacrum is not a degraded copy, rather it contains a positive power which negates both original and copy, both model and reproduction… In the overthrow of Platonism, it is resemblance that speaks of interiorized difference, and identity, of Difference as a primary power.[340]

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It is the Nietzschean Dionysian (*The Birth of Tragedy*) force – creative, positive, joyous – that Deleuze links with his vision of the emancipatory simulacra.[341] Dionysus is the ancient Greek god of dance, passion, emotions, ecstasy, and intuition. Deleuze also links his creative vision of the simulacra with Nietzsche's Eternal Return and the will to power, the power of "affirming divergence and decentering."[342]

Modernity in art is defined, for Deleuze, by the power of the simulacrum, the philosophical-aesthetic project of extricating from modernity what Nietzsche calls the untimely. The event in the history of art called Pop Art marks the moment when the copy of the copy is "pushed to the point where it changes its nature and turns into a simulacrum."[343] This instant is the happy destruction of models and copies unleashing a "creative chaos."[344]

Although the perspectives on simulacra of Baudrillard and Deleuze appear to be nearly diametrically opposite, I believe that they can be reconciled. Deleuze wants to overturn Plato's disparaging of simulacra and instead support the emancipatory potential of simulacra understood as transformative creative projects, including radical technological creativity. Baudrillard (or Baudrillard-inspired thinking) ultimately has the same goal, but he (or it) maintains that sustained engagement with the simulation-hyperreality simulacra of capitalist-semiotic culture is the essential prerequisite to arriving at the vantage point from which one can see where precisely simulacra as radical creativity can be defined and encouraged.

It depends on whether one places emphasis on the order of value or of signification in semiotics. Much of post-structuralist thinking engages in critical reflection on the impossibility of the semiotic sign's self-referential unity or full presence to itself.[345] The horizontal relationship of value, which relies for its structuration on the sign's two internal components (signifier and signified) and the bar between them gets critiqued. The vertical relationship of signification – the bar between the sign as a unified entity and what the sign excludes – then gets critiqued in a second step. Signification, which depends for its existence on the "institution" of a positive plenitude of the sign, is prematurely subsumed under value. The edifice of signification is subordinated to the foundation of value. Once the foundation fails, the building is – too quickly – believed to collapse along with it. The rapid stress applied to the bar of value denies to signification the preconditions for its full scrutiny. The quick pressure underestimates the intractability of the self-correcting and continually morphing positive sign. The strategy short-circuits the encounter with the hydra of signification of the simulacrum.

Unlike Baudrillard, Deleuze is not concerned with thinking about the ubiquitous simulacra of virtualizing images proliferated by contemporary media-capitalist culture. His project is rather to be an advocate of radical creative simulacra which challenge Plato's downgrading of simulacra. While reading Deleuze, one comes to a certain awareness that Baudrillard tends to conflate simulation and the simulacra. They should be kept more separate as process and artefacts. My position, somewhat against Baudrillard and Deleuze, is that it is fruitful to think about hegemonic simulacra and transformative simulacra together.

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Upgrading Hyperreality and the Simulacrum for Digitalization

How has the power of rhetoric to shape culture, politics, everyday life, and technological existence accelerated in the context of digitalization? How is hyperreality, in digitalization, now implemented on a micro level of detail by algorithms and software code? How does the challenge to hyperreality take place in theories and practices of software code?

I have argued that the challenge to the simulacrum is more important than the diagnosis of the simulacrum. Critiques of the concept of the simulacrum which have been made in the past mainly asserted that claims along the lines of "everything is virtual" are "empirically false." What such critiques do not confront is that the primary gain of the theorem of the simulacrum is that it enables one to see, conceptualize, and actively practice new challenges to the hegemonic capitalist and signifying system which are otherwise not visible. To deny research and thinking about the implications of virtuality based on the view that such a center of attention undermines traditional claims about the resistance to capitalism or oppression is ironically to stand in the way of new experimental thinking about social change. The traditional claims stress fighting for identities and the authenticity and dis-alienation of the supposedly sovereign human subject. I propose that we theorize and act upon new radical and ironic reversals of the system.

First example of hyperreality and digital transformation: The digitalization of the news media has contributed markedly to the decline of rational and informed deliberation about current events on the part of most of the news-consuming public. The technology of algorithms has become the primary engine driving the "social media" and aggregator platforms where "fake news," disinformation, echo chambers, baseless alternate realities, conspiracy theories, racism, misogyny, xenophobia, homophobia, transphobia, hate speech, and far-right neo-fascist subcultures run rampant. Content editors and knowledgeable human curators of news distribution have all but disappeared, roadkill of the cost-saving, data-accumulating, "personalized advertising," and surveillance business models of news website corporations.

Second example of hyperreality and digital transformation: One major aspect of consumer and mass media culture during the pre-digital era was the cult of celebrities and fame. Yet the scope of celebrities was limited to the "star system" of Hollywood and those who had made substantial achievements like Einstein being famous for relativity theory (although his substantial achievement was already substituted by the simulacrum of the formula $E=mc^2$). Andy Warhol was prophetic when he allegedly said that "in the future, everyone will be world-famous for fifteen minutes" (although he probably did not say that – the saying first appeared in a 1968 catalogue for an exhibition of Warhol's work). The obsessive thirst for celebrity and fame is so deeply ingrained in the narcissistic psyche of Americans that it has become our "birthright." The combination of Reality TV and digital transformation has exponentially accelerated the underlying simulacrum principle of "being famous for being famous." The charismatic power of the pure signifier of celebrity steamrolls over the content of any possible "achievement" for which one might have famous. The banality of what happens on Reality TV shows like *Survivor*, *American Idol*, *Big Brother*, or *Keeping Up with The Kardashians* is consistent with an almost conscious "flipping of the bird" in the face of achievement.

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In his book *Convergence Culture* (2006), Henry Jenkins pointed to the emerging phenomenon of transmedia or multiplatform "storytelling": a media product-experience is distributed multiply and interactively for consumers across several formats deploying advanced digital technologies.[346] TV production companies make smartphone apps available to viewers to comment in real-time on the shows they are watching to fellow members of their fan community. Platforms like youtube and TikTok provide endless recycling of tidbits, gossip, and wisecracks about every homegrown and culture-industry celebrity deploying every possible looping, zooming, morphing, and deep-faking digital video feature. The "influencers" of today are famous for their expertise in facial cosmetics, miracle health cures, and get-rich-quick schemes. The Reality TV show *The Apprentice* legitimized the simulacrum of Trump's supposed "billionaire wealth" and the whitewashing of his corrupt money laundering practices, even though those signifiers had no real referents. Trump then brought the public humiliations, malignant narcissism, cruelty, and banality of Reality TV to the "highest office in the land."

Personalized Advertising

Consistent with the modernist concept of democracy, the media politics of the European Union is rightly concerned with the freedom and pluralism of media content, both of which are essential components of an open and fair society. This way of thinking about the media is crucial for human rights and freedom of information, and for democratic debate and rational consensus. Yet in the era of digitalization, the public sphere experiences grave damage and must be protected in new ways. The democratic space suffers degradation from the monopoly consolidation of the control of social media platforms and e-commerce in the hands of a few large corporations and their business models. They harvest your personal data and sell it to advertising agencies. The shift from mass advertising to personalized advertising provides key insights into the paradigm shift in the media generally from the pre-digital to the digital phase. Prior to digitalization, advertising was a non-personal marketing message not directed at any individual. The mass media as public sphere was a buffer between the source and the target of the sales pitch. Goods and services were offered to the public through media announcements.

With social media, search engines, mobile and location technologies, facial recognition, artificial neural networks, Deep Learning AI, and algorithms, advertisers gain knowledge of identity through collecting the person's data. Your browsing, viewing, and buying histories – and your emotions, preferences, and interactions – provide the data for personalized advertising and feed their systems. Companies seize the identity of the consumer, eliminating the public space where citizens previously cultivated their democratic individuality through choosing goods in the marketplace. Political discussion gets similarly damaged. The algorithmic logic of web searches and newsfeeds that shows you more of the news and opinion which you have already seen from your familiar viewpoint isolates you in your echo chamber and filter bubble. Personalized advertising destroys to a significant degree one of the principal arguments in favor of capitalism: the idea that the market is an analogue to the democratic space where you the sovereign individual

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have the freedom of choice of what to buy. Now the sellers are directly welded to you through Data Science operating on Big Data producing the targeted ad.

Media should function as spaces of communication and mutually respectful dialogue. The European Union should actively support the building of new platforms where citizens can discuss their lives and futures with a spirit of solidarity and social awareness. There should be projects which develop the concept of moral algorithms, where the rules of ethics get coded with reduced discrimination, hate, bullying, racism, sexism, and fake news. We should design a dialogical relationship between human moral-driven institutions/actors and Artificial Intelligence – and redefine the meaning of the term algorithm to be more anti-automation. There should be game-like virtual worlds that show young people what a better world might look like.

Transdisciplinarity is Good for (Post-)Humanity

I find to be questionable the academic assumption that it is helpful for understanding the contemporary world to be an academic expert of a mono-discipline of knowledge – for example, being a scientific specialist of television, film, computing, or science fiction studies – without taking a transdisciplinary approach. I think that Baudrillard's idea that in "American" culture TV and daily life merge; cinema and ordinary life merge; and Virtual Reality and life merge – to be the start of a probing transdisciplinary insight. In my view, computing is everywhere, not only in computers. Science fiction is everywhere, not only in science fiction novels and films. Digitalization is everywhere, not just in the configuration of digital devices.

The question should be raised for serious and open discussion if academics in a field like science fiction studies should start to write less academically and instead be more creative in a playful and almost fictional sense. Should there be such a strict border between the scholarly practice of writing about science fiction and the forceful writing of science fiction narrative? I speak of science fiction theory and a science fiction epistemological mode.

Each existing knowledge discipline has its own private self-referential discourse or terminology that almost nobody outside of that field understands. The mono-disciplines tend to be conservative in defending their territories. When fields of knowledge come together in a transdisciplinary way, breakthroughs can occur. Transdisciplinarity is good for humanity.

In hyper-modernism, hyperreality is implemented with code and can be challenged with code. This entails both rewriting the codes and changing what code is: not code as it has been until now, but code infused with philosophical and aesthetic and political knowledge.

Virtual Reality, Augmented Reality, and the Metaverse

Digitalization represents the transition from the physical to the virtual and from the local to the global. In the 1960s, there were procedural and functional programming lan-

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guages. There was the command line interface. People owned TVs that received a handful of channels. Then came the 1980s with PCs and Macs: the interactivity and "personal empowerment" of the mouse, drag-and-drop capability, and the desktop metaphor. There was the revolution of the computer transformed into a media machine and consumer appliance. There were object-based programming languages and cable TV and satellite reception with hundreds of channels. In the 1990s we were introduced to new opportunities in digital publication and communication thanks to the Internet. Computer technology advanced automation in the workplace and robotics accelerated industrial working processes. There was global connectivity, hypertext and hyperlinks, and utopian visions of cyber-culture.

In the twenty-first century, we have Internet, smartphones, and social media platforms. Online existence exploded into millions of channels and was initially pluralistic. It then paradoxically became a solidified force in the hands of a few monopolies. Now there are advances in machine learning or Deep Learning and neural networks. Data mining, massive computing power and Big Data have made AI a significant force that impacts our lives and society and the economy. A pragmatic definition of AI: software that learns from experience and moves beyond its original programming.

With social networks, computer/video games, and virtual worlds such as Second Life and World of Warcraft, existence and experiences have become more and more online and virtual. The conventional and known physical world is no longer our primary frame of reference. The phenomenology of everyday life shifts to virtual. During the COVID-19 pandemic and lockdowns, physical workspaces closed and there was a boom of remote working. Video teleconferencing and work collaboration applications became mainstream practices. Most doctor appointments are now online rather than physically present.

Virtual Reality achieved a milestone in 1992 with the presentation at the SIGGRAPH annual computer graphics conference by the University of Illinois' Electronic Visualization Laboratory of the CAVE Automatic Virtual Environment, a surround-images-and-sound VR system influenced by the design objective of Artificial Reality Telepresence envisioned by pioneering computer artist Myron Krueger in the 1970s. With no heavy-duty personal hardware required, CAVE was distinguished by its wall-projected graphics and the participant's bringing along of her own physical body into the virtual world (like the Holodeck Virtual Reality media technology system on *Star Trek: The Next Generation*).[347] Nowadays, major steps towards the full sensory immersion VR of the future are being taken by commercially successful and highly promising systems such as HTC Vive, Oculus Rift, Sony PlayStation VR, and Samsung Gear VR. These are platforms for gaming, education, military training, art and design, narratives, role-playing, and pornographic experiences. They descend from the trailblazing system of the EyePhone head-mounted display, DataGlove, and DataSuit full-body sensor-equipped clothing brought to prominence by Jaron Lanier in 1985.

Since the cyberspace 1990s, VR has been a controversial prospect either celebrated or feared. For Bill Gates in *The Road Ahead*, cultural citizens will soon work, learn, make friends, shop, explore cultures, and be entertained from the privacy of their homes, and without leaving their armchairs.[348] On the post-Web Internet, which Gates calls the in-

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teractive network, they will enter total immersion cyber-environments via high-bandwidth connections.

For Sven Birkerts in *The Gutenberg Elegies*, VR is a betrayal of humanist ideals like reflective thinking, individual imagination, moral responsibility, and physical reality.[349]

With the VR headset or helmet, there has been an explosion of transformations in work, medical applications, virtual travel tours, virtual museum visits, communication, and architecture. The technology of the headset and its VR software constructs a simulated world. There is the generation of convincing computer simulations. Scenes and objects appear to be as "real" as those in the physical world. There is a sense of full immersion in one's surroundings. Everything we see and hear is part of the artificially built environment.

VR is the Holy Grail of a seamless media technology, dispensing with borders and screens, beyond the dualistic dynamics of television or cinema, with no more separation between viewer and spectacle. Yet we need alternative creative visions of VR. Mainstream VR imperils the world's equilibrium – on the analogy of an ecological threat – via its hyper-elaboration of an exorbitant hyperreality. It is the disappearance of the world into the codes of digital, genetic, subatomic, and holographic information. The dominant version of VR is at the same time the climax of Western society's belief in an absolute techno-scientific "reality" and the apex of simulation. It suppresses imitation or representation, eliminating the vital aesthetic open-ended illusion necessary to the preservation of "the real."

There is Augmented Reality (AR): an overlay of supplemental information and three-dimensional virtual images onto the physical world. Our world is the framework within which objects, other persons, and images are placed. Aspects of the familiar here-and-now are extended by media input such as sounds or interactive touch contact. Whereas Virtual Reality enacts separate simulated experiences, Augmented Reality provides enhancements of one's current nearby immediate perceptions. One of AR's potentials, called Mixed Reality (MR), is to create hybrid real-and-virtual environments. Physical and digital artifacts co-exist or get merged in new mixed surroundings. AR is a subset of MR, since Mixed Reality might also include the reversed situation of Augmented Virtuality, where elements of the physical world are brought into the VR simulation to boost its value or intensify its sense of "being real."

Smart glasses, which are a form of wearable computing, are a widely available device for AR applications. They add a layer of information and media to what their wearer sees. You see what you would see with your biological optical perception combined with visually displayed digital images and data. Google Glass is an optical head-mounted miniature computer that communicates with the wearer's smartphone via Bluetooth wireless data exchange technology and the touchpad built into the glasses. Smart glasses can operate as standalone units or interact with the individual's phone handset to run mobile applications.

The word Metaverse has come into common usage to describe the advent of a fully virtualized existence. Mark Zuckerberg, the founder of Facebook, renamed his company to Meta and announced that his enterprise would dedicate its efforts to building the Metaverse. The term originated in Neal Stephenson's 1992 science fiction novel *Snow Crash*.[350] The novel and film *Ready Player One* depict a Metaverse.[351] The Internet should become a

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unified, universal, and immersive virtual world based on VR, AR, and Brain-Computer Interface (BCI) technologies. Work, massively multiplayer online gaming, education, social interaction, alternative currencies, e-commerce shopping, remote participation in collective events, and virtual real estate are some of the application areas at the forefront of the Metaverse vision.

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Baudrillard and the Situationists

Introduction

First, I will say something about the similarities and differences between the Situationist critical social theory of advanced or hyper-capitalism and consumerist media culture – the theory of "the society of the spectacle" – which is generally considered to be a "modernist" cultural theory, and Jean Baudrillard's theory of image, media and consumer culture – the theory of simulation, simulacra, virtuality, hyperreality, Integral Reality, and "the models and codes precede the real" – which is considered to be a "postmodernist" cultural theory.

What additionally interests me about Baudrillard – perhaps more than his early critical theory of society – which is a variant of the sociological analysis of the questionable "reality" of "the social" which he himself self-critically distanced himself from in the 1978 text *In the Shadow of the Silent Majorities… or the End of the Social*)[352] – are the implications for how resistance and change and transformation can come about starting from his theory of objects, from his viewpoint of "taking the side of objects."[353] How might this more advanced perspective – the vantage point of the root of the chestnut tree in Jean-Paul Sartre's novel *La nausée* (an important reference for Baudrillard made in the first chapter on "Objects" of his book *Passwords*) – into strategies of resistance? How can the perspective of passionate, semi-living, active, wily, autonomous objects develop into a program for change? How can Baudrillard's sense of the world as an enigmatic "radical illusion"[354] contribute to activist practices for transforming the dominant capitalist society and culture?

Terms like "advanced capitalism," "dominant capitalist society," and "critical theory of society" are my terms. They are commonly employed in post-Marxist cultural theory discourse (although I am mainly an anarchist!). They were not used by Baudrillard (he might have said "hyper-capitalism"). Baudrillard's early books – like *The System of Objects*, *The Consumer Society*, and *For a Critique of the Political Economy of the Sign* – can be described as expressing a critical theory of society.[355] After 1978 – for example, in *Fatal Strategies* – he calls his own work a "fatal theory."[356]

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"Taking the Side of Objects" and the Situationists

One could say that there are two main ideas in post-1978 Baudrillard. First, there is the idea of simulation, simulacra, and hyperreality, that the media-and-image-dominated culture of "late capitalism" (not Baudrillard's term) is a very awful way of life, that so-called "reality" has disappeared under the weight of rhetorical images and rhetorical discourse, that the very idea of "reality" has generated "too much reality" and led intrinsically to the reign of the "self-referential signifiers."

Many people know only this idea of Baudrillard. It was popularized by the Wachowski Brothers in the 1999 blockbuster science fiction film *The Matrix*. The theory of simulation and hyperreality was a sort of prophecy. It has "come true" – especially in the age of post-factual, televisual, and evil Trump as President. This would establish Baudrillard's genius.[357]

The second main idea in late Baudrillard is that we might be able to do something about it. We might be able to *changer le monde*, "change the world," in an act of "reversibility," by "taking the side of objects." This second idea is less well known – probably because it is expressed by Baudrillard abstractly and theoretically, and it is underdeveloped. My goal is to develop it further. This essay is a step in that direction.

As part of that project, I will demonstrate connections between Baudrillard's idea of "taking the side of objects" and the work of another group of thinkers and activists called the Situationists, in the context of the intellectual history of the 1950s to 1970s. I will explore how the forms and strategies of "taking the side of objects" resistance are already present in Situationist practices. But first I will say something about the respective media theories of "the spectacle" (the Situationists) and "the simulacra" (Baudrillard).

At the end of the essay, I will connect Baudrillard's idea of "taking the side of objects" to some ideas of the mid-twentieth century French existentialists Albert Camus (*The Myth of Sisyphus*), Jean-Paul Sartre (*Nausea*), and Simone de Beauvoir (*The Ethics of Ambiguity*).[358]

My main thesis is that there is an important area of intersection or convergence to be explored and further developed between Baudrillard's idea about "the resistance of objects" and seven historical or contemporary Situationist activist practices:

(1) Wandering (le dérive)
(2) Psycho-geography
(3) The diverting of technologies (le détournement)
(4) The making or creating or construction of situations
(5) A certain minority tendency within art which can be called "post-art" or "the radical illusion beyond art"
(6) Neo-Situationism in the field of advanced digital technologies
(7) Urban and street art activism

During the 1960s, Jean Baudrillard was close to the Situationists, both intellectually and politically. The Situationists were an artistic and political movement active and prominent in Paris, and in other French cities like Strasbourg, in major European cities like Amsterdam and London, and in many towns of Italy.[359] They were the inheritors of Dadaism and surrealism and Lettrism.[360] The Situationists advocated and strove

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towards *le dépassement de l'art*: the going beyond or realization or suppression of art, its generalized transference or blossoming into an active and transformative critique of everyday life in the advanced capitalist society.

Situationist ideas and practices were massively influential and inspiring during the student-worker near revolution in France in May-June 1968, on the Metropolitan Indians and Autonomist movement in Italy of the late 1970s, and in the San Francisco-Oakland-Berkeley Bay Area in the United States.[361] Situationism produced works of radical utopian architecture like Constant Nieuwenhuys' New Babylon project, a science fictional worldwide city of the future.[362] The Situationists elaborated the idea of "unitary urbanism," the dream and design of a city of endlessly enchanting and participatory non-functionalist situations, among which the creative and passionate post-capitalist citizens would experientially drift.[363]

The Situationists produced two major theoretical texts, both of which were published in 1967, one year before the publication of Baudrillard's first major work *The System of Objects*. These were *The Revolution of Everyday Life* by Raoul Vaneigem and *The Society of the Spectacle* by Guy Debord.[364]

Vaneigem's work is a poetic, ludic, passionate, existentialist, and utopian text celebrating the potential qualitative richness of life which might become possible when the freedom of the individual gets expressed through the construction of situations: making of a "unitary ambience" and "the game of events."

The Society of the Spectacle is a book which has had a widespread impact since the 1960s on critical social theory, media theory, new media art, video art, underground music, independent cinema, and social-political activism.[365] The book develops a major analysis of the advent of the post-World War II advanced capitalist society: the ubiquity of the mass media, high-tech, the culture of images, television, movies, advertising, computers, consumerism, marketing, organized leisure, shopping malls, cybernetics, the obsession of information, modern transportation, telecom networks. and the tourist industry. The book's main thesis is that the citizen of the media culture is in a fundamental situation of spectatorship and passivity with respect to the power of the screen and the endless panoply of consumer objects.

The Society of the Spectacle is very close in spirit, style, terminology, and subject-matter to the first three published books of the young sociologist Jean Baudrillard: *The System of Objects* (1968), *The Consumer Society* (1970), and *For a Critique of the Political Economy of the Sign* (1972). The theory of the spectacle of Guy Debord and the semiotics of consumer culture of the early Baudrillard are twin theories. In the second volume of his notebooks or memoirs *Cool Memories II*, published in 1990, Baudrillard writes:

> Pataphysician at twenty – Situationist at thirty – utopian at forty – transversal at fifty – viral and metaleptic at sixty – that is my whole history.[366]

"I was very, very attracted by Situationism," he told interviewer Judith Williamson in 1989.[367] He seems to be stating that he was a Situationist in 1959 – already before the sixties. Two years after the founding of the Situationist International movement (sometimes called the SI), which happened in 1957. Nine years before *The System of Objects*.

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Baudrillard's Paradigm Shift

After *Symbolic Exchange and Death* (1976), there begins a paradigm shift in Baudrillard's intellectual worldview or system of thought. The concept of simulation already appears briefly in *The Consumer Society*, but the deconstruction of "the social" as a legitimate epistemological concept, or object of knowledge-inquiry, for the social sciences first appears in 1978 with *In the Shadow of the Silent Majorities*. The iconic work *Simulacra and Simulation*, which literally appears as a hollowed-out book in the SF film *The Matrix*, comes in 1981. From this point on in his career, Baudrillard explicitly conceptualizes and draws attention to a highly significant distinction between his own position about contemporary media culture and what he summarizes as his view of what is the position of the Situationists, or Debord's concept of the spectacle. In *The Perfect Crime* (1995), Baudrillard writes:

> Virtuality is different from the spectacle, which still left room for a critical consciousness and demystification. The abstraction of the "spectacle" was never irrevocable, even for the Situationists. Whereas unconditional realization is irrevocable. We are no longer either alienated or dispossessed: we are in possession of all the information. We are no longer spectators, but actors in the performance, and actors increasingly integrated into the course of that performance. Whereas we could face up to the unreality of the world as a spectacle, we are defenseless before the extreme reality of this world – before this virtual perfection. We are, in fact, beyond all dis-alienation. This is the new form of terror, by comparison with which the horrors of alienation were very small beer.[368]

To summarize: the invocation of typical post-1968 neo-Marxist concepts around ideology, attributed to the Situationists: false consciousness/critical consciousness, mystification/demystification, alienation/dis-alienation, unreality/redeemable reality, dispossession, hope, salvation. Allegedly "modernist" neo-Marxism superseded by Baudrillard's "postmodernist" post-Marxism: the murder of reality through too much reality, the Virtual Reality unconditional realization of the world, which is its unconditional simulacrum, the new interactive performance of the integrated spectacle.

The later Guy Debord develops and utilizes the concept of "the integrated spectacle" in his 1988 book *Comments on the Society of the Spectacle*.[369] In his 2004 book, *The Intelligence of Evil or the Lucidity Pact*, Baudrillard elaborates the concept of Integral Reality: "the perpetrating on the world of an unlimited operational project whereby everything becomes real, everything becomes visible and transparent."[370] It is the project of "realizing the world, of making it become technically, integrally real."[371] This suppression of "the imaginary," the loss of any imagination of the contingency of the real pushed aside by the realization of Integral Reality (or "the ecstasy of communication"), as characterized by Baudrillard, is very close to the definition that Debord gives in *Comments on the Society of the Spectacle* of "the final sense of the integrated spectacle," which is "that it has integrated itself into reality to the same extent as it was describing it," effacing the salutary gap between signifier and signified, the act of total integration steamrolling over aesthetic representation.[372]

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In the citation above from *The Perfect Crime*, Baudrillard "reverse engineers," or reconstructs logically, something like the concept of "the integrated spectacle" while elaborating his thought about how the early Debord's theory of "media culture as spectacle" needs to be revised. "We are no longer spectators," he writes, "but actors in the performance, and actors increasingly integrated into the course of that performance."[373] We are performing actors, integrated into what was the spectacle, and which is now the integrated spectacle.

In his 1990 interview in Australia with Nicholas Zurbrugg, Baudrillard says:

> Situationist modes of radicalism have passed into things and into situations. Indeed, there's no need now for Situationism, Debord, and so on… All of that is out of date. The hyper-critical, radical, individual sensibility no longer exists. Events are the most radical things today. Everything which happens today is radical. There's a great wealth of radical events, and all one needs to do is to enter its interplay. Nowadays, reality is radical. Reality is Situationist, not us![374]

"Radicalism has passed into events." (Mike Gane makes that the title of one-fourth of his edited collection of Baudrillard interviews).[375] eality is Situationist, not us. This would be a dimension of the later Baudrillard's perspective of "taking the side of objects."

Is Baudrillard Fair to the Situationists?

On the surface of things, in one important way of looking at it, Baudrillard's critique of the Situationists is unfair. For all intents and purposes, the Situationists stopped writing in the early 1970s. At least that is the official narrative or history. Baudrillard "capitalizes" on the formal event of their self-dissolution, and effectively forecloses in advance any possibility of them "catching up with" his post-1978 insights. The twelfth and last issue of the annually published journal *Internationale Situationniste* appeared in 1969. The organizational dissolution of the SI occurred in 1972. In the passages cited above from *The Perfect Crime* and the Zurbrugg interview, Baudrillard allows himself the freedom to have evolved and advanced in the 1970s and beyond, but he does not allow this to the Situationists.

What happened to Situationist theory after 1980 is not well known. This is a subject in the history of ideas that is still open to scholarly research and investigation. My impression is that there was a great deal of Situationist theory developed after 1980 in Italy (Gianfranco Sanguinetti, Mario Perniola), in northern California (Bureau of Public Secrets, Processed World), and in Great Britain (Spectacular Times, Workshop for Non-Linear Architecture).[376]

There is the post-anarchism of Hakim Bey (the Temporary Autonomous Zone).[377]

There is the French anti-surveillance journal *Tiqqun (This Is Not a Program)*.[378]

There are the extensive writings of the British art historian and former member of the SI Timothy J. Clark.[379]

What did Raoul Vaneigem write after 1980? He wrote about 15 books.[380]

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What did Guy Debord write after 1980? There are the *Comments on the Society of the Spectacle* and his autobiography *Panegyric*.[381] In *Comments on the Society of the Spectacle* (1988), Debord writes observations about contemporary media culture very similar to those of the later Baudrillard. Debord, like Baudrillard, questions if negation of the dominant capitalist society via "the critical consciousness of the human subject" is still possible, given the indistinguishability of rebellious gestures or so-called "authentic expressions and experiences" from their commodified and simulated versions. One can contemplate the "recuperation" of rebel style by the advertising industry starting in the 1970s, as documented by Thomas Frank in his book *The Conquest of Cool: Business Culture, Counterculture, and the Rise of Hip Consumerism* (1997).[382]

For Debord, the integrated spectacle is a new phase of capitalism corresponding to the spectacle's extension since 1967. The integrated spectacle combines features of Western free-market big corporation capitalism and Eastern state capitalism-slash-communism. The integrated spectacle is the cumulative effect of five principal developments:

- Incessant technological renewal
- Integration of state and economy
- Generalized secrecy
- Unanswerable lies
- Ubiquitous new media to enact an eternal present

Objective historical knowledge disappears, thus paving the way for unlimited falsifications. "Historical evidence which the spectacle does not need to know ceases to be evidence." "Spectacular power," writes Debord, "can deny whatever it likes… and change the subject; knowing full well there is no danger of any riposte, in its own space or any other."[383]

"Baudrillard and the Situationists" Commentators Douglas Kellner and Sadie Plant, and the Tension between Critical Theory and Fatal Theory

There is an extensive secondary literature about the difference between the alleged modernism of Debord and the alleged postmodernism of Baudrillard. Or about the reputed social revolutionary stance of the SI and the supposed "sellout" to the late capitalist culture of simulation of Baudrillard.

Several books by Douglas Kellner and Steven Best, for example *The Postmodern Turn*, are lengthy and detailed elaborations contrasting Debord's belief in modernist values like history, meaning, reality, interpretation, and social change against Baudrillard's so-called nihilistic descent into an alleged postmodernist fatalistic pessimism. Kellner and Best offer informative descriptions of the many ways in which "the Situationist spectacle" has developed further in its newer stages of contemporary American media and political culture.[384] But with respect to Baudrillard, Kellner is an opponent who does not make the effort to understand the originality and specificity of Baudrillard's positions.

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Sadie Plant, in her book *The Most Radical Gesture: The Situationist International in a Postmodern Age*, is hostile to Baudrillard.[385] Plant is a passionate proponent of Situationism. Her belligerent understanding of Baudrillard is reductionist (see Exhibit C below).

Baudrillard's stated critique of the Situationists is reductionist (see Exhibit B below).

Baudrillard, at times, presents his own view, which he contrasts to that of the Situationists, in a self-simplifying or reductionist way (see Exhibit A below).

On both sides of this debate, there is a self-expressed reductionist version of their conceptual differences.

Exhibit A (Baudrillard self-simplifies):

Baudrillard made the bold proclamation in 1983 in *Fatal Strategies* (a book focused in the first of its three parts on gambling, obesity, and hostages as objectively resisting "figures of the trans-political") that he was leaving behind "critical theory" in favor of a "fatal theory" (the title of Mike Gane's book is *Baudrillard: Critical and Fatal Theory*[386]). Yet major aspects of Baudrillard's later position, as exemplified by the citations zeroing in on the Situationists referenced above, remain a "critical theory of society": the conceptualization of the objects of the "critique" which are called virtuality, Integral Reality, and the implied "reverse-engineered" concept of the integrated spectacle.

In my view, we need both critical theory (media theory) and fatal theory ("taking the side of objects") – and the fruitful tension between those two cultural theory concepts.

The articulation of this tension between the two currents of thought is the most interesting area of discourse of Baudrillard's oeuvre. He often overstates the "death of critique": for example, in the passage in *The Perfect Crime* which immediately follows his attempted takedown of the Situationists cited above:

> In… the golden age of joyful disillusionment, we carried out the critique of all illusions – the metaphysical, the religious and the ideological. Only one remains: the illusion of criticism itself… the critical illusion has devoured itself.[387]

Immediately after this, attempting to provide an example, Baudrillard writes:

> The critique of virtual technologies masks the fact that their concept is seeping everywhere into real life in homeopathic doses.[388]

This is not putting an end to all critique and to all media theory. It is rather seeking out a critical epistemology where the object of the critique is a historical totality, where the virtual is to be deconstructed in and due to its coupling with the myth of the real, not in and due to its alleged betrayal of a supposedly intact real (which would be a mere "liberal" and not a "radical" critique of virtual technologies).

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Exhibit B (Baudrillard's critique of the Situationists is reductionist):

The one-sidedness of the claim by Baudrillard to have left "critical theory" behind, and to have arrived on the new continent of "fatal theory," is revealed not so much in his direct statements about the end of all critique, but rather in his pinning the label of "critical theorists who still believe in consciousness and the radical subject" onto the Situationists. He claims that their perspective on "the society of the spectacle" contrasts sharply with his own concepts of simulation and hyperreality, ignoring the fact that significant aspects of the Situationist historical project were radically performative – meaning that they were "ironic" and "fatal" and "taking the side of objects" in the senses in which Baudrillard uses these terms.

To find interesting "fatal strategies," one must look no further than the seven Situationist activist principles which I have mentioned: (1) Wandering (2) Psycho-Geography (3) The Diverting of Technologies, (4) Making Situations, (5) The Radical Illusion Beyond Art (6) Neo-Situationism in Digital Media, and (7) Post-Public Urban Art.

Debord was a Marxist who, in many of his writings, clung to the myths of working-class consciousness, the proletarian revolution, and the glorious future of "the generalized self-management of the workers' councils."[389] Many Situationist essays share this "theological" rhetoric. Baudrillard emphasizes this side, setting up the SI as the "straw dog."

The German words *Entfremdung* and *Verfremdung* can help here. Baudrillard overemphasizes the Marxist side of the Situationists' concept of alienation as *Entfremdung*: the debased historical condition of humanity under capitalism and its dreamt-of overcoming. He ignores the "radical theatre" and "radical performance" side of their concept of distantiation as *Verfremdung* – artistic techniques to incite change in the "consciousness of the audience" in the tradition of practitioners like Bertolt Brecht, Antonin Artaud, and the surrealists. *Verfremdung* is more rigorously the genuine historical context of the Situationists.[390]

Exhibit C (Sadie Plant's critique of Baudrillard is reductionist):

Sadie Plant argues that Baudrillard was deeply influenced by the Situationists and effectively co-opted their ideas. According to Plant, the later Baudrillard gave up all prospects of criticism and political contestation. For Plant, "[Baudrillard is a] sold-out Situationist who wanders without purpose."[391] Plant thinks that Baudrillard thinks that there is nothing to be done *pour changer le monde*. But this is, in fact, not the case.

Sadie Plant understands Baudrillard as believing that "the real and the meaningful have slipped away amidst a confusion of signs, images, simulations, and appearances."[392] No, Baudrillard is saying that "reality" disappears through too much reality. He is not celebrating this. Virtual Reality is not the disappearance of a natural and awesome "reality" that was intact prior to the advent of digital and virtual technologies.

The Left's longstanding emphasis on subjectivity is problematic because advanced capitalist-consumerist culture is a profoundly narcissistic culture, encouraging a "society" of narcissistic "subjects without others," subjects without the capacity to recognize otherness. Communication, which saturates media culture, is destructive of other-

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ness. The field of subjectivity and so-called "authentic expression and experience" is ripe for recuperation, co-optation, or assimilation. Récuperation of radical assertions from the cultural margins by the power centers and by the spectacle is a key concept of the Situationists. The key historical event of the 1970s was the assimilation of "cool," "creativity," and "individual empowerment" by the advertising industry, consumerism, and personal computers.

After the setback for practical radicality which took place around 1970, Baudrillard made it the goal of his work to go as far and as deeply as possible into "theoretical radicality."[393] He put his efforts into trying to figure out how to oppose a system which has already anticipated all opposition. This is, first and foremost, an epistemological question.

Situationist Practices

Wandering or the Drift – *Le Dérive*

In the essay "Theory of the Dérive," Guy Debord wrote:

> One of the basic situationist practices is the dérive, a technique of rapid passage through varied ambiences. Dérives involve playful-constructive behavior and awareness of psycho-geographical effects. They are thus quite different from the classic notions of journey or stroll. In a dérive one or more persons during a certain period drop their relations, their work and leisure activities, and all their other usual motives for movement and action and let themselves be drawn by the attractions of the terrain and the encounters they find there.[394]

The object-orientation here is that one is driven, doubled, and shadowed by the encounters –with both non-human and human "objects" – that one has in urban space. The Situationist view is that we live in an urban environment with so many possibilities for creativity and enjoyment, yet we constantly overlook these opportunities because we are focused in everyday life on the functional organization and layout of the city, the static places designated for work or sleep or shopping, and the physical transportation that we need to move among these locations. Drifting is a way of changing this, of discovering marvels and surprises in an intrepid playground of renewed urban spacetime.

In the dérive, one "takes the side of the object," consistent with the system of object-thought of the later Baudrillard, for example in his book Impossible Exchange (1999).[395] One follows the seduction, strange attractors, radical otherness, the non-human and the inhuman. One embraces "the world thinking me" of the cityscape as "psycho" and "geography" get rearranged playfully by the semiotic and physical signs encountered during the drift.

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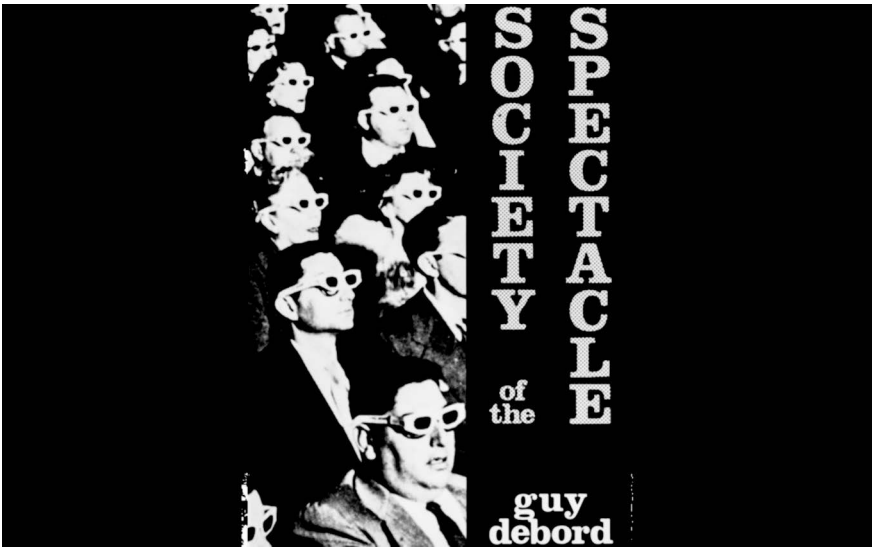
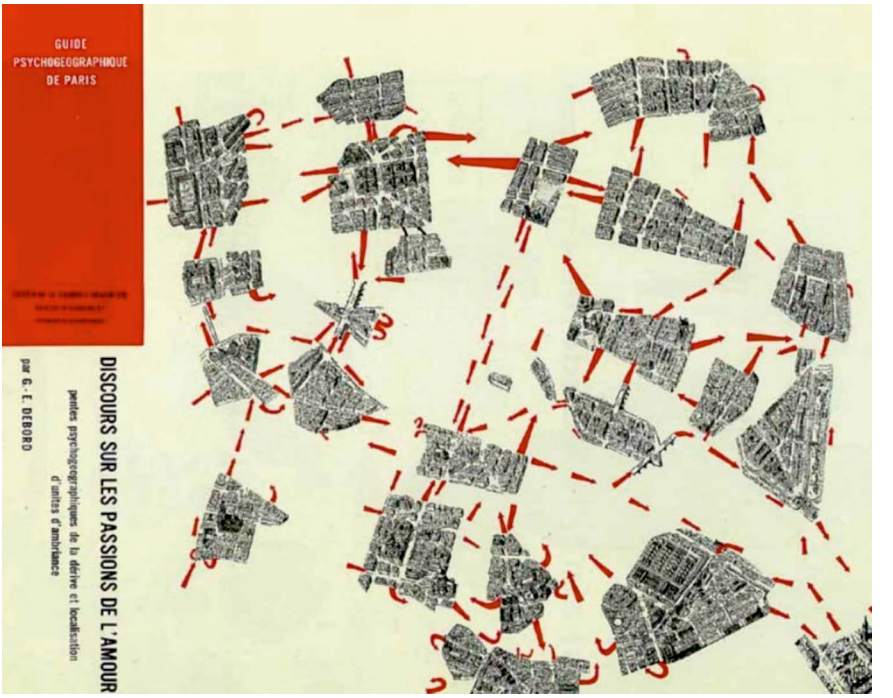


Guy Debord, Society of the Spectacle, cover picture, Black and Red, 1983



Guy Debord, Psycho-Geographical Guide to Paris, 1957

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Psycho-Geography

In the essay "Introduction to a Critique of Urban Geography," Guy Debord wrote:

> Geography, for example, deals with the determinant action of general natural forces, such as soil composition or climatic conditions, on the economic structures of a society, and thus on the corresponding conception that such a society can have of the world. Psycho-geography could set for itself the study of the precise laws and specific effects of the geographical environment, whether consciously organized or not, on the emotions and behavior of individuals…[396]

There is a complex intricate psycho-geographical separation and interweaving between places in Venice (for example) where tourists go and those places where only Venetian natives go. Psycho-geography conjures up free association and fascination; the construction of stimulating "situations"; and adventurous playing with architecture and urban space. You discern the psycho-geographical contours, currents, fixed points, and vortexes which encourage or discourage entries, exits, and flows into and out of specific prescribed zones of the city.

The Diverting of Technologies – *Le détournement*

In the essay "A User's Guide to Détournement," Guy Debord wrote:

> Any elements, no matter where they are taken from, can serve in making new combinations. The discoveries of modern poetry regarding the analogical structure of images demonstrate that when two objects are brought together, no matter how far apart their original contexts may be, a relationship is always formed… The mutual interference of two worlds of feeling, or the bringing together of two independent expressions, supersedes the original elements and produces a synthetic organization of greater efficacy. Anything can be used.[397]

The Situationists did not dream of a dis-alienation of man (*eine Ent-Entfremdung des Menschens* in German) as Baudrillard claims in his critique of them. Perhaps Erich Fromm or other "Marxist-humanist" thinkers would be more susceptible to such a criticism. *Le détournement* is usually translated into German as *Zweckentfremdung*, which is not wrong, yet it would perhaps be more correct to say Verfremdung, following the distinction between Entfremdung and *Verfremdung* originated by Bertolt Brecht.[398]

The Situationists advocated "beyond art" practices of "jamming the messages" and "turning the songs [of the dominant culture] inside out."[399] This is the revenge of the object, the destiny of the object beyond the determining codes, beyond the meanings and definitions imposed on the object by the economics, politics, sociology, or advertising discourses. As Baudrillard writes in *The Ecstasy of Communication*: "the destiny of signs is to be torn from their destination, deviated, displaced, diverted, recuperated, and seduced."[400]

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The Making or Creating or Construction of Situations

In the essay "Report on the Construction of Situations," Guy Debord wrote:

> We think the world must be changed. We want the most liberating change of the society and life in which we find ourselves confined. We know that such a change is possible through appropriate actions. Our specific concern is the use of certain means of action and the discovery of new ones, means which are more easily recognizable in the domain of culture and customs, but which must be applied in interrelation with all revolutionary changes…[401]

There is an alternative utopian-anarchist dimension to Baudrillard's thought: direct speaking, seduction, symbolic exchanges, transgression, and meaningful non-virtual encounters with the other are possible. In *Symbolic Exchange and Death* (1976), Baudrillard writes incisively about graffiti in the subways and on the walls of New York City as the insurrection of pure signs against the ruling semiotic order of messages and meanings. "Kool Killer: or the Insurrection of Signs" is a landmark cultural theory essay about graffiti and street art as symbolic rebellions against the dominant media society.[402] The creative graphics in the early 1970s were a new kind of urban intervention, an alternative to advertising, an outbreak against the sign-system.

Graffiti opposed the myths of the individual author and the identity of the human subject, being instead the invoking of ritual symbolic exchanges. Pseudonyms rather than proper names were asserted against the anonymity of postmodern bureaucratic existence. Urban space was reaffirmed against the system of well-behaved producers and consumers, of commuting subway riders, of the communicating senders and receivers of semiotic signs. The meaningless names like SUPERKOOL and KOOL KILLER (in Baudrillard's example) left the confined designated fictional space of the underground comic books. It is a graffiti with no content, no message, no goal, and no ideology. This graffiti contests the very form of the media. The beautiful scrawls are the insurrection of "signs of nothing" against interpretation and denotation, and for an anti-urbanism against architecture.

The Radical Illusion Beyond Art

There is a minority tendency within art which can be called "post-art" or "the radical illusion beyond art." Which artists does Baudrillard like? What does Baudrillard mean by "the radical illusion beyond art"? How do the realizations and processes of those artists whom he admires correlate to the "corresponding" Situationist practices?

In the era of the "integrated spectacle" (Debord) or "the conspiracy of art"[403] (Baudrillard), "art" persists and flourishes as a profitable hyper-industry, with its own inflated pretensions and its self-legitimating prestigious institutions. Baudrillard saw the contemporary art world as being complicit with – and metaphorical of – late semiotic hyper-capitalism.

Baudrillard explicitly rejected the New York art scene's attempted embrace of him as a critical cultural thinker in the 1980s. He was suspicious of any project of "applying" his

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ideas about simulation, hyperreality, Integral Reality, and the orders and precession of simulacra in a "transdisciplinary" or "crossover" way to either art – the New York "Simulationist" or "Appropriation" or Neo-Conceptualist or Neo-Geo artists such as Sherrie Levine, Jeff Koons, and Peter Halley, who claimed that their artworks were "simulacra" against "hyperreality" (for example, on the level of colors) – or film – as in the case of the Wachowski Brothers' canonization of him as the supposed philosophical inspiration for *The Matrix* film series.[404]

It is not clear if Baudrillard disliked the New York "Simulationist artists" in the 1980s because he ruled out an artistic practice that referenced his philosophy as an inspiration in principle, or because he simply viewed them as being bad artists.

The list of "artists beyond art" on whose creations Baudrillard favorably commented, however, is surprisingly quite a bit longer than one would expect. By "artists beyond art," I mean creators who are practicing something different from the mainstream currents of art, and whose works are to be interpreted differently from how the "art industry" sees them. Perhaps their creations should not be understood with the term "art." Some of the principal figures are:

- Edward Hopper (the use of light in his paintings)[405]
- Francis Bacon (whose paintings are "beyond aesthetics" and give form to "the illusion")[406]
- Jackson Pollock (of equal stature with the revered Andy Warhol)[407]
- Mark Rothko (establishes unmediated contact with "the object" or "the fragment")[408]
- Enrico Baj (a proto-Situationist and "pataphysician" about whose prints and collages Baudrillard wrote an essay and conducted an interview – they have a "mythical" quality and confront "the monstrous")[409]
- Luc Delahaye (Baudrillard wrote about his "illegal" and hidden-camera photography of Paris Metro riders)[410]
- Mike Disfarmer (photographer of residents of rural Arkansas in the 1940s)[411]
- Christo and Jeanne-Claude (The "wrapping" in synthetic fabric and cloth of architectural structures such as the Berlin Reichstag and the Parisian Pont-Neuf bridge, and natural locations such as the New York City Central Park pathways or the coastline near Sydney, Australia "enoble(s) a form by covering it up")[412]
- Charles Matton (Baudrillard and Virilio both wrote essays about his artworks which were miniature experimental spaces or "enclosures" which brought attention to "the illusion" and not to "the reality")[413]
- Olivier Mosset (a painter of monochrome abstract works about which Baudrillard wrote a catalogue entry)[414]
- Sophie Calle (about whose photographic-conceptual-storytelling-performative art projects Baudrillard wrote the essay "Please Follow Me" – also known as "Pursuit in Venice")[415]
- Marcel Duchamp (The master of the readymade, he made banality into art. His "found objects," for Baudrillard, prefigure the media genre of Reality TV. He reduced everything to insignificance. His "fountain" is an emblem for our hyperreality yet is also the gesture of its possible reversibility)[416]

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- Andy Warhol (Baudrillard wrote about Warhol in "Machinic Snobbery" in *The Perfect Crime*. Some of Warhol's gestures were to embody the "death of the artist as subject" by "becoming a machine"; to work with the technologies of serial reproduction, and to historically mark the acceleration of hyperreality)[417]

Baudrillard's many essays of appreciation of some art projects, on the one hand, and his critique in the essay "The Conspiracy of Art" of the "art industry" which is too close to the "creative industries" and the "technological fetishism" of capitalism (parallel to the critique offered by Andreas Reckwitz in *Die Gesellschaft der Singularitäten*[418]), on the other hand, provides guidelines for distinguishing the principles of symptomatic art versus art which radically challenges the media-capitalist simulacrum and hyperreality.

In his 1996 provocative essay "The Conspiracy of Art," Baudrillard asserts that contemporary art has "lost the desire for illusion" and instead elevates everything in the world to "aesthetic banality."[419] Like pornography, the logic of which replicates itself infinitely to all media and advertising images, art has become an obscenity of visibility, a relentless transparency of all things. What could art possibly still mean in a culture saturated by hyperreality and ubiquitous "cool" and marketable images? The aesthetic gesture of nullity or meaninglessness was inaugural when Duchamp or Warhol first thought it up, but it becomes endlessly banal in its endless recycling in countless exhibitions. It is the counterfeiting repetition in "signs," or in the mode of irony, of previously initiatory gestures of art history. It is the commercial or sentimental-commodified form of nullity that sells well in the art market.

Neo-Situationism in the Field of Advanced Digital Technologies

Our activities in the space of digital and virtual media should avoid the two extremes of utopian and dystopian perspectives. Many theories of new media and new technologies have been euphoric in seeing great possibilities for creativity, self-expression, and democratic communication in online existence. Other discourses have been exclusively critical, observing in our networked immersion in "social media" and simulations the deepening of capitalist-consumerist conformism and control – now administered by a new set of large corporations.

The alternative to these two opposite positive and negative views of digitalization is to deal with the digital-virtual realm as an "ambivalent interspace." We should conceptualize – and then act in – media from cyberspace to Augmented Reality as open contested arenas situated between commodification now re-inscribed through software code by economically powerful surveillance agencies and the potentialities of radical transformative creativity.

Urban and Street Art Activism

Space is both real-physical and simulated-virtual. We will need to invent new concepts to deal with this new situation. We need to extend creative and activist interventions in the province of urban space to the double-territory-and-imagination of material-and-informational space. We need an aesthetic movement of Interspace Art to comment prolifi-

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cally on these physical-and-virtual and theory-and-practice boundaries. Physical spaces that we inhabit in the offline zones of the capitalist society are largely demarcated by "ownership." We traditionally understand these spaces via the conceptual system of "public" and "private" – a still very influential instituting and interpretive framework belonging to modernist political-economic theory. In the concepts of digital codes and informational flows, the structural arrangement of clear physical demarcations between "public" and "private" recede into the past.

Street art and public art, although noble endeavors whose histories and politics still interest us greatly, largely operate based on the assumptions of these conventional categories. These genres founded themselves on the left-liberal idea that there is and should be a "shared cultural space" within modern society outside of and exempt from the nexus of cash values.

The work of Christos Voutichtis is at the intersection of art, architecture, and urbanism. His installation "All About Mistakes" was an urban intervention in Lisbon. The work consists of screen prints, sculpture, and real-time audiovisual computational media. Fractal geometric shapes projected onto the front façade of a high-rise building. This is a computer-generated pattern influenced by the parameters of the shape of the building itself. Street art emerges as pattern from the fractal unit. The fractal is the secret passageway beyond private and public to perception of the "radical illusion of the world."

Voutichtis seeks an architecture without rules, without control or hierarchical order. A space is an anarchist space when it is not static, when it continuously changes, when it is influenced by its surroundings. See Christos' work "Moving and Space-Forming Objects (The Performativity of the Space)" – a work of Interspace Art. Voutichtis' installation piece uses large sheets of plastic wrapped around a selected physical structure to form a contained space that grows and expands as influenced by the outside breeze. Voutichtis is interested in fractal and breathing geometry, not a conventional Euclidean geometry with its three-dimensional axioms and classical dimensions. With fractal design patterns and parametric instantiation, there is relocation of the real-virtual body, inseparable from its immersion in hybrid space.

Christos Voutichtis, © 2018

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Augmented Reality protest in front of Spanish Parliament against law prohibiting protests in front of Spanish Parliament, 2015. Photo "No Somos Delito"

Augmented Reality versus Wall Street

There are huge possibilities for Situationist resistance practices that engage in a critical and transformative way with the dominant culture in the digital age. The aesthetics and technology of Augmented Reality enable the players of the game *Pokémon Go* to superimpose funny characters and monsters onto the familiar phenomenological environment of the physical world to re-enchant urban life. Other AR applications call up information from a database that is pertinent to a specific scene to add the enhancement of contextual information. Messages are digitally superimposed onto the real world. Augmented Reality played a major role in *Occupy Wall Street* of 2011 in New York City, a social movement which protested drastic income inequality and the political power of the wealthiest 1% of the global population (one Occupy slogan was *We are the 99%*). Political activism has been supported recently by AR.

More than 25 artists from around the globe took part in the collective action "Augmented Reality Occupy Wall Street," covering the Wall Street and New York Stock Exchange geographical areas of downtown Manhattan with more than 400 augments. In this urban art installation of remote telepresence, the artist-activists created protest works that were seen in the desired target location even though their creators were not physically present there. At a certain stage of the unfolding of the Occupy events, the FBI and the NYPD police had occupied the Wall Street area with a massive presence of barricades, mounted horses, and the forces of order, blocking the thousands of protesters from entering that section of the city. The movement was primarily encamped in Zuccotti Park in the Financial District.

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The *ProtestAR* smartphone app virtually projected images and sounds of protest movement members who were in Zuccotti Park into the space in front of the Stock Exchange. Using a smartphone or tablet (in the future, it would be done with AR glasses), people standing on street corners or assembled anywhere downtown could see artistic images-and-sounds of ironic commentary on the global financial system – casino slot machine bells-and-lights, a cage enclosing the iconic Stock Exchange bull, dollar bills, the Statue of Liberty, virtualized electronic money circulation, liquid data flows, green frogs – superimposed onto the physical reality in front of them. The *ProtestAR* app safely transported the demonstrators into the zones forbidden by the police. Enthusiasts with the app formed the AR Flash Mob, forming chains and circles of persons standing side-by-side and holding up their smartphones and tablets, enabling others standing around them to see and hear the augments.[420]

In 2015, the Spanish parliament passed laws restricting freedom of expression, freedom of assembly, rights of information access, and the right to protest. Any individual or group demonstrating in front of the Parliament building would be subject to a very large fine. The organization No Somos Delito (NSD) conceived of the hologram protest. The protest itself was filmed at a location outside Madrid and then projected with Augmented Reality in front of Parliament. It was shown in a loop to keep the rally in constant movement.[421]

Conclusion

The Situationists still have much to tell us. We are living in a society that still relies on the same chimerical sleights of hand which the SI described. The culture of digital and virtual technologies, and the advent of the Fourth Industrial Revolution, take the spectacle (and simulation) into new and unchartered galaxies. The Situationists are much closer to the later Baudrillard's perspective of "taking the side of objects" than he himself chose to keep in mind or may even have been aware of. The Situationist practices offer a possible path for "applying Baudrillard" (even in an academic sense, if one considers the "activism of design" to be an academic discipline), making the relatively abstract philosophical and theoretical idea of "taking the side of objects" more concrete, practical and applied.

McKenzie Wark on the Situationists

The media theorist and activist McKenzie Wark has published two books on the Situationists – *The Beach Beneath the Street: The Everyday Life and Glorious Times of the Situationist International* (2011) and *The Spectacle of Disintegration: Situationist Passages Out of the 20th Century* (2013) – where she demonstrates her passion for, and encyclopedic knowledge of, their history, ideas, practices, pre-history, and post-histories.[422] Wark read "Debord's *Society of the Spectacle* at an impressionable age and decided thereafter to do something with it."[423] She explains that many of her books are deeply imprinted by the Situationists.

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Virtual Geography: Living With Global Media Events (1994) engages with Debord's theory of a "lived time of experience" to glimpse, in the differentiated flows of information and vectoral trajectories of electronic transactions, gaps in simulation or the spectacle.[424]

Dispositions (2002) is a *dérive* or wandering, written in the shadow of the worldwide integrated spectacle of global positioning and surveillance systems that want to fix our location and identity, defining us by our data profile.[425] It is a diary of aphoristic poetic musings.

Written in the style of *Society of the Spectacle*, *A Hacker Manifesto* (2004) is an updating of *détournement* (the diverting of technologies) for the digital age.[426] Echoing Marx and Engels' *Communist Manifesto*, it calls for the "hacker class," who work in the realm of intellectual "abstractions," to rebel and actively question the necessity of private property.

Gamer Theory (2007) is a critical theory of games that rises to the anthropological level of Roger Caillois' seminal *Man, Play and Games*, where the French ethnologist developed an "ideal typology" of games and festive rituals in different human societies across time.[427] Computer games and virtual worlds are the archetypal cultural form of contemporary society. Wark explores the complex intertwined relationship between the comforting perfection of the online game and the imperfections of the "compulsory creative" games we must play offline to survive in everyday life in the "disintegrating spectacle" of global capitalism.

The most succinct statement of Wark's position with respect to the Situationists appears at the beginning of her pamphlet *50 Years of Recuperation of the Situationist International* (2008).[428] From the 1950s to the 1970s, the Situationists were the heartbeat of a movement of neo-Marxist rebellion in Europe that was "beyond art and politics." Their energy culminated in the student-worker near-revolution in France in 1968. The organization officially dissolved in 1972. According to almost all accounts, that was the end of it. It is precisely that assumption of closure with which Wark takes issue. She is primarily interested in what happened afterwards. Her books explicitly about the SI trace in detail the post-1972 activities of those who had been part of the group, or of others who sought to continue, or go beyond, the legacy of the Situationists. This is almost a secret history. McKenzie Wark wanders with grace and verve through the ideas, creations, and activist practices of many figures in the social and intellectual history of the Situationists who were previously regarded as secondary to Guy Debord.

Starting about 1989, the Situationists were recuperated by "official international cultural exchange."[429] They entered the museum and pantheon of culture. The Pompidou Center in Paris curated an official exhibition that went on tour. Greil Marcus published his book *Lipstick Traces: A Secret History of the 20th Century*, situating Situationism in "the history of oppositional popular culture": the successor to Dada in art provocation and the forerunner of punk rock and the Sex Pistols in music.[430] Academics rushed in to claim the Situationists as part of art history, or of futuristic architecture, or of utopian urban planning and design. For literature professors, Debord's writings came suddenly to have poetic and literary value. For film studies professors, Debord's films became part of the avant-garde cinematic curriculum.

For McKenzie Wark, the *dérive* is only one instance of the more general ideas or practices of experimental behavior and permanent play. Situationist architecture is only one component of the more general idea of unitary urbanism. When experimental behav-

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ior is choreographed and enacted brilliantly in the context of unitary urbanism, then the possibility of the highest stage of "the construction of situations" appears.

The thesis of *The Spectacle of Disintegration* is that May-June 1968 and the self-dissolution of the SI in 1972 were not the end of the Situationist project. Wark writes at length about the works of the art historian and former Situationist Timothy J. Clark; the utopian writings of Raoul Vaneigem (and his relation to nineteenth century utopian socialist Charles Fourier); the *détournement* films of René Vienet such as *Can Dialectics Break Bricks?* (1973), *The Girls of Kamare* (1974), *Mao by Mao* (1977), and *Peking Duck Soup* (1977); and the later collaborations of Guy Debord, the film editor Martine Barraqué, and the poet and scholar of Western European slang Alice Becker-Ho in filmmaking and the devising of a board game called *Game of War*.

A great Situationist coup of the 1970s was when Gianfranco Sanguinetti, a colleague of Debord, writing under the pseudonym Censor, sent out his book-length text *Truthful Report on the Last Chances to Save Capitalism in Italy* (1975) to many political and financial power elite members of Italian society.[431] Pretending to be a Machiavellian sage of the Italian ruling class, Censor argued that bringing the pseudo-radical Communist Party into the government would be a brilliant strategic move to consolidate the system of the integrated spectacle.

Debord saw three versions of the spectacle: the concentrated spectacle (speaks the language of command), the diffused spectacle (invokes the imperative of shopping and consumerism), and the integrated spectacle. The integrated spectacle is characterized by the participatory interactive performance of "the user," perpetual technological upgrades, merging of capitalism and the state, secrecy and lies, and the "eternal present" enforced by the media.

McKenzie Wark adds to these the concept of the disintegrating spectacle. It is concentrated and diffuse. Yet it is neither concentrated nor diffuse. The spectators are tasked with having now to themselves produce and distribute the images of the spectacle. But, for Wark, these images are no longer effective enough to mask the disappearance of "every real thing."

Like Sanguinetti, and echoing Machiavelli, Dostoyevsky's Grand Inquisitor (the secret of God is that God does not exist), Baudrillard, and Claude Lefort, Wark concludes that the power of capitalism and the state is not "real." The secret of power is that power does not exist. It is a ruse perpetrated on the populace. It exists because people believe in that power. Power abides thanks to the spectacle of appearances. "The state renders spectacular the production of its own secrets," writes Wark.[432] Appearances are exchangeable for other appearances. Secrets are exchangeable for other secrets. Secrets are complexly related to the spectacle. Wark concludes:

> While the spectacle renders all that appears equivalent, the division between the secret and the spectacular implies a hierarchy – the main game of power. The division between the spectacle of appearances and the secrecy of non-appearances is itself an aspect of the falsification of the whole that the spectacle affects.[433]

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Play Don't Work

The book that I have read about Marx that most inspired me was *Marx's Theory of Alienation* by the Hungarian Marxist philosopher István Mészáros, published in 1970.[434] Mészáros argues that the first full-fledged elaboration of Marx's philosophical system is in the theory of alienated labour of the *Economic and Philosophical Manuscripts of 1844* (also known as *The Paris Manuscripts*), which were first released by Soviet Marxologists in 1932.[435] Marx writes of the estrangement or alienation of the worker under capitalist conditions of production both from the process and from the product of his labour, as well as from social-psychological reality. It is the chain of overseers in the power hierarchy of the capitalist organization who dictate to the worker what he must do in his daily activity and how he must go about doing it. Not only is the product of his work an alien fetishized commodity, but "the worker sinks to the level of the most abject commodity."[436] Forbidden to be active in freedom, the worker:

> does not affirm himself in his work, but denies himself, feels miserable and not happy, does not develop free physical and mental energy, but instead disciplines his physical nature and ruins his mind… The more the worker works himself to the limit… the poorer he and his inner world become.[437]

Marx is not against work *per se*, which he regards as a healthy objectification of man. In a possible future non-alienated variation of work, man will come to be truly human for the first time. He will realize what Marx calls man's species-being. Objectification is something like the creative and meaningful *métier* of the artist. But "in the sphere of political economy [capitalist organization under the prevailing paradigm], this realization of labour appears as a loss of reality for the worker."[438] Man is estranged from his own body, from nature, from other human beings, and from his spiritual dimension.

In *The German Ideology* (1845), probably heavily influenced by Robert Owen, Marx writes of the utopian possibility of transcending the division of labor, and what this could mean for individual happiness. In positive freedom, man would:

> do one thing today and another tomorrow, hunt in the morning, fish in the afternoon, rear cattle in the evening, criticize after dinner, do exactly what we feel like doing [*wie ich gerade Lust habe*], without ever becoming hunter, fisherman, herdsman or critic.[439]

In the capitalist mode of production as we know it:

> Each man has a particular and exclusive sphere of activity, which is forced upon him and from which he cannot escape. He is a hunter, a fisherman, a herdsman, or a critical critic, and must remain so if he does not want to lose his means of livelihood.[440]

In a post-capitalist mode of production, which Marx in *The German Ideology* calls communist society, "nobody has one exclusive sphere of activity, but each can become accomplished in any branch he wishes."[441] The early Marx envisions a replacement of work by play, creativity, freedom, diversity of activities, and respect for scientific knowledge.

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We are living in a society of self-imposed workaholism. As Erich Fromm wrote in *The Fear of Freedom*, published in 1942, modern man "has not gained freedom in the positive sense of the realization of his individual self; that is, the expression of his intellectual, emotional and sensuous potentialities."[442] Everywhere one looks, people are working longer and longer hours to escape from themselves and the terrifying questions: what would they do with their lives if their day, week, and year were not structured by the routines and obligations of work? Who am I and what is the meaning of my life? The society of workaholism is "adverse to human happiness and self-realization."[443] Workaholism is chiefly an inner compulsion.

The next stage of human freedom in post-capitalism would entail a synthesis of the accumulation of capital and the practice/realization of freedom by and for the free creative artistic worker. The great artist Joseph Beuys said that we are living under the oppression of an ideological version of Capital. In a democracy, Beuys said, *everyone is an artist*, everyone is creative, everyone – as a free being – has her own culture.[444] Humans are the co-creators of capital. We must deconstruct the ideological form of Capital and reconstruct a general economy of capital starting from art, popular culture, meaningful work, and self-determination.

Existential Encounter with the Object

It is summer and I go for walks in the botanical gardens. Past the rocky paths and the manicured lawns and the timed sprinkler fountain, I walk through the free-air and air-conditioned greenhouses. I breathe in the aroma of the subtropical plants from Madagascar. I toss coins into the running stream for good wishes. I sit in solitude on a bench in front of a tranquil pond. There are swans and ducks and what I call waterbirds. I am in Germany, but this meditative scene reminds me of the duck pond of my childhood on Long Island. I gaze at the water and feel my inner peace. I stare intently at the fluttering leaves of an overhanging tree. What do these leaves want to tell me? What is the brute facticity of their existence? I see the roots of the tree in the ground. I see the tree inhabiting and breathing its ambience in the air. The tree calls to mind a tree-image on one of the screensavers of one of my computers. I hold the two trees – pond-tree and screen-tree – together in my mind's eye as a magical pair.

This is a revisit to the chestnut tree which Roquentin encountered in Jean-Paul Sartre's novel *Nausea* ("The chestnut tree pressed itself against my eyes."[445]) This arboreal duo has a stealth connection to the Chestnut Tree Café in George Orwell's novel *1984*, where Winston Smith sought refuge from the future video-controlled totalitarian society, and where he later betrayed his lover Julia to the government ("Under the spreading chestnut tree, I sold you and you sold me…"[446]).

This is my existential encounter with the root of the chestnut tree. Objects are changing, taking on a life of their own. The bench on which I sit is manmade, yet the objectness of the root seeps into my space, undermines the taken-for-granted utility of cultural and natural objects, their design for use by humans. The underground part of the plant, buried in the soil, is a natural longevity that will outlive me. It invokes an emotion of both fear and of the heart. Roquentin: "I was the root of the chestnut tree. Or rather I was en-

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tirely conscious of its existence. Still detached from it—since I was conscious of it—yet lost in it, nothing but it."[447]

I sit at my pond, living my *Auseinandersetzung* with the water, the chestnut tree root, and the leaves of the tree. If you tell me that your VR software will replace this elemental scene, then I will say that I am against that kind of software. But if you tell me that your software will enhance the *Wirklichkeit* (substantiality) of this scene, that it will lead to an advancement in what reality is, then my Vulcan Mister Spock ears will perk up.

What did you say? Spock ears? You mean the pointed ears of the half-human half-Vulcan Science Officer Spock of the *U.S.S. Enterprise* on the *Star Trek: The Original Series* TV show, who is always pointing out the relative "primitiveness" of Earth science?

What kind of software would it be? Perhaps the software they have on Planet Vulcan, the home of an advanced humanoid civilization with a more advanced science than what we have. A planet which has overcome through collective spiritual growth its early instincts of violence. A planet that has eliminated war and poverty.

From the Subject to the Object in Jean-Paul Sartre's *Nausea*

Baudrillard writes at the beginning of his retrospective work *Passwords*:

> For me, the object will have been the "password" par excellence. I chose that angle from the beginning because I wanted to break with the problematic of the subject. The question of the object represented the alternative to that problematic, and it has remained the horizon of my thinking… What really interested me, however, was not so much the manufactured object… but how objects spoke to each other – the system of signs and the syntax they developed… Behind this semiological formalism there was no doubt a memory of Sartre's *Nausea* and that famous root… an obsessive object, a poisonous substance.[448]

The narrative of Sartre's *Nausea* is told through the monological voice of the first-person protagonist Antoine Roquentin:

> 6:00 pm – I can't say I feel relieved or satisfied; just the opposite, I am crushed. Only my goal is reached: I know what I wanted to know; I have understood all that has happened to me since January. The Nausea has not left me, and I don't believe it will leave me so soon; but I no longer must bear it, it is no longer an illness or a passing fit: it is I.[449]

When the nausea or existential anxiety first came over Roquentin, it was something new to his being. He was frightened by it. The pain was doubled by trepidation about the pain. Roquentin had not known existence in this way before. Now the nausea is becoming a part of him, of his consciousness. He explores it like a scientist would. He accepts its familiarity and wherever it will take him. Contrary to the usual interpretation of *Nausea* that something bad has happened to him, something good has happened. It is the new normal of who he is.

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The Myth of Sisyphus: Albert Camus on the Side of Objects

In his book *The Myth of Sisyphus*, published in 1942 during the Second World War, Albert Camus wrote the following sentences at the very beginning of the book:

> There is but one truly serious philosophical problem, and that is suicide. Judging whether life is or is not worth living amounts to answering the fundamental question of philosophy. All the rest – if the world has three dimensions, whether the mind has nine or twelve categories – comes afterwards. These are games; one must first answer.[450]

Camus concludes logically that suicide is not a solution to the absurd. The absurd does not dictate death. The absurd emerges from the confrontation between the human striving for reasonableness and "the unreasonable silence of the world… This world… is not reasonable, that is all that can be said," writes Camus. "But what is absurd is the confrontation of this irrational and the wild longing for clarity whose call echoes in the human heart. The absurd depends as much on man as on the world. For the moment it is all that links them together."[451] From the moment that absurdity is recognized, it becomes a passion, the seed of a seduction.

Do you want to live? Camus answered in the affirmative. YES. The answer is that life indeed is worth living. The sense of absurdity that gave rise to the question, to the doubt, is not a static condition. The absurd is a dynamic, a relationship, a gap, a cleft — between my aspirations for a good life and the frustrations of the existing social-existential order of things. And this dynamic is the groundswell of the most important human quality of all: creativity.

The absurd is born of the desert. Absurdity arises from a comparison or tension. Absurdity is a water source, an oasis in the middle of the desert. It appears at first to be a negative, but it is really a double-positive of consciousness and rebellion, which are Camus' two basic principles. How to live in the state of the absurd?

Sisyphus and his rock. The rock is the embodied metaphorical object *par excellence*. To abide with the rock is to take the side of the object. The rock links the consideration of the world from the perspective of objects with Camus' iconic existentialism:

> The gods had condemned Sisyphus to ceaselessly rolling a rock to the top of a mountain, whence the stone would fall back of its own weight. They had thought with some reason that there is no more dreadful punishment than futile and hopeless labor… At the very end of his long effort measured by skyless space and time without depth, the purpose is achieved. Then Sisyphus watches the stone rush down in a few moments toward that lower world whence he will have to push it up again toward the summit. He goes back down to the plain. It is during that return, that pause, that Sisyphus interests me. That hour like a breathing-space which returns as surely as his suffering, that is the hour of consciousness.[452]

Sisyphus represents neither acceptance of the social-technological condition in which we find ourselves at the present historical conjuncture nor simplistic radical rejection of it. One must abide in this condition, as in the human condition, with awareness, to trans-

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form this condition into something better, into creativity and, later, into a better society. The overall theory must emerge slowly and immanently from the experience, from deep familiarity with the condition, in a phenomenological and existentialist way. "The struggle itself toward the heights is enough to fill a man's heart. One must imagine Sisyphus happy."[453]

Simone de Beauvoir, *The Ethics of Ambiguity*

Like Baudrillard in *Symbolic Exchange and Death*, Simone de Beauvoir in *The Ethics of Ambiguity* defines what is specific to humans as being their conscious relationship to death.[454] The awareness of death that is uniquely human is the basis for developing a philosophy or ethics of ambiguity. For Baudrillard, this relation has been betrayed in the postmodern society which prefers to marginalize death, to institutionally push it to the edges of a non-awareness.

Simone de Beauvoir is nearly in complete agreement with the existentialist philosophy of her life partner Jean-Paul Sartre, as articulated in works such as *Nausea* and *Being and Nothingness*.[455] For de Beauvoir, the relationship of humans to death infuses a fundamental ambivalence into the human condition, due to our awareness of death which is allegedly lacking among animals and plants. Man or woman is conscious of the world yet a part of it. He or she also experiences himself or herself as a thing potentially crushed by other things. He or she is an object for others. "As long as there have been men and they have lived," writes de Beauvoir, "they have all felt this tragic ambiguity of their condition."[456]

Other non-existentialist philosophies and ideologies have tried to eliminate this visceral ambiguity. "Hegel tried to reject none of the aspects of man's condition and to reconcile them all."[457] But Hegelianism is an idealism of *Geist* (spirit) recuperating all the negative moments of history into an "artificial paradise" of progress. Kierkegaard's rebellion against Hegel stands as the starting point of existentialism in the history of philosophy. Kierkegaard opposed Hegel's totalizing system through the Danish philosopher's insistence on ambiguity.

In his 1979 book *Seduction*, Baudrillard writes extensively on Kierkegaard and his *Diary of the Seducer* (which is part of the two-volume *Either/Or*).[458] Baudrillard channels Kierkegaard's story of Johannes the seducer and Cordelia the seduced into a theory of seduction as a critique of (Hegelian) dialectics. Baudrillard writes: "Suppose that all the major, diacritical oppositions with which we order our world were traversed by seduction, instead of being based on contrasts and oppositions."[459] Relations of opposition, of Hegelian *Aufhebung*, fixed polarities, all challenged by the playfulness of seduction.

"Since we do not succeed in fleeing it," writes Simone de Beauvoir in *The Ethics of Ambiguity*, "let us therefore try to look the truth in the face. Let us try to assume our fundamental ambiguity."[460] Humans can seek solidarity with the object-ness of the world, to commune with the "radical illusion" of the world. De Beauvoir writes:

> Man makes himself present to the world and makes the world present to him. I should like to be the landscape which I am contemplating. I should like this sky, this quiet

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> water to think themselves within me, that it might be I whom they express in flesh and bone, and I remain at a distance. But it is also by this distance that the sky and the water exist before me.[461]

Embedded in the ambiguity of the human condition, human actions or freedoms are object-oriented. The term "object-oriented" updates the crucial notion of *engagement* in Sartrean existentialism. "Today must also exist before being confirmed in its existence," writes de Beauvoir. "It exists only as an engagement and a commitment."[462] Humans must first be situated in this world, living among objects. I seek alliance with technological and design objects which strive through defiance and wiliness to realize their objecthood. I must first disappear from myself, sojourn with "singularities" and recognize the "radical other," to have some chance to ultimately reach an indirect "emancipatory" or "liberatory" opening onto subjecthood.

"Taking the side of objects" is a powerful and already present idea in one of the classic texts (de Beauvoir) of twentieth-century existentialist philosophy. De Beauvoir's expression of solidarity with Kierkegaard's concept of ambiguity connects with Baudrillard's reading of Kierkegaard in the latter's book *Seduction*.

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Jean Baudrillard and the Donald: Is Trump a Fascist or is He the Parody of Fascism?

Epistemology of True and False

The kind of media theory or media analysis which has been prevalent on the American political left for the past several decades operates essentially with an epistemology of true and false. Noam Chomsky has always been subtle and nuanced in describing the moral complicity of the intellectual class (and his own personal struggle to overcome that complicity) with abhorrent U.S. government policies such as the destruction of Vietnam in the 1960s or of Iraq in 1991. Yet Chomsky's commentaries on what the corporate liberal media reports on politics, current events, and world affairs are largely about exposing the lies that the news media tells and recounting the contextual and factual realities on the ground which they conceal. Chomsky only analyzes the entity called "the news media." He does not analyze the media as a whole – for example, entertainment TV shows, advertising, celebrity culture, or blockbuster movies. He assumes that an understanding of the news media or of the domain called politics or the public sphere can be accomplished without connecting the news media to the media in general in the overall situation of advanced capitalism. In classic works such as *Manufacturing Consent* (co-authored with Edward S. Herman and published in 1992) and *Media Control* (2002), Chomsky argues that the mass communications news media carries out the propaganda function of lying.[463] Powerful business interests which have a profit motive manipulate the media, which in turn manipulates and controls the citizenry. The truth that American foreign policy has the essential function of establishing governments around the world which are politically controlled by us and are friendly to big companies is concealed by the dissemination of falsehoods. The role of the leftist activist or journalist is to tell the truth about any given political conjuncture. Chomsky's work is extremely valuable, yet what is Chomsky's perspective missing?

In their war against Trump, the liberal political media – CNN and *The New York Times*, for example – take the same tack as Noam Chomsky in epistemologically framing their struggle with the fake billionaire as a battle between true and false, between facts and lies. Trump is constantly telling lies and *The Washington Post* is unmasking them every

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day, keeping a list of them, setting the record straight. As of July 2020, Trump had told twenty thousand lies. It is no surprise that Chomsky and the liberal media share this same epistemology – they both believe in the philosophy and the historical project of the modernist Enlightenment: facts, science, truth, communication, rationality – these are allegedly the great achievements of the democratic West. Never mind that it was this same liberal media that helped Trump win the Republican nomination for President in the first place against sixteen other candidates in 2016. Trump merged the sphere of politics with shock jock Reality TV World Wrestling Federation media entertainment. He provided those liberal TV stations and websites with a new sensationalistic headline every day for many months. Since making money is their priority – and astonishment and titillation are the commodities they sell – the media loved it and made Trump their focus of attention.

Society of the Spectacle and Hyperreality

An alternative to the epistemology of true and false as a media theory – which is derivative of the assumption that Enlightenment rationality and the civilized discussion advocated by John Stuart Mill in *On Liberty* are going to save us – was offered by the French Situationist Guy Debord in his 1967 book *Society of the Spectacle*.[464] Let me state that my position is that we should seek a balance between the "modernist" commitment to "truth" and the "postmodernist" placing into question of that assumption. I do not want to reject rationality and truth, but I believe that new strategies are urgently required as well. Guy Debord was a neo-Marxist thinker attempting to comprehend how control over the lives of workers by capitalists expanded from the sphere of production to consumerism, everyday life, and the media culture of images and rhetorical language in the historical progression to advanced capitalism. With his concept of "the spectacle," Debord understood that the omnipresence of visual images institutes a world of both abstraction and passivity, a diminishing of what is "directly lived" and an increase in the autonomy and power of the images themselves.[465] Something becomes true – or more true than true – by virtue of having been said, or said charismatically, in the media. In the spectacle, "the liar has lied to himself." "In a world which is topsy-turvy," writes Debord, "the true is a moment of the false."[466] Social life undergoes the shift from being to having to appearing – bringing on the reign of appearances.

The media theorist and semiotician Jean Baudrillard developed Guy Debord's notion of the society of the spectacle even further into his theory of simulation, simulacra, and hyperreality. Baudrillard's most celebrated book is his 1981 volume *Simulacra and Simulation*, where he famously wrote about the map preceding the territory, and about Disneyland existing to conceal the fact that all of America is Disneyland.[467] Simulacra are copies without originals. Semiotics (linguistics applied to culture) teaches about "the signifier" and "the signified," which together constitute the linguistic-cultural sign. In postmodernism, the signifiers (images and discourses) come to replace the signifieds (facts and references) of which the visuals and words are supposed to be the reliable and verifiable representations. Representation is surpassed by simulation. Words and images stand on their own and have no reference.[468]

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The spectacle itself has become the main thing that contemporary society and economy produce. Consumer objects, architectural ambiences, and media artefacts all primarily have an abstract semiotic and signifying function. In "the system of objects," the physicality and definite location of objects gets subordinated to their participation in the "perfect circulation of messages."[469] The relationality of sign-objects to each other takes precedence over the specificity of each. All objects and media content enter an equivalence through their common belonging to the universal self-congratulatory communication system.

Publicity for a specific product is rarely successful – but this is not advertising's true purpose. Its function is the promotion of the entire system. Although "we may be getting better and better at resisting advertising in the imperative," writes Baudrillard in *The System of Objects*, "we are at the same time becoming ever more susceptible to advertising in the indicative. Without 'believing' in the product, therefore, we believe in the advertising that tries to get us to believe in it."[470] Each product ad refers not only to the individual product that it is allegedly informing us about – it also refers to itself as ad, endorsing the wonder of advertising *per se*. Through the spectacular celebration or "radical visibility" of a single object or brand, it is the totality of objects and a universe made complete by brands that is promoted. In speaking of one single consumer object, advertising virtually glorifies all spectacle objects, including all other media images, semiotic signs, and the sense of abstract well-being that *ambience* generally promotes as a sort of mental attitude. Consumer society does not satisfy so-called *needs* (a concept of the abstract universal humanist economic model) but is rather a manipulation of signs. To become a consumer object or media message, the entity must first enter the universal sign-system.[471]

Baudrillard's third book was called *For a Critique of the Political Economy of the Sign* (1972). Here he outlines his theoretical program of making a synthesis of Marxian political economy and a semiotic analysis of the language-like sign system of the cultural dimension of late capitalist society.[472] Most Marxists had previously considered the cultural dimension to be the mere derivative "superstructure" of the determining instance of the economy and the "relations of production." In *For a Critique*, Marx's political-economic theory of the "commodity-form" of "exchange value" in early production capitalism gets merged – and in a critical way – with a radicalization of Ferdinand de Saussure's linguistic semiotics in an original fusion critique of the sign-form in late consumer capitalism.

Baudrillard articulates the homology between Saussure's linguistic sign and Marx's commodity form. This unified "political economy of the sign" or analysis of the commodity-slash-sign form equals what Baudrillard calls "the code."[473] The real, the lived, the myth of an objective reality – they all become justifications or "alibis" keeping us from seeing the dominance of the simulation models. These so-called realities are "reality effects" (a play on the cinematic term "special effects"). To change registers slightly as an example, the signifier of the greatness of consumer culture or "America's prosperity" stands in for the concrete singularities of objects. The code of signifiers substitutes for references in the process of simulation. We live in the democracy of standards of living and signs of affluence – the republic of the automobile, the cheeseburger, the personal computer, and the home entertainment system. Happiness is the accumulation of signs of happiness.

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The media have cut us off from "real access" to historical events. Everything that I know about the Holocaust, World War II, and the Vietnam War comes from Hollywood films about those events. Baudrillard cites an aphorism by Jewish German-language philosopher Elias Canetti from 1945, speaking about a certain point in history, when exactly this point was is unknowable, when history itself disappeared. Canetti writes: "As of a certain point, history was no longer real. Without noticing it, all mankind suddenly left reality, everything happening since then was not true; but we didn't notice."[474] In his essay on Francis Ford Coppola's 1979 blockbuster Vietnam War movie *Apocalypse Now*, Baudrillard writes that Coppola's masterpiece is the continuation of the Vietnam War by other means. "Nothing else in the world smells like that," says Lt. Colonel Bill Kilgore (Robert Duvall). "I love the smell of napalm in the morning… It smells like victory." The high-budget extravaganza was produced the same way that America fought in Vietnam. "War became film," writes Baudrillard. "Film becomes war, the two are joined by their common hemorrhage into technology."[475] There is implosion or mutual contamination between film becoming Virtual Reality and War.

Donald Trump the Empty Signifier

Donald Trump is a product of this culture of postmodern "anything goes" images and rhetorical discourse. The mythology of Trump was born during the New York City gilded 1980s, the era of Ivan Boesky and Gordon Gecko greed and Wall Street insider trading. Donald Trump plastered the name Donald Trump everywhere he could. He of the golden toilet, he the playboy ladies' man, the casino owner, the entrepreneur of the opulence of the billion-dollar Atlantic City Taj Majal gambling and entertainment paradise-complex. He was a failed businessman and a gangster, but on Reality TV he played the ultimate glamorous billionaire whom many Americans admired and dreamed of themselves becoming. President Trump lies constantly, and his supporters believe all of it. For them, his charismatic speech has become more powerful than the democratic and scientific systems of true and false.

In two of his final texts – *Carnival and Cannibal* and *The Agony of Power* – written shortly before his death in 2007, Jean Baudrillard describes a newer "order of simulacra" which is the phase of irony, parody and "the carnivalesque."[476] Baudrillard upgrades his concepts of simulacra, simulation, and hyperreality into a cogent diagnosis of the self-parodistic stage of Western society. Simulation or hyperreality is no longer the artificial staging of a so-called reality by the models and codes which precede it. Simulation is now a farce, an immense irony, a masquerade, a funhouse-mirror distortion of the previous values and ideals of modernity: freedom, culture, truth, humanitarianism. "Every signification is eliminated in its own sign," writes Baudrillard in *The Agony of Power*, "and the profusion of signs parodies a by now unobtainable reality… Power is only the parody of the signs of power – the cannibalization of reality by signs."[477] The values of the West and of America degenerate into a caricature of themselves and devour themselves. This is Donald Trump.

We have experienced these past four years – in the masterful showmanship of Donald Trump and his fanatic deplorable followers, in the full-scale replacement of politics

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by Reality TV, in the tele-morphosis of the merger between Reality TV and everyday life – the disappearance of political substance into the fascination with the banality of insults (see Hannah Arendt's banality of evil) that is now the hallmark of the media-celebrity-gossip culture of obscenity which dominates American life and the online monopoly social media platforms.[478] Donald Trump is a successful "empty signifier." "The bigger he got as a name, the smaller he got as a person," recently said the former Trump Organization executive Barbara A. Res.[479] Trump is the ultimate simulacrum, the living demonstration of the rule of the signifiers over the signifieds. Fake is not a betrayal of authenticity. Trump is the most talented fake in the world. Lies are exciting. They set in motion their own forceful narrative. When Trump says something, it becomes true because Trump says it, and there is little that *The New York Times* or *The Washington Post* can do about it. The institutional bases for consensus and legitimation of "the truth" have disappeared beneath the mountains of information and virtualization of discourse. The media culture in general paved the way for Trump. All of America is responsible for the disastrous situation in which we find ourselves.

From Simulation to the Grotesque and the Self-Parody

A not so well-known aspect of Baudrillard's theory of simulation and hyperreality is the way that he links the postmodern culture of media images to the motif of the grotesque in art, literature, and performance, as a cultural expression moves from parody to self-parody, as something becoming a parody or caricature of itself. We are living the historical phase of the self-parody of the revered values of Western civilization. Simulation takes a major step forward from merely "the hyperreal replacing the real" to the grotesque. We are on the fast track to what Baudrillard calls "carnivalization" and "cannibalization." Carnivals were historically very political – they were parodies made of the powerful by the oppressed. At festivals, the black African colonized dressed up monkeys in admiral suits and hats to parody the white colonizers.[480] In Cologne and in the Rhineland region of Germany, parody and mockery of the French and Prussian occupiers were at the center of the carnival tradition that began in the nineteenth century. But self-parody is something different. It occurs without conscious intention. It is like what Karl Marx wrote in *The Eighteenth Brumaire of Louis Napoleon*, writing about the French coup d'état of 1851, when Marx famously said: "Hegel remarks somewhere that all great world-historic facts and personages appear, so to speak, twice. He forgot to add: the first time as tragedy, the second time as farce."[481] To avoid having to give up the Presidency, Louis-Napoléon Bonaparte staged a self-coup to stay in power. He carried out Operation Rubicon on the anniversary of his uncle Napoleon's triumph at Austerlitz in 1805.

Self-parody sinks its unaware performer into debasement or abjection. America sank into abjection with the 2004 Abu Ghraib torture and prisoner abuse scandal (Baudrillard wrote about Abu Ghraib in his 2004 essay "War Porn" [482]). U.S. Army and CIA personnel sent selfies to their friends and relatives from Saddam Hussein's infamous prison, now taken over by the occupying American power, smiling and saying cheese while standing next to prisoners whom they had just sodomized and tortured. Disneyland and the Americana culture of universal total simulation seem like harmless fun. Radical sim-

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ulation is how America came to achieve hegemony over the world. America had no peers in its fabrication of fantasies and spectacles. Yet at what point does that become seriously perverse? Donald Trump is the embodied metaphor of that turning point. You want to be the world's only superpower through the image? Then you will bring yourself down by the endlessly looping video image and the image-playback.[483] After the tragic event of September 11, 2001, the video footage of the implosion of the World Trade Center twin towers was played back thousands of times again and again on TV in an endless loop, the eyes of the tele-spectators fixed to the screen in perverse fascination. Baudrillard detected a symbolism in the way that the two tallest buildings of the Manhattan skyline collapsed or imploded in a visually suicidal motion, seemingly responding in turn as a counter-gesture to the murder-suicides of the nineteen terrorists.[484] The carnival of the image is also the self-cannibalization by the image.

An important precursor of Trump playing the President on television and on Twitter was the election of Arnold Schwarzenegger as governor of California in 2003. The elevation to a powerful political position of the Mr. Olympia bodybuilder and star of the Terminator series of science fiction films was a not-so-surprising caricature of democracy. Reagan the Hollywood actor and TV host of General Electric Theater had already been governor and President. Politics has been fully banalized into a game of idols and fans, the triumph of the celebrity culture.[485] Schwarzenegger would have certainly become President if not for the bad luck of an antiquated clause in the Constitution which disqualified him a priori on xenophobic grounds. As we are now witnessing the probable end of the Trump presidency – and thinking with Baudrillard – I contemplate the contempt for the rest of the world which the Trump supporters feel and express through their allegiance to him. Those who identify the most with the simulacrum of America take revenge symbolically for the envy and scorn which the rest of the world feels for the American simulacrum. America exercises its power in the world through its mastery of images. Yet a certain desperation seems to have now set in. The Trump phenomenon is the marriage of that showman grifter narcissist and the desperation of the MAGA throngs worried about losing their standing.

Springtime for Hitler

For a long time, some Jewish theologians thought that showing images of the Holocaust should be taboo since the event was the ultimate unrepresentable evil. Photography theorists have sometimes argued generally that historical truth cannot be depicted through visual images. Similarly, it was thought that Adolf Hitler and the Nazis in the 1930s were so morally reprehensible that parody or comedy or jokes about them should be taboo. In the 1967 film *The Producers* by Mel Brooks, bankrupt Broadway producer Max Bialystock (Zero Mostel) needs to stage a musical that is guaranteed to be a flop to carry out a complex scam to save himself from financial ruin. Bialystock hits upon the apparently ingenious idea of producing a musical comedy about Hitler and the Nazis. It will be in such bad taste that the show is guaranteed to be panned by the public and the theatre critics and to close in disgrace on opening night. Yet to Bialystock's astonishment, the show is a smashing success. The Broadway public finds *Springtime for Hitler* to be the funni-

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est thing in the world. Adolf Hitler is unintentionally brilliantly parodied by deranged ex-Nazi Franz Liebkind. Due to the unexpected triumph, Bialystock now paradoxically faces financial ruin and even prison.[486]

Is Trump a fascist or is he the parody of fascism? Here is my answer: he is the parody of fascism. Yet he is also the self-parody of America and, at one step removed, of the celebrated values of the West. Trump is the self-parody of the most hyper-mediatized culture in the world: the culture of consumerism and shopping mall "no-place" ambient spaces; television and advertising; the media- and image-saturated society of the spectacle; and the hyper-real fantasy aesthetics of Disneyland. As both the parody of fascism and the self-parody of the post-World War II so-called American way of life, as the synthesis of both (self-) parodies, Donald Trump has brought us to the precipice, to the edge of the cliff, to the spot from where we are now standing and staring down into the abyss.

Classical fascism works on the Führer principle and a strong and stable set of beliefs. There are territorial claims, hard nationalism, and theories of race. For Trump, these aspects become variable and "anything goes." He changes his mind every day and has no goals or agenda other than greatness and freedom. The energetic force of fascism persists, but without fixed ideological reference points. This parodies fascism since absolute truth is transferred to the double-system of the empty self-referential signifiers and the arbitrary signifieds. Trump's "parody of fascism" and Trump's "real" fascism – his destruction of America and his danger to the entire world – have merged into a monstrous combination.

Serge Latouche Remembers Baudrillard

With his first three books criticizing the media and consumer society, Baudrillard made such an intense and favorable impression on his French readers, that, according to French economist and leading thinker of the ecological "degrowth" movement Serge Latouche in his recent French-language book *Remember Baudrillard* (Latouche chose an English-language title), Baudrillard was elevated to the status of THE STAR of the French leftist (*gauchiste*) intellectual-academic scene in the early 1970s.[487]

Baudrillard was a chief and frequent contributor to the ascendent architecture and urban studies journal *Utopie* and to the journal of the Pompidou Cultural Centre *Traverses*.[488] He was introduced to the art and design world as a prominent speaker and manifesto writer at international design conferences in Aspen, Colorado in 1970 and in Kyoto, Japan in 1973. Baudrillard was the keynote speaker at the colloquium convened by Latouche at the University of Lille in June 1974 entitled "Economic and Symbolic Practices."

After the publication of *Symbolic Exchange and Death* in 1976, Baudrillard abandoned the academic discipline of sociology in favor of a self-questioning "patasociology" (as he and fellow professor at the University of Nanterre Jacques Donzelot called it[489]), declaring in his 1978 essay *In the Shadow of the Silent Majorities… or the End of the Social* that many of the principal objects of scientific investigation of that field – society, the social, the masses – do not exist independent of the observer.[490] They are rather self-fulfilling prophecies or simulation-projections of the wish of sociologists that they should exist.

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Baudrillard's "fall from grace" from his status as a highly respected leading figure of the French intellectual left occurred following the publication in 1977 of his small book *Forget Foucault* where he criticized central concepts of both Michel Foucault (power) and Gilles Deleuze (desire), who at the time were emerging as the two most significant and often referenced philosophers of the "post-Marxist" intellectual and academic left (both in France and worldwide).[491] With his polemics against Foucault and Deleuze, Baudrillard damaged his reputation.

Yet just a few years later, Baudrillard made a surprisingly big splash globally and in some of the English-speaking countries (the US, the UK, and Australia) with his groundbreaking 1981 text *Simulacra and Simulation*, a work that became so famous that it eventually appeared visually and literally as a hollowed-out book in the blockbuster 1999 Hollywood film *The Matrix*, directed by the Wachowski siblings.[492]

Latouche cites *The Consumer Society* and other early books of Baudrillard as pioneering and "precursor" texts (*malgré lui*) of *degrowth* (a term originated by André Gorz in the 1970s) and reproaches Baudrillard for his alleged failure to embrace the ecology movement. The absence of the ecological dimension, according to Latouche, constitutes a serious blind spot in Baudrillard's system of thinking. Latouche is undoubtedly right – for the most part.

In *The Consumer Society*, Baudrillard zeroed in on the fetishism of the consumable object and the false abundance of consumerism.[493] The so-called abundance of the society of growth exists only through the spectacle of the accumulation of commodities. The critique of the consumption of objects begins with the critique of the supposed universal "naturalness" of "needs" and their satisfaction as the basis of the "universal model" of all possible economic systems espoused by "bourgeois" economic theory and its justifications of capitalism. In *The Mirror of Production*, Baudrillard extended his critique to Marx for the latter's "religion" of production, in other words, growth.[494]

Latouche reproaches Baudrillard for not placing the ecological destruction of the planet at the center of his thinking, but rather focusing on depicting a sort of collective suicide of the human species by transhumanism and its hyper-technological values. We are witnesses to global warming, the melting of the polar icecaps, the destruction of old-growth forests, oil drilling in the Arctic National Wildlife Refuge, polluted water in the Berkeley Pit, threats to the Great Barrier Reef, loss of biodiversity, and the extinction of many species – including the human species under the accelerating force of technological transhumanism.

It is not clear if Baudrillard has no ecological perspective or if he wants a more radical ecological consciousness than that currently in circulation. He criticizes the existing ecology movement for humanizing, sentimentalizing, and abstracting nature. He wants nature to be seen as savage and more "radically other." In the essay "Maleficent Ecology" in the book *The Illusion of the End* (1991), Baudrillard writes: "The virtual produces the real as its waste-product. No ecology – no benevolent ecology – can do anything to stop it. It would take a maleficent ecology."[495] Latouche even misreads the meaning of the title of this essay as a disparaging of the ecology movement, whereas Baudrillard clearly intends the phrase as a description of the kind of alternative ecological movement that he would like to see develop.

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The emphasis in Baudrillard on *the image* can shed much light on the phenomenon of what today is called "greenwashing." This time it is about a different meaning of the term *image* – advertising or public relations image. Latouche ignores this dimension of the ecological catastrophe completely. It is well known that large companies and governments seek to enhance their PR *image* by advertising themselves as avid promoters of ecological values and the noble changes they are undertaking in their business models for "sustainability." Greta Thunburg is not only justifiably angry about climate change and the failure of big corporations and states to take consequential action – she is also angry about the "greenwashing" or empty signifiers uttered in the rhetorical discourse and self-praising claims of these powerful institutional actors.

In *The Illusion of the End*, Baudrillard criticizes a certain apocalyptic discourse surrounding ecology, energy, and the environment. His critique is certainly a one-sided and somewhat misguided position. Perhaps the challenge is to make a synthesis of what he says and of the discourse of catastrophe that he criticizes. The discourse that warns of coming catastrophe covers up that the drastic destabilizations of "the real" and time have already happened. In "The Reversal of History," he writes of time running in reverse and the "end of linearity."[496] The future "no longer exists." Time in hyper-modernism is turbulent, like a film played backwards. There are ubiquitous time-distortion patterns like recurrence and retroactivity.

In the essay "Catastrophe Management," Baudrillard asserts that the disaster of the "end of history" is "managed" by apocalyptic Hollywood films (like Roland Emmerich's *The Day After Tomorrow* (2012)) with their discourse of the impending "real" catastrophe that covers up the across-the-board "virtual" catastrophe which has already taken place.[497] In "Maleficent Ecology," Baudrillard writes that our industrial and urban hyper-concentration converts nature into *le reste*.[498] With our massive postmodern architectural construction projects, we render the environment as a residue. With transhumanism – the idea that an immortal successor species to humanity is on the way, as soon as the technological "singularity" or "superintelligence" is reached – humanity treats itself already as a residue or survivor. The discourse warning of the ecological catastrophe is, in one sense, a reflection of the wider discourse of permanent emergency of the dominant society. As a literary trope, Baudrillard prefers anastrophe to catastrophe. In rhetoric, anastrophe is a figure of speech involving an inversion of a language's usual word order. The German anthropologist Dieter Claessens has generalized anastrophe as a counter-term to catastrophe, meaning a change for the better.[499]

Another important recent work is *Le Livre dont Jean Baudrillard est le héros* by Emmanuelle Fantin and Camille Zéhenne.[500] The German electronic musician and philosopher Achim Szepanski recently published *In the Delirium of the Simulation: Baudrillard Revisited*.

Biosphere 2: The Artificial Paradise of Nature

Biosphere 2 is the enclosed artificial simulation of a natural environment in the Arizona desert which Baudrillard wrote about extensively in *The Illusion of the End*.[501] Biosphere 2, according to Baudrillard, is the desperate project of a desperate humanity faced with

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its own extinction, the obsessive mania to create an artificial paradise of so-called nature and so-called reality, given that both of those nostalgic referents have already disappeared.

Biosphere 2, writes Baudrillard, is "the artificial synthesis of all the planet's systems, the ideal copy of the human race and its environment."[502] Baudrillard's critique of the ecology movement is not a rejection or ignoring of concern for the fate of the planet but is rather a plea for a more radical ecology, a so-called *écologie malefique* consistent with his Nietzschean positive valuation of the term "evil" which recurs throughout his philosophical system, and which counterweights the term "good" in the Nietzschean "genealogy of morals."[503] He would like to deepen ecology with an ethics of "radical alterity," which means both the recognition of a more savage and truly *other* nature and a media philosophy analysis of (the mainstream version of!) Virtual Reality and Artificial Intelligence as the primary system of the catastrophic replacement of the life-and-habitat-sustaining "vital illusion of the world."[504]

The physical-environmental destruction of the planet is the most horrible yet secondary effect of the primary (mainstream version of the) VR cloning of existence and the AI cloning of intelligence. Just as the Persian Gulf War of 1991 (*The Gulf War Did Not Take Place*) was primarily a television war of images which produced the death and physical destruction of Iraqis and Iraq as its most horrible side-effects – secondary "reality-effects" or "fresh meat" data input for the "VR game" from the perspective of the TV viewers of the VR system.[505]

The mainstream meaning of the term "environment" is its artificial resurrection. Biosphere 2 invests heavily in this experimental Bio Art microcosm, a cloned copy of the world. It contains seven different ecosystems and all the planet's climates, recreated in a combination Walt Disney and techno-scientific style, housed in a geodesic steel-and-glass structure, including an ocean, a savanna, and a virgin rain forest. Visitors to the Arizona theme park of the Earth in miniature come to watch the eight astronaut-like inhabitants go through the daily routine of their two-year sentence: a zoological garden of the artificial survival of our species.

The 2020 film *Spaceship Earth*, directed by Matt Wolf, brings together archived material and recent interviews with former participants to document the 1991 Biosphere-2 project. The film itself is excellently made. Its title is taken from the 1969 book *Operating Manual for Spaceship Earth* by the visionary futurist, systems theorist, and popularizer of the geodesic dome R. Buckminster Fuller.[506] A geodesic dome is a hemispherical architectural structure shaped as a geometric polyhedron. We learn in the movie that the Biospherians were also inspired by the 1972 science fiction film *Silent Running*, starring Bruce Dern. In that SF narrative, all plant life on Earth has become extinct yet an environmental ecology in miniature has been preserved in greenhouse domes attached to spaceships near Saturn.

From my perspective, what becomes apparent from this cinematic tribute is the lack of intellectual clarity of the Biosphere-2 undertaking with regards to the question if they were seeking to help the Earth's endangered ecosystem by "getting close to nature" or if they were, in fact, damaging the planetary habitat by replacing or simulating it as an artificial copy. There is confusion if the dream of colonizing other planets embodies the idea of saving human existence or rather fleeing from it by doubling it as simulacrum.

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As one of the former stakeholders excitedly expresses it in an interview, they wanted to "launch humanity into an extraterrestrial evolutionary trajectory." They visualized a long-term colony off the planet.

Biosphere Two

As the film amply documents, Biosphere-2 was an American media spectacle and a global media event. There was extensive coverage on local (Arizona), national, and international TV news programs. TV commentators compared the event to the Apollo missions that went to the moon. They waited for a blastoff. The project participants were contradictorily lauded as "protectors of the planet" and "pioneers blazing a trail for outer space." As the eight scientist-adventurers open the door to enter the domed vivarium at the spectacular start of their two-year stay, they race from being seen by the TV camera outside to staring into the next available TV camera closest to the inside of the door. Their "sustainability survival" experiment begins in its first moment with the media gaze upon them. The process of selecting the eight Biospherian finalists from among a larger group of candidates was just like a Reality TV game show. A contest or competition, judged by project leader John P. Allen, was held to choose the winners. Each candidate had a minute in front of the camera to self-advertise as the best candidate, like a beauty pageant. The "green" and "space exploration" installation became a tourist attraction of trendy ecological entertainment, complete with t-shirts, a Visitors' Center, and mud wrestling among the scientists.

The cult leader John P. Allen began to recruit idealistic hippies from the famed Haight-Ashbury section of San Francisco to his spiritual and activist closely-knit community in the late 1960s. The group was searching for meaning in life and wanted to do theatre, art, business, and science all at once. They founded the Theater of All Possibilities. In the interviews, some former members confess that they would have done anything that Allen might have asked them to do. He is described as "tempestuous,

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big time." Video clips of the theater rehearsals show Allen pushing actors violently and ritualistically to the ground. To their credit, the group had a strong awareness of the imminence of global warming, climate change, and the danger of destruction of the Earth's environment. At the interdisciplinary "Man, Earth and Challenges" conference which they organized in 1981, they announced their quest for "sustainable living on Earth." Their financial backer was the Texas investment management billionaire Edward P. Bass, who believed the enterprise would achieve long-term profitability via future outer space spinoffs.

The initial two-year mission inside Biosphere-2 failed due to a runaway greenhouse effect. The balance between oxygen and carbon dioxide went way out of whack. The oxygen deficit made it difficult for the inhabitants to breathe. They were threatened with possible brain damage. Crops took longer to mature, or they failed completely. Food became scarce. They were all losing weight rapidly. They looked emaciated. They were suffocating and starving. Animosity towards John P. Allen grew. He controlled which experts on the outside they were allowed to talk with via their telephone link. John wanted God-like power. By 1994, the Biosphere-2 project was discredited when it was discovered that the managers had violated the self-sustainability principle by secretly installing a "CO_2 Scrubber" device to remove CO_2 from the inside atmosphere. It was also detected that they were pumping in liquid oxygen.

Reality TV and Baudrillard's *Telemorphosis*

On December 14, 1957, a few days after accepting the Nobel Prize, Albert Camus gave a lecture at Uppsala University, Sweden called "Create Dangerously." In the transcript of this lecture are comments by Camus anticipating Reality TV and *The Truman Show*:

> What is more real, for instance, in our universe than a man's life, and how can we hope to preserve it better than in a realistic film? But under what conditions is such a film possible? Under purely imaginary conditions. We should have to presuppose, in fact, an ideal camera focused on the man day and night and constantly registering his every move. The very projection of such a film would last a lifetime and could be seen only by an audience of people willing to waste their lives in watching someone else's life in detail.[507]

Compare Jean Baudrillard writing in *Simulacra and Simulation* about the 1973 Public Broadcasting Station (PBS) first ever Reality TV show "An American Family," featuring the Loud family and the separation and subsequent divorce of Bill and Pat Loud:

> This family came apart during the shooting: a crisis flared up, the Louds went their separate ways, etc. Whence that insoluble controversy: was TV responsible? What would have happened if TV hadn't been there?... The producer's trump card was to say: "They lived as if we weren't there." An absurd, paradoxical formula – neither true nor false: but utopian. The "as if we weren't there" is equivalent to "as if you were there.[508]

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In his essay "Telemorphosis" – on the media genre of Reality TV – Baudrillard, referring to a TV show called "Loft Story" (the French equivalent to "Big Brother"), identifies in the narrative structure of this kind of broadcast the "total telemorphosis of society."[509] In the promiscuity of screens everywhere and society's endless image-feedback of itself, there is a mania of banality and insignificance, a "maximum exaltation" of the ordinary person, celebrating his or her "minimal qualifications." The fascination with the "container" and "desert island" settings reveal a compulsive attraction to confinement and sensory deprivation. In the SF film *The Truman Show*, the hero is telemorphosed, but all the other actors/participants are as well – accomplices and prisoners in the same hoax.

The Truman Show: "The Last Thing That I Would Ever Do is Lie to You"

Truman Burbank – played by Jim Carrey – is under surveillance by television cameras twenty-four hours a day within the framework of a carefully choreographed Reality TV show that is watched by billions of voyeuristic viewers all over the world. Truman lives inside a vast Hollywood studio erected as an enclosed dome that is so large that it can be seen from outer space. There are five thousand cameras observing him, and more added all the time. It is not the totalitarian state permanently watching us, as in George Orwell's novel *1984*. It is all of us watching each other and watching ourselves. The high-tech engineering studio of *The Truman Show* can simulate the brightness of day and the darkness of night in Truman's world. It can control weather conditions. Truman is the only person in the world who does not know that his life is a TV show, who naively believes that he is living a *real life*. As a child, Truman was adopted by a corporation. He was born and has lived his every waking moment on the television screen. Like everyone in postmodern society, he understands nearly nothing of the effects that the media have on him (us). We are all Truman. We cannot distinguish what is real and what is media. Although Reality TV as a genre has been sold to us as being more "authentic" than the traditional scripted narrative show, Truman acts as the perfect television character, talking in slogans and cliches – but with an added Jim Carrey layer of self-irony: "Good morning, and in case I don't see ya – good afternoon, good evening, and good night."

Truman's wife and his best male friend are actors faking him out every day. They are live performers in the show. His wife Meryl behaves like a Disneyland animatronics character who just stepped out of a 1950s Sears shopping catalog. Marlon has been Truman's best buddy since childhood. In on-screen advertising interviews for the show, Marlon assures the worldwide audience that "It is all true, it's all real. Nothing here is fake." Meryl declares: "My life… is the Truman Show." The show's creator and director Christof comments: "We've become bored with actors giving us phony emotions. We are tired of pyrotechnics and special effects. There is nothing fake about Truman himself. No scripts, no cue cards."

Truman's home Seahaven Island is better than real life. It is the hyperreal copy or recreation of the perfect 1950s American suburban community. Its resemblance to perfect-living Disney communities in Orlando, Florida is unmistakable. It is a copy of a copy, and at the same time *more real than real*. Truman is a prisoner in paradise. Despite the constant discursie invocations of "the real," simulation and hyperreality have become the

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obvious goals of existence in Seahaven Island. "Seahaven is the way the world should be," says Christof. There is a frantic proliferation of signs of "the real" to mask the absence of reality. All of America is television, cinema, Virtual Reality, and an immense spectacle.

Truman dreams of traveling around the world, to faraway places like Fiji, and having adventures. But he is unable to leave water-surrounded Seahaven due to being psychologically crippled by a phobic fear of water. He developed aquaphobia after his father apparently died in a boating accident. It was a staged death. Constant radio broadcasts on the local station warn of the dangers of leaving the comforts of one's hometown and the chaos of the outside world. The producers of the show have manipulated Truman's life and psyche very badly. They faked his father's death and they got rid of the girl whom he loved.

In a crucial close-up scene on a pier after hitting golf balls aimlessly into the water, Marlon assures Truman of his loyalty and honesty as his best friend. "I would never lie to you. I would gladly step in front of traffic for you, Truman. And the last thing that I would ever do is lie to you." Tears are welling up in the eyes of both pals. From his microphone in the control studio to Marlon's hidden earpiece, Christof is telling the dialogue to the actor, feeding him his lines. It is the biggest whopper of all time, yet it is not a pure lie. The relationship between true and false, between truth and lies, the simulacrum or hyperreality of this moment, has a complex structure. In the "post-truth" culture, there is a paradoxical synthesis of authenticity and lies.

Truman begins to suspect that "something is going on." A light fixture falls from the sky. Raindrops fall only on his head. He espies a camera crew behind an elevator door. He overhears a radio transmission while in his car that describes precisely where he himself is driving. In the final climactic scene, Truman escapes on the small *Santa Maria* sailboat, no longer afraid of the water. As Truman becomes increasingly aware of the fakeness of his life and his prisoner status, Christof becomes more and more desperate to come up with tricks to keep him from leaving. Truman's departure will be the death of the show. Truman sails until his boat strikes the wall of a painted sky. He has reached the edge of his cosmos.

My Two Key Differences from Baudrillard

I have two key differences from Baudrillard. First key difference: For me, the most crucial area for research and reflection about simulation, the simulacrum, and hyperreality is not the diagnosis of that postmodern and hyper-modern cultural situation for its own sake. To assert that "everything is simulation" is irrationally obsessive and not empirically valid. The advantage of the hypothesis of simulation is rather the ways that new challenges to, or contestations of, the hegemonic techno-cultural system that we call simulation are made visible by the assertion of the simulacrum. The epistemological stance is the key. What is pivotal is the idea that "everything is simulation" – the very idea that was so anathema to Baudrillard's critics, that was too "totalizing" for them. My focus is on the question of which new resistance and transformation practices and strategies are enabled by the epistemological bearing. Baudrillard himself moved somewhat towards

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that emphasis with his concepts such as seduction, the "radical illusion of the world," and "taking the side of objects."

Second key difference: We now exist fully in the cultural circumstance of digitalization – of digital, virtual, and cybernetic technologies and their effects on the lives of citizens of late capitalism. It is not sufficient anymore to criticize or oppose or lament this conjuncture, as Baudrillard often, in his tone, appears to be doing. We must operate within the situation of the digital. There is a happy coincidence between these two key points of my divergence from, or going beyond, Baudrillard. We can look for ideas and projects of resistance to hyperreality and the simulacrum in the context of radical technological praxis and Creative Coding.

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Part Three – Posthumanism: N. Katherine Hayles' History of Cybernetics, Creative Coding, and the Future of Informatics

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Overview of Part Three

The challenge to the simulacrum leads to another media theorist: N. Katherine Hayles. The project of transforming the simulacrum switches to paradigm shifts in computing beyond the original formulation of computer science. I bring together ideas from cultural and media theory with the practical movement of Creative Coding.

Hayles is a scholar of posthumanism. In *How We Became Posthuman*, she writes a genealogy of twentieth-century informatics, interpreting the three successive orders of cybernetics.[510] She argues that an idea of information was developed that is disembodied. This could be re-thought with an upgraded re-embodied concept of code. I study ideas and projects of Creative Coding which contribute to a transformative future of informatics.

My exegesis and extensions of the ideas in *How We Became Posthuman* are revised excerpts from three chapters of my book *Star Trek: Technologies of Disappearance*.[511] The chapters are about the three orders of cybernetics and their SF representations in *Star Trek*.

Lost in the original invention of computing were the poetic, musical, ambivalent, and resonant qualities of human languages. As the history of programming languages continues, and in the spirit of Creative Coding, human language increasingly reappears within code. Hayles suggests that we are moving beyond the binary logic of identity and difference towards a language of intelligent machines that resembles the resonant language of humans.

The Science Fiction of *Star Trek*

I published a book on *Star Trek* and its principles of a future utopian society. *Star Trek* predicted many technologies and scientific areas of research – from cell phones and speech interfaces to quantum teleportation and wormhole physics – which later were brought to fruition. *Star Trek* is a vision of a better future for humanity in the twenty-third century. There is a major revival of *Star Trek* going on right now in 2024. I wrote about the literary stories of *Star Trek* and about the futuristic science fiction technologies of *Star Trek*. I wrote about *Star Trek*'s post-capitalist society of the future with better social and economic arrangements.

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Star Trek is multiracial, multicultural, and multispecies. It deconstructs anthropocentrism and ecological destruction. *Star Trek* looks at technology with ideas from the humanities. The *Star Trek* civilization of the future is beyond war and poverty. There is bottom-up globalization. Earth is united, but the singularities of local and indigenous cultures are respected. *Star Trek* shows the Replicator technology that makes food and material objects based on digital and quantum information. It resembles the 3D printer technology of today that is making the Additive Manufacturing revolution and the invention of new additive raw materials. *Star Trek* shows a vision of the post-scarcity post-capitalist economy. Through designing and implementing technology intelligently, and with ecological awareness, we can transcend what economics, work, production, and the domination of nature have been under capitalism and industrialism. We can live in harmony with nature in a sustainable way. We can work less and become more creative. We can live in cooperation with self-aware technologies. I develop the ideas of Dialogical Artificial Intelligence and Moral Algorithms.

Star Trek's Spock, Data, and Seven of Nine and the Three Orders of Cybernetics

My writing about the sequence of *Star Trek* characters Spock, Data, and Seven of Nine is accompanied by discussion of the historical cycle of the three orders/waves of cybernetics.

Our society dreams of making *Star Trek*'s technologies "real." Scientists, computer technologists, and science fiction media fans strive to accomplish: the transporter with quantum entanglement, interstellar space travel with faster-than-light speed; time travel with fabricated wormholes; the Holodeck as the Holy Grail of Virtual Reality, and cyborgs and androids with Artificial Intelligence.

Star Trek is also about one's affinity with a certain kind of biographical fate. This is the fascination of alternative cyborg figures like Mr. Spock, Lt. Commander Data, and Seven of Nine. "Pushing the reality of the cyborg harder," in its original context of cybernetics, as Donna Haraway, the author of "The Cyborg Manifesto," recommends.[512]

As a creature of fractured identity, Spock exists at the boundaries between previously defined dichotomous categories which are losing their distinct opposition. Humanism and anthropocentrism are brought into question from the standpoint of radical recognition of others and a broader ethics of life itself. Cyborg Spock shows himself to be sensitive towards our "joint kinship with animals and machines."[513] In high-tech culture, the boundaries that "construct the human" – between human/machine, human/animal, living/nonliving, artificial/natural, male/female, self/other, informatics/biology, reality/fiction, real/virtual, truth/illusion, and science/humanities – are disrupted.

The original meaning of cyborg was an Engineered Astronaut dreamed of by NASA. Spock is not just "Mister Logic," or a figure "torn between logic and human emotions." His inter-species birth was made possible by Vulcan technoscience, his skills as an information processor fitting with the cybernetic paradigm of a self-regulating machine built for command, communication, and control (Norbert Wiener).[514] The seminal episodes about Spock like "The Devil in the Dark" deal with the tension between Spock as an em-

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blem of first-wave cybernetics and Spock as potentially subversive boundary-crossing cyborg (Donna Haraway).

For the *Star Trek* industry, the predicament of the android Data of *The Next Generation* is that of a postmodern Pinocchio who pines to become human. Yet the stories themselves suggest that Data's quest is more about the struggle than the goal. His condition is that he is neither the "same as" nor "different from" the human, neither comparable nor opposable. The definition of human is not fixed – the android can "double" and induce a transformation in us.

Although Data often says that he has no emotions, one can distinguish between emotions corresponding to the flexible knowledge-acquisition competencies of second-wave cybernetics, which he does have, and those corresponding to the Artificial Life fluidity and turbulent energies of third-wave cybernetics, which he is lacking. In contrast to the first-wave static regulatory and rational homeostatic control exercised by Spock, Data is a figure of second-order object-oriented reasoning and "learning by doing." He has the self-emendating capacity of acquiring emotions from his performative involvements in the world.

Seven of Nine is a cyborg figure descendant from Spock and Data. For the *Star Trek* industry, her narrative arc is summed up in the phrases "recovering Borg" and "becoming human."[515] Her parents were Borg specialists whose imprudent high-risk research in the Delta Quadrant led to young Annika Hansen's being assimilated at age six by the Borg. Captain Janeway represents a maternal superego who, 18 years later, replaces the father's failed authority. Janeway enjoins Seven to "choose" and "enjoy." Choose to stay with *Voyager* and to become human. Enjoy your "individuality," your creativity in Leonardo's Holodeck workshop, your sexuality, your food. Pleasure becomes her Starfleet duty. I reinterpret the stories as Becoming-Borg Seven of Nine. Seven learns to live the singularity of her situation, becoming something that would not have been possible without her experience with the Borg.

What is Posthumanism?

We need a posthuman worldview where we (1) stop anthropocentrically dominating nature and the planet and (2) embrace our co-existence with self-aware technological entities.

For Katherine Hayles, posthumanism has at least two different meanings: (1) A "negative critique" of what has happened in the technoscience mainstream since the advent of cybernetics. (2) A "positive vision" of a possibly emerging society beyond the destructive consequences of anthropocentrism and possessive individualism that is the hidden alternative potential of advanced technologies such as Artificial Intelligence and Virtual Reality.

On the one side, posthumanism is the fantasies of disembodiment of the prevailing informatic discourses and user-experience applications.

On the other side, posthumanism is the breakthrough transdisciplinary understanding of humans as embodied and embedded in complex social, cultural, narrative, and technological circumstances. This comprehension of our embroilment, co-existence, and

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ethical partnership with – on the one hand – nature, animals, plants, and our environmental ecology, and – on the other hand – with self-aware technological beings and processes, engenders hopeful, alternative, radical utopian projects of specific changes to those complex circumstances, and a realistic optimism about a general post-humanist planetary reversal.

Posthumanism is a free association of many different and related perspectives. Posthumanism means that rationally thinking and industrially producing Man is no longer the center of the world. White European patriarchal hetero-normative Man is no longer the ruler of something posited as universal. Racist definitions of what counts as humanity are rejected. Posthumanism is about nonhuman agencies and our relationship to them. The boundaries between human and nonhuman dissipate. Six general areas of posthumanism are identified:

(1) **Ecological**: Rethinking and transformation of the relation of humans to nature, the environment, and the planet. Confronting global warming, climate change, and the challenge of sustainability. Animal studies and animal rights.
(2) **Technological**: Humans and Artificial Intelligence. Cyborgs, Androids, and Robots. The rights of robots. Aliens in science fiction and in the "real" galaxy. AI as a different form of intelligence from assumptions of what human intelligence is, or what we imagine AI intelligence should be. AI as surprise. The coevolution of humans and self-aware technologies in "the age of intelligent machines."
(3) **Political**: Otherness or the "recognition of the other" or the acknowledged salutary impossibility of "knowing the other" in post-colonial, feminist, cyber-feminist, queer, gender, and LBGT+ theories and expressions. Afrofuturism: the SF novels of Octavia Butler[516] and Samuel R. Delany[517], W.E.B. Du Bois' short story "The Comet" (1920)[518], Sun Ra's SF film *Space Is the Place* (1974), Ralph Ellison's novel *Invisible Man* (1952)[519], Janelle Monáe's story "The Memory Librarian" (2022)[520], and the films of Jordan Peele like *Get Out* (2017) and *Us* (2019). Technoscience will lead away from biology-based definitions of gender. Opposition to all white-centric, Euro-centric, Russo-centric, and MAGA-centric nationalisms and racisms.
(4) **Philosophical**: Rethinking the Western tradition. Nietzsche, Heidegger, and Foucault. Post-structuralism and deconstruction (Jacques Derrida). Object-Oriented Ontology (Graham Harman[521], Timothy Morton[522]). Embodied cognitive autopoiesis (Maturana and Varela[523]). The Sartrean existentialist idea that there is no fixed human nature – technoscience changes us continuously, biologically, and existentially.
(5) **Virtual**: Avatars and non-player characters (NPCs) in computer games and in the Virtual Reality Metaverse. The substitution of the human subject by her avatar.
(6) **Algorithmic**: The role of non-human agencies in society and in the economy. Assemblages or systems that combine human decision-making and algorithmic processes. Asking if automation must be a continuation of instrumental reason, or if can we rethink automation in a new way as a dialogical encounter?

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The Concept of Nature in Whitehead and Merleau-Ponty

Early in his academic career, the French philosopher Maurice Merleau-Ponty was a classical phenomenologist, influenced by Edmund Husserl, close to the existentialism of Jean-Paul Sartre, emphasizing the "radical freedom of the human subject," the subject's perceptions of the world and actions in the world, the interspaces of language or between self and other, and, in a sense, the subject's frustration when confronted with the-world-as-it-is or the-world-as-it-is-conceived which limits and stands in the way of the desire for freedom. Merleau-Ponty, however, evolved philosophically towards the end of his life to a position quite different from that of phenomenology and existentialism. The fullest expression of his new worldview is his 1964 work *The Visible and the Invisible* (compiled, edited, and published by his student Claude Lefort after Merleau-Ponty's death).[524] An important text leading up to that work is *Nature: Course Notes from the Collège de France*, published posthumously in 1995.[525]

The concept of nature as elaborated by the later Merleau-Ponty is a significant step away from phenomenology and towards a philosophy of "the new real," as I call it, or towards an "ontology of the flesh of the world," as he calls it in *The Visible and the Invisible*. The poly-sensorial, embodiment, immersion, interaction, technological and software entities as semi-alive, and hybrid real-virtual environments – these modalities all receive ideational support in the philosophy of nature of the final few works of Merleau-Ponty's *oeuvre*. The French thinker was influenced by a book published in 1920 by the British mathematician and philosopher Alfred North Whitehead entitled *The Concept of Nature.*[526]

In *The Concept of Nature*, Whitehead presses ahead towards fathoming the world in its tension between determination and indeterminacy rather than going back towards any reliance on a knowing subject. He calls this "the passage of nature," which is opposed to assumptions about "the bifurcation of nature." He adds to this thinking the key idea of *the event* – a tier of the world that belongs to nature yet can be neither grasped nor explained by the natural sciences. *The event* is a dimension which we experience through the perceptual senses and the qualities of the world such as colors, odors, and tactility. Whitehead calls this privileged object of inquiry "descriptive generalization" – neither nature nor the human mind is in command. It is a layer of being which escapes the epistemology of Western scientific apprehension, resembling Merleau-Ponty's "flesh of the world" or "the ontology of the flesh."[527]

In *The Concept of Nature*, Whitehead approaches knowledge in a transdisciplinary way by arguing that the philosophy of science is about studying the relations between the different disciplines. The main object of inquiry of science is ostensibly nature, but there is a whole dimension of nature that science cannot capture. When we consider the human senses, nature expands to what we observe in sense perception. Whereas the natural sciences deal with what he calls "homogeneous thoughts about nature," Whitehead develops what he calls "heterogeneous thoughts about nature."[528] Sensory perception and sensory awareness of nature designate the other domain of our interface with nature. It is not part of the natural sciences.

In his university lectures on nature compiled into a book, Merleau-Ponty examines and critiques the concept of nature in Aristotle, Descartes, and Kant. For Descartes especially, nature is a synonym for existence itself, without orientation or inner life. In his

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philosophy, Descartes treats animals and plants as automatons without any interiority. This perspective inexorably leads to an idea of nature as a system of laws and their automatic functioning.

Rosi Braidotti's Celebratory Posthuman Philosophy

In her much-celebrated book *The Posthuman* (2013), Italian philosopher Rosi Braidotti deploys concepts from Gilles Deleuze and Félix Guattari such as the ethics of "becoming," deterritorialization, flows, and "the nomadic" to argue for the emergence of an emancipatory posthuman subject contesting the possessive individualist subject of liberal humanism and global corporate capitalism.[529] In a time where "discourses and representations of the non-human, the inhuman, the anti-human, the inhumane and the posthuman proliferate," Braidotti's vision is that of "life beyond the self."[530] The basis of her celebratory optimism is the blurring or end of the binary opposition between nature and culture. The new non-dualistic nature-culture continuum enables the emergence of "the vital, self-organizing, and yet non-naturalistic structure of living matter itself."[531] The autopoietic generative vital force of living matter and non-human life dynamically supports the advent of a non-unitary posthuman subject who will be endowed with an expanded sense of connectedness with others.

Through broadening "subjectivity" to that which traditional humanism excluded – ranging from animals to oppressed subaltern human minority groups to creative technological engagements – we humans come closer to the vital force of "the Zoe," which is life itself. Superseding the individualist subject, we identify or feel affinities with many cultural, ethnic, and social expressions. We experiment with "intensities" and with our bio-technologically mediated bodies. We become-animal, become-Earth, and become-machine.

On the question concerning technology, Braidotti comes down strongly on the side of digital technologies as privileged sites for creativity and resistance (to capitalism). She writes:

> I will always side firmly with the liberatory and even transgressive potential of these technologies, against those who attempt to index them to either a predictable conservative profile, or to a profit-oriented system that fosters and inflates individualism.[532]

What is tellingly missing in this statement is any hint of how one would distinguish between the two. Does siding with these technologies' liberatory potential mean that their liberatory potential is a given empirical fact and one is on its side, or does it mean that one is asserting as a philosopher that one has an understanding and vision of how these technologies could be developed or diverted away from their mainstream capitalist guises and in liberatory directions? If it is the first, then one is skirting one's responsibility as a philosopher to explain the principles that would make the technologies emancipatory. If it is the second, then one is again skirting the responsibility by offering no elaboration of how this vision (and Braidotti's celebratory vision of posthumanism overall) is distinguished from the endless adaptability and "recuperating" powers of cybernetic cap-

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italism itself. Is this "posthumanism" merely a continuation of humanism in new semblances and phases?

In lieu of rigorous argumentation, Braidotti ends up with elegant poetic expression:

> What we humans truly yearn for is to disappear by merging into this generative flow of becoming, the precondition for which is the loss, disappearance, and disruption of the atomized, individual self… What we most truly desire is to surrender the self, preferably in the agony of ecstasy… the moment of ascetic dissolution of the subject; the moment of its merging with the web of non-human forces that frame him/her, the "cosmos as a whole."[533]

There is nothing wrong with this. It is the inspired (Deleuzian) and inspirational perspective of a creative thinker, and a very interesting and admirable one at that. But it is just one point of view, one interesting way of looking at posthumanism. The poetic sublime expression is packaged in a wrapper in such a way that, in fact, the book has come to be regarded as a centerpiece of the canon of academic posthuman studies. I think that Braidotti's work can be appreciated and respected as creative speculative philosophy. Its status as scientific or (trans-) discipline-founding work is somewhat exaggerated. She has an interesting and beautiful poetic vision of a world beyond the domination of the self-centered liberal humanist subject.

A Fully Posthuman Situation

In his seminal work *Understanding Media* (1964), the founder of media theory Marshall McLuhan defined a medium as being any "extension of ourselves" – for example, the wheel extends our running capabilities, and the hammer extends our arms.[534] In this view, the hammer is more a media than a tool or a technology. Our physical bodies and our senses (our *sensoria*) are extended in and by media. The design of any given media is, in a sense, the design of an artificial human sensorium. Language is, for McLuhan, also a media, since it extends, in the communicational transfer, the thoughts in my head and the words formed by my mouth to the ears and the mind of the listener or interlocutor.

From Friedrich Kittler's viewpoint, there is something human-centered and Promethean about McLuhan's formulation of the "extensions of man," since McLuhan does not elaborate a theory of history that grants an independent and determining role to media.

The great insight of the literary Marxist György Lukács in *History and Class Consciousness* (1923) was that one major aspect of "reification" (Lukács' central concept) under capitalism is the ideological operation whereby a phenomenon that is a contingent cultural-historical artefact, extant at a specific time and place, comes to appear – in "false consciousness" – to be ahistorical, necessary, and eternal.[535] Kittler takes the digital-binary logic at the heart of computer science of Alan Turing's "On Computable Numbers" of 1936 and – like Lukács' reification – universalizes it as the only possibility for all structural levels of computing and eternally into the future, claiming to override all differences among successive historical paradigms of informatics.[536] Vilém Flusser takes a more utopian ap-

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proach of "after the media," searching for a method to glimpse within the new authoring apparatuses made possible by computational media the potential reappearance of the human and posthuman activity of writing which resembles engraving, inscription, and the penetration of a surface.[537]

McLuhan provides prescient empirical descriptions of "the electronic age" and "the global village" as well as the insight that "the media is the message." He diagnoses the twilight of the principal media of the dissemination of knowledge of the book, a media whose individuating effects which historically strengthened the culture of democracy he had written about in *The Gutenberg Galaxy: The Making of Typographic Man* (1962).[538] With the advanced digital, informatic, and virtual technologies, we are beyond extending who we are and what we can do (*Homo faber* or *man the maker*), fully engaged in transformation into what we are becoming – with the robotic, biotech, and software systems merging with us in a cyborg way, all these devices and processes co-determinant of the posthuman condition.

The new media no longer serves the function of a mediation between two distinct locations or dimensions (here and there, viewer and what is shown on the screen, or the many nodes of a network). The media no longer enable a translation or crossover from one mode of presence to another, as with the mediation between a story and an audience, or the mediation between a live performance and those who wish to hear it but are not physically present. With contemporary technologies, algorithms hold sway over us and govern us.

Today we are in a fully posthuman situation.

Wendy Chun on Software Code

In her book *Programmed Visions: Software and Memory* (2011), Wendy Hui Kyong Chun develops her concept of "programmability" to argue that almost all social and economic institutions and procedures of life under capitalism are now shaped by software that pilots the unfolding of the future by intimately knowing data patterns and making extrapolations from the past.[539] Starting from Foucault's notice of governmentality, Chun sees software as a neoliberal governmental technology that holds together the intense homologous relationship between capitalism and computing. Neoliberalism and computation are a couple. Software enables us to navigate the choppy waters of that tandem. For Foucault, governmentality is the techniques and meticulous ideologies by which citizens in a society are governed, the implemented strategies of power which direct their behavior. Chun's book is a magisterial disentangling and exposure of the primary function of software as socio-cultural production.

Software, for Chun, is fascinatingly ambivalent in every respect. Software is apparently knowable and accessible with its "user friendliness," but it is mysteriously unfathomable. No one can fully understand the organizational structures and relations and many levels of complexity which are happening "under the hood." Software renders the invisible visible, and vice versa. Software is that which can be known and seen, yet simultaneously not known nor seen. It realizes a new world where a great deal that palpably affects our lives is vaguely hidden.

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Some common myths about software source code are that of the "all-powerful (male) programmer" who can make happen anything that he wants, and the related assumption that code is a straightforward series of instructions to a machine. Software is in fact embedded in networks of complex systemic assemblages. Source code does not always do what it apparently says that it will do. The code written by the individual programmer gets processed through team code reviews. The execution of the code passes through many mediations of filtering, translation, syntax-matching, and linking with other code in code libraries, compilers, interpreters, and operating systems. The code can modify itself while it is running. It would require an approach of literary textual analysis to fathom all of this. Wendy Chun identifies code explicitly as a form of rhetoric. She writes that source code is a "generalized writing."

Source code is an anthropomorphizing of the machine. This becomes clear for Chun as she considers the history of programming languages. The idea of software never occurred to the original builders of computers around the time of the Second World War. In the late 1940s, "programming" experienced a decisive chapter in its gendered history. Male engineers made decisions and gave instructions to female subordinates. They were the "girls of the ENIAC" who physically went around and set switches in the giant computer. These low-paid women operators were the precursors of the command-line interface and the Graphical User Interface, the literal human female incarnation of the Man-Machine Interface.

After the era of machine code and assembler languages, and the low-level manipulation of registers, bits, and bytes, the development of readable and comprehensible languages was necessary. Programming languages are metonymic languages *par excellence*. Higher-level programming languages mark the capitalist commodification and materialization of software.

Software is ephemeral. It is material and immaterial. Critical of new media theorists Geert Lovink and Alexander Galloway, Chun declares "vaporiness" to be the essence of software. She writes: "Vaporiness is not accidental but rather essential to new media and, more broadly, to software… New media projects that have never, or barely, materialized are among the most valorized and cited."[540] Against the anthropocentric model of the programmer-as-human-subject holding power over the processor-object as "dead" mechanical machine, the direction of software trends towards the absence of both the human programmer and the machine. Creative projects like software poetry point towards the promise of unknown future paradigms. "Source code may be the source of many things other than machine execution."[541]

In her historiography of twentieth-century computing, Chun further argues that the idea of software code as "logos" did not come from the computer engineers themselves but rather "emanated from the elsewhere" of Mendelian genetic biology. The code of DNA as the blueprint of life was the "larger epistemic field of biopolitical programmability" that set the stage for programmability in software code.[542] Norbert Wiener's first-order cybernetics made the key link of proclaiming itself to be the science of systemic "command and control," independent of whether the entities being controlled are machine, human, or animal.

Today computing is evolving toward less strictly "programmable" systems – "in theory if not yet in everyday practice," writes Wendy Chun. She continues: "The pressing

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question therefore is: What do we do with this move away from the map that nonetheless presupposes the map in a fundamental way?"[543] This corresponds to my idea of Creative Coding "building on top of" the programmable informatics that was rooted in the axiom of purely "formal language" towards reconciliation with human idioms and intuitively visual expression.

Chun reflects as well on hyperreality, and on simulation and simulacra. She writes: "Digital images challenge photo-realism's conflation of truth and reality: the notion that what is true is what is real and what is real is what is true."[544] Analog machines are (representational or descriptive or mimetic) *simulation machines par excellence*. Digital computers are *simulacra par excellence*. The universal technology of the computer, with its numerical method of 0s and 1s, can simulate all other previous analog machines which, in their physicalness, were dedicated to specific tasks. The digital simulates other simulations – a pure simulacrum. Chun's idea that software is evolving towards less "programmable" systems is parallel to the present study.

Software Code as Expanded Narration

In the second essay of Part Three, entitled "Software Code as Expanded Narration," I explain the history and principles of Creative Coding. How can the writing of software code become an expressive media? What is the relation of Creative Coding to post-humanism? What is the relation of software code to the history and future of writing? How do the main theses in software studies differ from my hypotheses and conclusions? What is the difference between existing computer science's concept of code and that of Creative Coding? Are cultural studies undergoing a knowledge shift from the paradigm of media to a paradigm of code? Can Creative Coding influence the future of computer science?

Creative Coding began as a movement of artists and creatives who had the intention of making art and design projects with computer technology. I explore the implications of the movement for cultural and media theory. Creative Coding demonstrates that informatics changes over time parallel to paradigm shifts in culture. Creative Coding initiates the artistic genres of "generative art" and generative Deep Learning.

I review and critique the ideas of Friedrich Kittler in his famous essay "There is No Software," and comment on his "media archaeology" approach.[545] I enumerate ten historical paradigms of informatics and programming. I comment on the first computational machines built around the time of the Second World War. I compare my ideas about software and code to those of luminary media theorists Lev Manovich, Vilém Flusser, and Jay David Bolter. I comment on two books in the MIT Press Software Studies book series. I make an interpretation of Alan Turing's famous "imitation game" and "Turing Test" in his 1950 pioneering Artificial Intelligence essay "Computing Machinery and Intelligence."[546] I present my take on Turing's equally famous 1936 paper "On Computable Numbers with an Application to the *Entscheidungsproblem*," where he devised the "Turing Machine."

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The Software of the Future

In the third essay of Part Three, which is excerpts from my book *The Software of the Future*, I pursue Flusser's idea of connecting the future of software code and the history of writing. I discuss the paradigm of object-orientation in software development in relation to procedural programming, to future AI, to software objects, and to the idea of "taking the side of objects." I ponder the relation between technological and cultural simulations. I write about the SF film *Moon*. I write about the ideas of calculation in Pascal and Leibniz, and about the nineteenth century difference engine and analytical engine of Babbage and Lovelace.

I turn to consideration of the Q-Bit of quantum computing in software. MIT mathematician Peter W. Shor has written an important paper on this subject and on the Fourier Transform.[547] I touch upon David Gelernter's idea of "tuple spaces" in his book *Mirror Worlds*.[548] I write something about the SF film *The Matrix* as telling us something important about "the code of the simulacrum." I conclude with a statement about moral algorithms.

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Star Trek: Technologies of Disappearance

Technoscience and Storytelling

N. Katherine Hayles is a humanities scholar who is so knowledgeable about science, and admirably rigorous in her explanations of science and technology, that she proves that postmodern "science-and-society" cultural theory cannot be discredited and dismissed by generalizing accusations emanating from the camp of "hard scientists" like Alan Sokal that such transdisciplinary research is ignorant of science.[549] Given her meticulous understanding of, and engagement with, scientific concepts, and her standing as Professor of Literature at the University of California, Los Angeles (UCLA) and at Duke University, Hayles is the ideal thinker to bring together science and fiction. Hayles is most well known for her 1999 book *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, a pioneering work which was one of the principal founding texts of the cultural theory and ecological movement of posthumanism.[550]

One major aspect of Hayles' prolific research and publishing output is concerned with understanding the codes of digitalization as new or transfigured forms of linguistic expression and inscriptions of textuality. Some of her objects of hybrid scientific-cultural investigation are cybernetics, information theory, hypertext narratives, electronic literature or techno-texts, the structures of computer documents, digital artworks as "writing machines," and the effects of computational media on language.[551] Hayles' work on these software codes is crucial to the overall argument of the present study. Her deep dive into the fate of language, literature, and storytelling in the age of computing will be of great help to my project of Creative Coding to challenge the social and technological life-conditions of hyper-modernism and hyperreality.

The ten books and many articles that Katherine Hayles has written bring together, and rethink the foundations of, the two usually separated intellectual cultures of literature and science (or humanities and science) in a transdisciplinary and original way. There is a desire to develop what Charles P. Snow termed an in-between "Third Culture," one that would reconcile the formerly divided two separate cultures. In the 1963 revised edition of his book *The Two Cultures, and A Second Look*, Snow modified somewhat the views that he had previously expressed in the 1959 original edition of the book *The Two Cultures*.[552]

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How We Became Posthuman was primarily a critique of the historically specific "posthuman" view of technology of the post-World War II movement in ideas called *cybernetics*. Hayles' system of thinking has since evolved towards a hopeful vision of a posthuman future of co-existence between humans and non-human actors in society. Hayles' work is also deeply ethical, feminist, and ecological, always calling out racism and Western domination of those whom its hegemonic practices and discourses call "others." She is a theorist of embodiment, material-semiotics, and trans-feminist resistance.

N. Katherine Hayles is a cultural historian of the interrelations between technology and society, and of the connections between storytelling and technoscience. She is a media theorist of the computational media age. *How We Became Posthuman* examines the command- and control-oriented founding formulations of computer science and cybernetics in the mid-twentieth century when a notion of bodiless and immaterial information came to prevail. In that movement of *first-order cybernetics*, humans came to be seen primarily as information patterns. Information lost its body. In the prevalent version of informatics, information or code is disembodied and has prevailed over materiality. The body is viewed as a mere shell or container that houses the subjective mind. Hayles writes that "there are no essential differences or absolute demarcations between bodily existence and computer simulation."[553]

From Liberal Humanism to Posthumanism

In the liberal humanist worldview that prevailed in Western Europe and North America from the end of the eighteenth century until the mid-twentieth century, emphasis was placed on the sovereignty of the individual, enlightened self-interest, and the "natural self." This liberal self is rational, thinking, and dualistically separated in a philosophical sense from nature, animals, and the world. The liberal humanist self tends to be white, male, property-owning, and hetero-normative. The positive hopeful version of post-humanist philosophy places into question all these assumptions. Intelligence comes to be conceived by Hayles as existing in a "cognitive assemblage" or co-production with intelligent machines. She takes the relation between human and machine intelligence in a different direction from that of predominant first-order cybernetics, for which "humans were to be seen primarily as information-processing entities who are *essentially* similar to intelligent machines."[554] As an alternative to the change in the definition of what it is to be human driven by the rise of informatics, Hayles seeks a compact, dialogue, or exchange between humans and AI.

There are continuities between the worldviews of humanism and mainstream posthumanism, and not necessarily a break between them. Descartes regarded the essence of his subjectivity and overcoming of ontological self-doubt as being his thinking mind in binary opposition to the body and to the world. For humanism, the body is merely another object to be owned and mastered. For mainstream posthumanism, the subjective mind extends to information and code. Computation replaces possessive individualism as the ground of being.

Hayles chronicles the scientific movement of *second-order cybernetics* –the concept of *autopoiesis* in cognitive science of *The Embodied Mind* by Varela, Thompson, and Rosch or

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Heinz von Foerster's *Observing Systems*.[555] She chronicles *third-order cybernetics* – the Artificial Life research field that ascended in the 1990s of bringing software to semi-life of Christopher Langton and the Santa Fe Institute.[556] These successive waves of cybernetics have attempted step-by-step to recover the embodiment which had been lost in computer science's initial elaboration. Embodiment, for Hayles, is different from "the body." The body "is always normative relative to some set of criteria."[557] She invokes the example of medical imaging technologies like tomography which construct a normalized and idealized mapping of a data-driven simulated body against which the individual is called upon to measure herself, ignoring her own psycho-somatic connections. Embodiment "is contextual, enmeshed within the specifics of place, time, physiology, and culture, which together compose enactment."[558] Embodiment is a specific instantiation of individual experience.

Cyborg Spock and NASA's Cyborg

According to popular belief, science fiction is about the representation of science in an imaginary space or story. Once that assumption is made, it becomes important to talk about a "representation" like *Star Trek* in terms of the accuracy of the "representation." It becomes possible and desirable to write books with subtitles like *A Trek from Science Fiction to Science Fact*[559], focusing on the alleged journey from representation to "reality." Regarding the original invention of *Star Trek*, constant reference is made in the academic and journalistic literature to the fact that Gene Roddenberry (the creator of *Star Trek* in the 1960s) consulted "real scientists" when elaborating *The Original Series*. "Gene worked with several consultants. One was named Harvey Lynn, a scientist with the Rand Corporation."[560]

The problem with the presumption that science fiction is about "the representation of science" is that, in hyper-modern culture, there is very little representation anymore. The media is inclined to institute its own "reality." In an electronic media culture dominated by images, statistical models, video processing, screen hyperlinks, discourses without author, and endless reduplication and recombination, the difference between original and copy that is necessary for representation to take place tends to evanesce. The sign is substituted for the referent. The signs of "the real" are substituted for "the real." Signs and images refer principally to other signs and images, not so much to some verifiable outside "reality."

To better understand the relation between the original creation of *Star Trek* and science in a way that does not rely on a notion of representation, we can contemplate the "elective affinities" between the TV show's inception and the contextualized activities of 1960s space scientists. Technoscience studies (the methodologies of Donna Haraway, Bruno Latour, Sandra Harding, Karen Barad, N. Katherine Hayles, etc.[561]) scrutinizes objects of scientific knowledge that emerge in a specific historical period. It pays special attention to the coincidence of appearance among scientists and media artefacts of a new cognitive construct. In this vein, I pursue the association in the 1960s between NASA's design of a cyborg astronaut and Gene Roddenberry's design of his first alien: Mr. Spock of *The Original Series*.

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Despite everything that has been written about cyborgs, the connection between Spock and the cyborg has never been made. Chris Hables Gray, editor of *The Cyborg Handbook*, says that there were no cyborgs in *The Original Series*.[562] This is a misunderstanding of what Haraway means in her cyborg theory. In thirty-five years of journalism and scholarship about *Star Trek*, Spock has been unendingly described in terms that rarely go beyond the cliché of his being the master logician or a figure "torn between logic and human emotions."

Donna J. Haraway, author of the milestone 1985 essay "A Cyborg Manifesto," has emphasized the importance of using the term "cyborg" specifically for techno-scientific entities that became possible in the historical conjuncture around 1960. "Pushing the reality of the cyborg harder" with situated knowledge means examining its entanglement in a definite matrix of cybernetic communications theories, ideas about humans as information processing devices, Cold War militarization, and behavioral and psycho-pharmacological research.[563]

Haraway cites the late twentieth century feminist science fiction writers Joanna Russ, Samuel R. Delany, John Varley, James Tiptree, Jr., Octavia Butler, Monique Wittig, Vonda McIntyre, Suzy McKee Charnas, and Anne McCaffery as weavers of narratives about what happens to identities and boundaries in an advanced technological society.[564] These authors are "theorists for cyborgs."[565] Organic and cybernetic are no longer separated in their stories of embodiment. In the breakdown of the border between flesh and machine, the hegemonic structure of the "Western self" is threatened. Haraway's focus is on (1) writerly stories about women of color and (2) feminist science fiction stories about "monstrous selves" who are no longer our enemies. Cyborg science fiction authors subvert the "origin myths" of Western culture by questioning naturalized identities and "recoding communication and intelligence to subvert command and control."[566]

Haraway's figure of "Sister Outsider" (taken from the title of the essay collection *Sister Outsider* by poet Audre Lorde) is the caricatured image of women of color outside the United States spread by fear-mongering demagogic politicians inside the United States.[567] Third-world women are claimed to be threats to the survival of first-world women. "Sister Outsider" writes for self-affirmation on the borders and "without the founding myth of original wholeness."[568]

Writing is technology. Feminist science fiction writes as itself a cyborg technology. It fights "illegitimately" for language and against the alleged "perfect communication" of the universal digital code of the first-order cybernetics of "phallogocentrism" (the privileging of the masculine). Humans are by now biotic systems and communications devices. They are coded. Code is fluid, reversible, and always changeable. Code undermines the distinctions of mind and body, and programmer and programmed. Haraway cites the female android Rachael of *Blade Runner* as emblematic of the blurring of the human/technology dualism. In Anne McCaffrey's novel *The Ship Who Sang* (1969), the birth of a disabled child is resolved by the technological hybridization of a brain and a machine.[569]

Feminist science fiction is about "cyborg monsters." The genre consistently brings into question the fixed binary oppositions of male and female, human corporeality and technology, and individual and systemic assemblage. Monsters have always played a major role in the Western imagination as defining the limits of acceptable community. Like the Centaurs and Amazons of ancient Greece, the hermaphrodites of early modern

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France, and primates in the evolutionary and behavioral sciences, cyborg monsters in feminist SF continue this lineage.

In her novel *Houston, Houston, Do You Read?*, James Tiptree, Jr. narrates a tale of three male astronauts who are propelled three hundred years into the future by an anomalous solar flare to arrive in a world where men are extinct and highly competent women have developed great theoretical and practical knowledge.[570] In his Gaea trilogy, John Varley writes of a giant living torus in orbit around Saturn, ruled by a controlling intelligence whom Haraway describes as a "mad goddess-planet-trickster-old woman-technological device."[571] Octavia Butler's novel *Kindred* is a time-travel story of an African American woman transported back to pre-Civil War America, plunged into a situation of slavery. The protagonist's actions with respect to her new master will paradoxically preserve or eliminate the conditions for her own birth in her original late twentieth century time-period.[572] In *Superluminal*, Vonda McIntyre writes of space pilots who, to withstand the pressure of acceleration to faster-than-light speed, must undergo an operation to have their heart replaced by a mechanical pump.[573] To help humanity colonize inhabitable planets in distant star systems, the astronauts must metamorphose from the human condition to the status of cyborg. Posthuman transfigurations are also enacted by means of genetic re-coding and the implanting of nano-electronic devices.

Justine Larbalestier investigates *The Battle of the Sexes in Science Fiction*, a "genre where the negotiations that produce and shape heterosexual subjectivities are explicitly realized."[574] Joanna Russ writes: "The strangest and most fascinating oddities in science fiction occur not in the stories that try to abolish differences in gender roles but in those which attempt to reverse the roles themselves."[575] Larbalestier discusses David H. Keller's 1929 story "The Feminine Metamorphosis" and Edmund Cooper's 1972 novel *Who Needs Men?*[576] In Keller's short story, thousands of women take over the world in a conspiracy. In Cooper's symptomatic sexist tale, a male protagonist establishes heterosexual economic exchange for an entire culture by sealing the heroine's acquiescent allegiance through a symbolic penetrating kiss that is overwhelming and nearly orgasmic. The foundational kiss is the prerequisite to a new system of sexual and gender circulation. It marks the turning point from matriarchy to patriarchy and reinstates both sexes to the status of so-called "real men" and "real women."

Haraway writes: "Science and technology are possible means of great human satisfaction, as well as a matrix of complex dominations."[577] Technological skills are a dimension of embodiment. One can take pleasure in becoming technically competent. Humans need to take responsibility for their machines. The task of the feminist cyborg is to actively challenge the informatics of domination.

First Order Cybernetics

In their landmark 1960 article "Cyborgs and Space," Austrian-Australian neuroscientist Manfred Clynes and American psychiatrist Nathan Kline coined the influential term cyborg.[578] This new word, an abbreviation for cybernetic organism, described a technologically enhanced astronaut who would be better equipped than an "ordinary human" to thrive in the harsh conditions of outer space travel. The "augmented man" of interplane-

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tary voyages would be endowed with upgraded replacement parts, integrated electronic extensions, and an internal drug-releasing device to promote optimal performance.

During the early 1960s, at the time of the flights of the "telemetrically implanted chimpanzee" Enos (who orbited the Earth twice) and the human pioneering Mercury-Atlas soloists, NASA commissioned "The Cyborg Study." The final report of this investigation was submitted to the space agency in May 1963 under the title "Engineering Man for Space."[579] The project studied the feasibility and application of artificial organs, hypothermia, suspended animation, implanted oxygenating equipment, electric neurological excitation, multimedia sensorial stimulation, and regulated drugs in facilitating the adaptation of astronauts to the extreme conditions they would encounter during Deep Space expeditions. NASA's cyborg architects believed that their conception of refitting human beings to function efficiently in a "freely chosen" alternative environment was part of a spiritual awakening of humans taking an "active part in [their] own [second] biological evolution."[580]

To cope with the environmental, physiological-medical, and psychological difficulties encountered by "man in space," information and life science systems experts (Clynes and Kline) conceived of a bionic posthuman outfitted with surgically grafted electronic sensors; homeostatic and feedback-yielding instruments; and an osmotic pressure pump capsule, embedded under the skin to allow injections of chemical substances at controlled rates.

Thanks to systematic modifications to his body, the NASA cyborg can survive for long stretches of time in outer space's hostile conditions of radiation, near-zero gravity, extreme temperatures and air pressures, low oxygen supply, and scarce food. A physiotechnical system that substitutes for breathing will be implanted. Like the hyper-intelligent fish invoked as metaphor in "Cyborgs and Space," who would fabricate extraordinary techno-apparatuses to venture onto land, Cape Canaveral's Man will overcome his innate biological limitations to prosper within the closed-system confines of space travel. He will master his metabolic and physical movement requirements, including the cycles of hunger, thirst, and fatigue. Klynes and Cline sought an overcoming of inherent physiological limitations for their cyborg astronaut, who would function without the "constraints that having evolved here on Earth make him subject to – the level of gravitation, the oxygen, the atmosphere."[581]

The intellectual background to the 1960s NASA scientists' enthusiastic figuration of the astronautical cyborg was the cybernetic science of control, command and communication in humans, animals, machines, and living-nature elaborated by mathematician Norbert Wiener of MIT in the years just after World War II.[582] First-wave cybernetics focuses on message feedback loops and information transfer as organizational forces in the study and mastering of complex systems. The term cybernetics derives from the Greek *kybernetics*, denoting steering or governance. By emphasizing informatics and statistics in a systems context, Wiener and his colleague Arturo Rosenblueth unified the conceptualization of techno-scientific knowledge objects which had been divided into the separate categories of the living and the non-living. One of Wiener's primary conceptual models, the self-regulating man-machine system, was taken over by Clynes and Kline. As articulated by the two Rockland State Hospital research scientists, the handlers of the cyborg

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astronaut would systematically overcome his discomfort through an approach combining pharmacology, machinic apparatuses, and hypnotism.

Norbert Wiener was obsessed throughout his career with the reduction of entropy, uncertainty, chaos, degradation, Brownian motion, and "dis-organizational noise." The outcome of his work in first-order cybernetics was that "humans were to be seen primarily as information-processing entities who are essentially [like] intelligent machines."[583] What allowed Wiener to include "transformed humans" and "beyond mechanical" machines enriched by feedback in the same heuristic category was their shared "ability to use probabilistic methods to control randomness."[584] Only non-cybernetic mechanical systems lacked the negentropy of relational messages and informational order. In the "first wave" order of rational technoscience, entropy, chaos, and flows are still the targeted enemies. The "emergent phenomena" of uncontrolled complex self-organization are exterior to its definition of information. Wiener defined information probabilistically as the choice of messages fighting the entropy or noise that was its opposite. Methods of statistics and probability would control randomness. The artefact of the feedback loop is an opening for Hayles to articulate her view that links humans and machines in "cognitive assemblages."

How Information Lost Its Body

As the philosopher of technology Arthur Kroker cogently explains, Hayles' view of computation is not that of some universal computer of either the natural or artificial realms that would allegedly generate and program all of reality.[585] Her vision is that of a hidden yet embodied and creative tension waiting to be rendered visible between the discrete identifiers and differences, or zeroes and ones, or computable numbers, of the digital-binary logic. Utopian potentialities, for Hayles, are to be discerned at the inflection points within systems understood as being dynamic. Hayles' pioneering literary perspective on computing is not some idiosyncratic view belonging to the so-called digital humanities. It is, to the contrary, essential to the project of resisting the totalizing systems of the informatic society.

The Macy Conferences on Cybernetics were a series of scientific meetings organized by Warren S. McCulloch and Frank Fremont-Smith which took place in the late 1940s and early 1950s. They brought together luminaries from academic fields ranging from linguistics and anthropology to physics and engineering.[586] The conferences gave a great boost to neuroscience as a bridge between physiology and psychology.

The researchers convened by the Macy Foundation played a major role in the construction of information as the disembodied media that enables humans and machines to become objects of a single unified science. Information became more important than materiality and "lost its body." The neural structures of the human mind were conceived of as flows of information. Another contributor was Claude Shannon, who stressed that, according to Hayles, "information theory concerned only the efficient transmission of messages through communication channels, not what those messages mean."[587] Untethered from context and content, information became a weightless mathematical entity or quantity of pure probability.

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Data and code – and even concepts of what are human consciousness and thinking – have become disembodied and cut off from relations, circumstance, and embeddedness. As a chronicler of the digital age and computational media, Hayles investigates how disembodied free-flowing data has been upgraded in steps by the three successive historical waves of cybernetics. Digital code and automatic writing – the algorithm-generated opposite of fleshy narrative – have superseded analogue-era simulacra or hyperreal forms of image and rhetorical language. SF stories are, for Hayles, the eminently embodied form of discourse. The lesson of Hayles is the appreciation of human discourse as either poetic or numeric or, even better, as new innovative hybrid of both as "electronic literature" or "writing and code."

Disembodiment and re-embodiment are the crucial stakes in Hayles' narrative of the past and future of informatics. The body-less alteration between the on and off switch states of formal logic play host to and conceal an embodied difference that challenges the taken-for-granted certainty of the formal-numeric difference. There exists an incompleteness (in the sense of Kurt Gödel's incompleteness theorems[588]) of the strict identity/non-identity that is at the basis of digital computing. This would be a fleshy difference inside the habitual definition of the discrete difference. The logic of the binary code is undergoing its self-deconstruction as a playful logic of presence and absence pointing towards something deeper.

In a 1995 interview, Dr. Manfred Clynes expressed dismay at the travestying and "total distortion" of his original concept of the cyborg by popular icons of contemporary science fiction cinema and television, such as James Cameron and Arnold Schwarzenegger's *Terminator*, Paul Verhoeven's *Robocop*, and even *Star Trek*'s Borg, with that Delta Quadrant alien species' connotations of insect-like Group Mind and "technological totalitarianism."[589]

Contrary to cultural legend and widespread misleading interpretations which identify the fearsome Borg Collective of assimilated robotic-humanoids as the leading cyborg figure in the *Star Trek* universe, it is the *Enterprise*'s half-human, half-Vulcan First and Science Officer Spock who perfectly embodies the cybernetically-extended spacefarer of which NASA scientists dreamed, and which they partially succeeded in constructing. Looking at the particulars of Spock's imaginative creation by Roddenberry reveals him to conform very closely to the 1960 specification of Clynes and Kline, as well as to that of the 1963 Cyborg Study of the "physiology of man in space" undertaken during the epoch of the Mercury, Gemini, and Apollo programs. Looking at Spock's character reveals him to be a cyborg in Haraway's related second sense. He is a divided self who explores the boundaries between organic and machinic, human and nonhuman, and informatics and biology.

Spock may not wish to conclusively reject his human side. He seems to be lacking a language to express himself and his unnamed cyborg existence. Spock's extraordinary techno-scientific competence could be cracked open as the basis for new imaginative and creative practices. Technological skills do not have to be constrained by the assumption that the domain to which they belong must never have anything to do with crafting an intersubjective existence. Spock starts to notice the radical singularity of objects and the "otherness" of other people, against the obsession of scientific explanation and classification which was his habit.

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Claus Pias on First-Order Cybernetics

The complete transactions of the Macys Conferences on Cybernetics, held between 1946 and 1953, were recently (2015) edited by Claus Pias and published in English and German. Pias discusses the importance of first-order cybernetics in the post-Second World War history of ideas in his introductory essay called "The Age of Cybernetics," which appears at the beginning of the volume.[590] Ten conferences took place under the heading "Cybernetics, Circular, Causal, and Feedback Mechanisms in Biological and Social Systems." The venue was the Beekman Hotel on Park Avenue in Manhattan.

The advent of the computer and its digital logic in the mid-twentieth century inspired a resolute rethinking of the Claus boundaries of the scientific disciplines which led the transdisciplinary thinker Gregory Bateson to exclaim: "I think that cybernetics is the biggest bite out of the fruit of the Tree of Knowledge that mankind has taken in the last two thousand years."[591] At issue were fundamental questions of knowledge and clarifying the definition of cybernetic epistemology. Norbert Wiener had started the discussion by proclaiming that cybernetics would unify into one science the study of humans, animals, and machines by grasping the shared systemic nature of information and the feedback mechanism which are common to all those objects of inquiry. Cybernetics was to be a science of command, control, and regulation. It would be relevant to established knowledge fields ranging from economics, psychology, and sociology to the analysis of art, music, and literature. All disciplines were to be rethought under the numeric, digital, and informational paradigm.

In his essay, Claus Pias articulates the essence of the intellectual synthesis which the luminary presenters and discussants achieved at the Macys Conferences. The deepest questions remained unresolved, however, and cybernetics was overtaken in the 1960s by the more banal paradigm of "computer science," which limited itself to pragmatically writing better programs and better serving the machines. This engineering-oriented informatics of data structures, algorithms, and operating systems became the standard curriculum at technology universities. The current revival in the twenty-first century of interest in the first- and second-order cybernetics which historically preceded technical computer science is a strong hint of widespread desire today for a trans-disciplinary informatics to reappear.

According to Pias, there were three components of a "set of models" discussed at the Macys conferences which were crucial to the cybernetic synthesis: the logic of Boolean algebra embedded into neurological and physical circuitry, information theory, and feedback.

(1) In their 1943 article, "A Logical Calculus of Ideas Immanent in Nervous Activity," the logician Walter Pitts and the neurophysiologist Warren McCulloch proposed the mathematical model of a neural network. Their "threshold logic" and concept of a formalized neuron implied a universal theory of digital machines. Humans are information machines. Humans are embodiments of switching logic. One reason why humans are themselves digital is that everything, both natural and artificial, is a digital information machine.

(2) The information theory of Claude Shannon is, in Pias' formulation, a "stochastic theory of the symbolic."[592] It is a theory and practice of universal symbol manipulation.

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Information is a new technoscientific concept beyond matter and energy, which were previously thought to be the basis of all "physical" objective reality in the universe. Information fights against entropy. According to Shannon, information can arrive intact at its receiver due to its mathematical abstraction from materiality, its existence independent of the physical conditions surrounding the transmission.

(3) In their 1943 article "Behavior, Purpose, and Teleology," Arturo Rosenbleuth, Norbert Wiener, and Julian Bigelow had formulated what Claus Pias calls a "non-deterministic yet teleological theory of feedback." Biological and artificial systems both require information and feedback to be productive. They both operate on a logic of signals and cycles. Systems do not always require new input. They can instead be self-sustaining by converting their own outputs into instructions received and processed at anticipated and discrete intervals of time.

Pias emphasizes that, at the time, the participants in the Macys conferences did not think of themselves as having arrived at an overall coherent perspective. First-order cybernetics was post-humanist in the sense of seeing both humans and everything that is not-human as digital machines. The agreed upon science of information was disembodied in that the discrete logic of the digital lacked materiality and the continuousness or "in-betweenness" of the analog.

The conceptual grasping of systems in their time-based teleological dynamic meant that the verb tense of cybernetics would be the "future perfect." Everything will have always already happened. What characterizes the digital age, for Pias, is "the excess of presentness in the present."[593] In first-order cybernetics, there was a kind of optimistic social engineering or technological determinism. The result was a belief in a cybernetic or technocratic government. A correctly parameterized and steered system could be set in motion and the desired results would occur quasi-automatically. All intuition, judgment, and debate would be removed from the political.

The inheritors of first-order cybernetics and cybernetic epistemology are systems theory (which separates the construction of a functioning system and the description of its functioning), actor-network theory (an action-oriented view of assemblages in society and nature consisting of both human and non-human components, processes, and interactions), and the trend of creating computer simulations to forecast the future.

Claus Pias concludes his essay on a pessimistic yet very insightful note:

"The established methods of understanding have clearly reached their limits and now serve merely to indicate even more conspicuously how strongly they have been influenced by the cybernetic technologies that they seek to describe."[594] The irony is that the social and human sciences have become so imbued with "cybernetic" methodology that they have lost the distance or independence required to see clearly what they investigate.

Gene Roddenberry Designs His First Alien

Due to the genetic sequencing that he shares with other Vulcans, Spock can "withstand higher temperatures, go for longer periods of time without water, and tolerate a higher level of pain" than humans.[595] Spock is more resistant to radiation and needs less food to nourish himself than his non-Vulcan counterparts on board the *Enterprise*. Physical dis-

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tress, for Spock, is merely a kind of information input, "which a trained mind ought to be able to handle," as he declares from his bio-bed in sick bay in the episode "Operation – Annihilate!" Spock does not perspire. He exercises extreme restraint in his "movements, gestures, and facial expressions."[596] He has greater physical strength. He has more acute hearing, due to evolutionary adjustment to sound wave attenuation in the thin atmosphere of Vulcan.

The most important of Spock's qualities as a cybernetic organism is his superior neural-cerebral proficiency, due to the "enlarged neocortex" of Vulcans, in the areas of information gathering, processing, and analysis. Spock can directly understand machine language output from a computer's CPU, without the interface of higher-level programming languages, graphical displays, or speech synthesis. "He can even read memory bank 'bleeps'."[597]

Mr. Spock is a data wizard, constantly in the flow of information feedback, long-range sensors, handheld tricorders, and makeshift techno-contrivances. In the episode "The City on the Edge of Forever," he concocts the alternate timeline online newspaper reader from vacuum tubes and pieces of wire. He holds the highest computer expert certification (A7) awarded by Starfleet Command. Spock is most typically seen standing at his Bridge position – the library-computer station which interconnects all host and distributed workstation systems on the ship. He can absorb "library" database information at a rate eight to ten times faster than a normal human. Spock the cyborg is an organism rethought as a technological device.

The most fruitful insights to be gained from working out the concept of the cyborg require going beyond the popularized definition of the cyborg as an entity combining organic and machinic parts. Mr. Spock as a techno-cultural figure can above all be grasped within the cybernetic paradigm of a self-regulating information-processing machine built for purposes of command, communication, and control. Spock can also be understood as a cyborg in the important second sense fleshed out in Donna J. Haraway's thinking.

Spock shows himself to be capable of enlarged apprehension of "that which is other than myself." His ongoing search for freedom in The Original Series occurs in the shadow of his hybrid and initially awkward circumstance as a life-form made by technoscience. "As my parents were of different species, my conception occurred only because of the intervention of Vulcan scientists. Much of my gestation was spent outside my mother's womb."[598] Spock is "an illegitimate offspring of technoscience" (Haraway, "Cyborg Manifesto")

Cyborg is the mode of resistance to the "techno-bio-power" of the first order of cybernetics. As we shall see, the simulating and seductive android resists the second order. The "body without organs" or "nomad in reversion" resists the third.

Spock transmutes in the direction of a heterodox, many-layered, and trickster position that is no longer satisfied with the established truths of either of his – Vulcan or human –heritages. What emerges is an almost accidental new subjectivity or mutated experimental way of life. Haraway's double sense of the cyborg is someone who belongs to a concrete scientific history yet seeks a new radical sense of self. Spock must figure out which elements of his human and Vulcan sides to weave together. Facing his situation as a "processed" technological being with exceptional machinic skills, he moves away from

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the model of the mastering subject patterned command, communication, and control after a tool, and towards the expression of a sense of self that starts from the other. This affirmation grows from dialogue with interlocutors like the alien Horta in the episode "The Devil in the Dark."

"The Devil in the Dark": Empathy for Radical Otherness

Spock is unusually empathetic. He begins to demonstrate his unusual capabilities of empathy towards alien others in his "mind meld" encounter with the silicon-based Horta life-form on the mining planet Janus VI. The workers of the mineral production station are menaced by a hideous creature they are not sure they have ever seen. The beast has allegedly killed more than fifty of them, apparently via exudation of a highly corrosive mixture of acids. Captain Kirk and Mr. Spock are the first to get a clear look at the low to the ground, slithering being as it moves with great speed through the underground labyrinth of caverns and tunnels.

The creature has left security guards and engineers "burned to a crisp." It seems to possess the ability to burrow through solid rock, since new tunnels have been noticed. The killing began three months ago. Machine parts that the miners put in place on a newly opened level mysteriously disintegrated, and a multitude of unidentifiable spherical silicon objects were discovered. The colonists would like nothing better than to terminate "the monster" so they can get on with their work of extracting valuable pergium from the hard rocks.

Spock deduces from various pieces of evidence that the enigmatic entity is intelligent, and that the caves are its natural habitat. It must be capable of rational thought, the Science Officer conjectures, because it stole the one item of equipment, the perfusion pump, vital to the functioning of the fission reactor used by the mining colony for heat, electrical power, and life support. Since the creature was not injured by a blast from phasers, it must be constitutionally different from carbon-based life-forms. The alien must be silicon-based. The dark grey silicon nodules with a light oxide outer layer found by the miners must be its eggs.

With a reactor meltdown looming, and 48 hours of breathable oxygen still left, the Starfleet officers must act quickly to find the alien. They assemble a search team and enter the serpentine complex of tunnels. Spock adjusts his tricorder to pick up traces only of "silicon life." Moments after a security guard is fatally attacked, Kirk and Spock espy the crawling, rock-like creature on the tunnel floor. The animal makes a rattling sound and charges them.

Kirk and Spock shoot the creature with handheld phasers. It escapes despite being wounded, cutting a new passage through the stone walls. Kirk and Spock separate into parallel tunnels. Alone in a small chamber, rocks collapse around Kirk. The bulky life-form appears and blocks his way, trapping Kirk within its inner lair.

The multi-colored alien beast does not menace him. Observing its hesitant moves, Kirk sees the deep gouge in its side where its fibrous silicon skin was ripped by the phaser beam. The entity is severely injured and in pain. Although afraid of Kirk's weapon, it

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stands its ground in a protective posture, close to the many silicon nodules embedded in the wall.

Spock arrives at the clearing with a raised phaser, but Kirk tells him not to shoot. Spock initiates the Vulcan technique of the joining of two minds to attempt reciprocal communication. Spock closes his eyes and concentrates his mental powers. He comes close to the alien, which is in agony from the phaser wound, and establishes a first telepathic contact.

Spock screams out in torment and collapses to the ground. "Waves and waves of searing pain," he emotes. The animal slides wormlike to an open space, then moves again, leaving a three-word message in broken English branded in the ground: "NO KILL I." The open-ended, grammarless utterance is neither indicative nor imperative. Is it a promise or a plea? Is the Horta asking that its life be spared or stating that it will not kill further?

Spock touches the Horta with his hands. He reenters the trance and begins a communion with an alien other. He becomes, for one instant, the voice of this last of a dead race whose offspring are about to hatch in renewal of life but are threatened by annihilation:

> The thousands, eternity ends, it is the end of life, murderers, go out into the tunnel, to the chamber of the ages, cry for the children, walk carefully in the vault of tomorrow, sorrow for the murdered children, sadness for the end of things, it is time to sleep, it is over, death is welcome, let it end here.

Star Trek: The Original Series, Paramount Pictures, 1967

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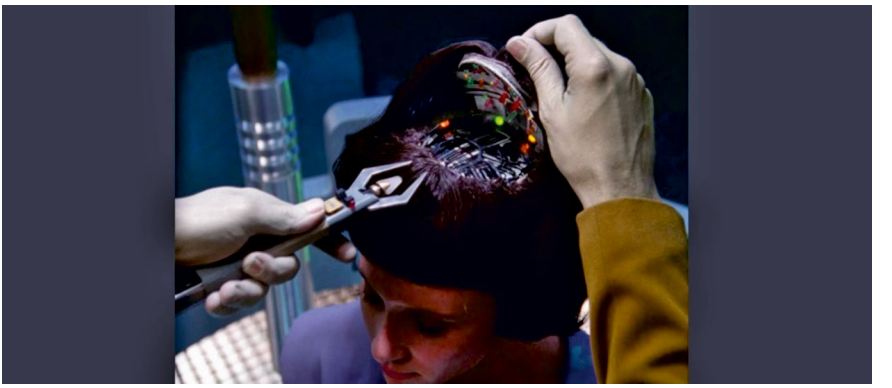
Spock breaks from the spiritual copula. With tears in his eyes, he explains to Kirk and Dr. McCoy – who has been called in to try to heal the wounded creature – what he has learned. The highly intelligent and normally peaceful Horta species has lived underground on Janus VI for millions of years. Every fifty thousand years, all Horta except one die out. The sole survivor is responsible for caring for the unhatched eggs of the new generation. The miners broke into the nursery and unknowingly killed hundreds of the silicon spheres, unrecognizable to them as eggs. The "Mother Horta" only became bellicose in defense of its unborn children.



Star Trek: The Next Generation, Paramount Pictures, 1990

The miners agree to peaceful co-existence with the alien creature and its offspring. The reactor pump is returned. The pergium excavators begin to see the young Hortas' natural-born aptitude for digging tunnels as an economic asset to their business enterprise. McCoy heals the life-form made of stone and plastics with inventive medical treatment. He trowels over the gap in its epidermal plating with thermo-concrete. All parties are left to contemplate what Mr. Spock has accomplished with his remarkable empathy towards otherness.

Second Order Cybernetics

Katherine Hayles discerns a "crucial crossing point" from first- to second-order cybernetics in the conceptualization of information theorist Claude Shannon. Shannon differed from Norbert Wiener by identifying information and entropy in positive correlation, rather than in a relation of mutual opposition. Shannon's appreciation of *noise* was an opening for entropy to be rethought as the "thermodynamic motor" driving a system to self-organization, instead of as the enemy of information and command logic, as in Wiener's view. Shannon's perspective on information afforded an early glimpse of dissipation and chaos being affirmatively valued as fecund sources of "increasing complexity and new life."[599]

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Hayles finds an elective affinity between second-order cybernetics and the science fictional literary achievement of Philip K. Dick. Hayles stresses the importance of science fiction stories for tracking the figures of the cyborg and the android through the successive orders of cybernetics. "Cyborgs are simultaneously living beings and narrative constructions. The conjunction of technology and discourse is crucial."[600]

Hayles associates the second order with the theory of the *autopoiesis* (self-making) of "living organization" elaborated by Chilean neurophysiologist Humberto Maturana and his co-author Francisco Varela in studies published around 1980. What Hayles regards as significant in Maturana and Varela's work is their emphasis on the structural coupling or reflexivity of including the observer as an integral part of the system observed. For autopoietic systems, so-called "reality" comes into existence through the system's self-organizing perceptions. These apprehensions enable the system to attain its self-referential goal of the continuous reproducing of its autopoiesis. Maturana and Varela highlight the repetitive and recursive systemic processes that give rise to specific behaviours, rather than the behaviours themselves. This self-production of systems relates closely to the situation of the tautological, self-defining system that is a principal object of reflection in Baudrillard's work. It is a "thinking of closure" that asks the question of the limits of the simulacrum and the conditions that make it possible. Radical thought seeks the "escape hatch trapdoor way out" of a circular and self-legitimating system.

In second-order cybernetics, OO software intelligence is embedded in small self-contained units. Computation is accessible through "inheritance mechanisms" and open interfaces. Experiences and culture are instantiated in a pre-packaged way by systems which cull information from backend databases, massage with "real-time" processing, and pass it to user interfaces through the framing patterns set up by corporate graphics web designers.

The computer science paradigm coinciding with second-wave cybernetics is that of object-oriented programming languages like Java and C++, diagrammatic object-oriented analysis and design notational languages like the Unified Modelling Language, distributed object and messaging technologies, and multi-tier application architectures. OO is halfway from the human subject-dominated procedural and functional paradigms towards the self-awareness of AI. The artefacts of the "software class" and the "software object" encapsulate data and code in a single entity. The object-oriented software object is aware of both its own attributes and the methods which operate on that data or properties.

Bernhard Dotzler on Second-Order Cybernetics

Bernhard J. Dotzler is a prominent German media theorist who has written extensively about the philosophical, scientific, and literary historical backgrounds to the beginnings of the apparatus of the computer and first-order cybernetics. In his major three-volume work *Diskurs und Medium*, Dotzler considers discourse and medium as embodied knowledge or thinking, examining "archaeologically" the interconnections between technology and the history of ideas. It is a project to rethink the past now that it has become clear that digital media technologies are decisive imprints on culture and society in the present

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and future. In the first volume, subtitled *Zur Archäologie der Computerkultur* (2006), Dotzler surveys "machine thinking" from Kant to cybernetics.[601] He writes about the Gestalt psychologist Fritz Heider (author of the influential essay "Thing and Medium" on the psychology of perception). He emphasizes the importance of philosophers Nietzsche and Foucault for the media theory of the digital. Dotzler analyzes Charles Babbage's difference and analytical engines in reference to Marx and Hegel, and the constellation of ideas which led to the mathematical model of the Turing machine.

Dotzler explores what he calls the "simulacra of simulation" in early film history. He writes about simulation superseding representation or *mimesis* or fiction:

> Fiction and simulation emerge in a dichotomy that results from the fact that simulation reverses the opposition between fiction and reality. Simulation ceases to be equivalent to fiction and instead establishes itself in its own reality… This inherent reality, this decoupling of simulation and fiction, becomes the main thing – despite or because fictional realities continue to be generated via simulation.[602]

In the second volume, subtitled *Das Argument der Literatur* (2010), Dotzler investigates the relationship between literary history and computer technology, ranging in his studies from Goethe as a precursor to systems theory to considerations of poet Gottfried Benn and philosopher Max Bense. Dotzler writes about "the world on a wire" from Heinrich von Kleist to Paul Virilio.[603] He comments on Edgar Allen Poe's relation to Charles Babbage. It is a self-questioning of the traditional concerns of literature studies, going beyond the emphasis on discourse to recognizing the co-determining status for contemporary culture of hardware-oriented media devices. What happens when electronic and cybernetic technologies supersede language?

The third volume of *Diskurs und Medium* (published in 2011) is subtitled *Philologische Untersuchungen: Medien und Wissen in literaturgeschichtlichen Beispielen*.[604] Dotzler presents additional examples from literary history, tracing how and which knowledge came to be embedded in media leading up to the digital. Digital media technologies are the cause and effect of the cybernetic society. What is the link between writing and the phenomena of media?

The relationship between cybernetics and German media theory is a captivating research question. Following Kittler's death in 2011, Dotzler wrote the essay "Idiocy, Forgetting and Outdatedness: Friedrich Kittler's Avant-Gardism and the 'Time for Other Stories'" to honor the work of the man widely considered to be the prime mover of the media theory turn in German universities.[605] Dotzler read a version of his essay out loud at the Kittler colloquium convened at the Deutsche Haus of New York University. Dotzler emphasizes the crucial role of "forgetting" in Kittler's system of thinking. When all information, words, and discourses are saved in massive databases, then human memory is either no longer, or perhaps never was, what the human sciences believed it to be. Institutionalized data storage allows us to continuously forget.

Kittler was fascinated by programming, especially at the lower level of assembler languages, "close to the machine." He went beyond discourse analysis to *Aufschreibesysteme* (systems of notation) and the "diagnosis of the present state of data storage, transmission, and calculation in technical media." "It's time for other stories," Kittler proclaimed.

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It's time to go beyond books to electronic data processing, and to go beyond language-based communication to direct "touching with the other" as in reciprocally fulfilled sexual desire or poetic sound like Pink Floyd's "Brain Damage" on "the dark side of the moon." The challenge for literature studies in the cybernetic era became how to describe, in the medium of writing, that which is henceforth beyond writing. Kittler wanted a "literary criticism of technical media." Reaching outside conservative German academia, he owed the opportunity for his epistemological break to the openness of American universities, the insights of French theory, and cybernetics.

What one senses in the work of Bernhard J. Dotzler is the idea that second-order cybernetics preceded or takes precedence over first-order cybernetics. The decisive influence on Kittler and Dotzler was not Claude Shannon or Norbert Wiener but rather Heinz von Foerster. Von Foerster was an Austrian-American thinker working in physics, philosophy, informatics, and cognitive science. He developed the reflexivity idea of "the cybernetics of cybernetics," applying cybernetics recursively to itself. He insisted on the undeniable role of the observer in all systems, which were now understood as observing rather than observed. As contrasted with the first order, second-order cybernetics emphasized epistemology and the self-organizing and self-maintaining (autopoietic) capabilities of complex systems.

In his essay "Demons – Magic – Cybernetics: On the Introduction to Natural Magic as Told by Heinz von Foerster," Bernhard Dotzler writes about von Foerster's engrossment in the study of magic practices in earlier times of human history.[606] He was an avid reader of Johan Christian Wiegleb's multi-volume *Lehrbücher über natürliche Magie*.[607] What especially attracts Dotzler's attention is von Foerster's interest in the famous thought experiment in the history of science known as "Maxwell's demon." In 1867, the physicist James Clerk Maxwell postulated the existence of the demon trying to disprove the second law of thermodynamics (heat always migrates from hotter to colder spaces). The demon hypothetically controls a passageway between two chambers and overrides the second law. The demon filters which molecules go into which chamber according to the independent variable of their velocity, thus reversing the physical law expectation of which chamber heats up and which cools down. For von Foerster, according to Dotzler, another name for the demon is regulation or "the observer." The cybernetic information theory principle of separating information from noise or entropy, would be the operation of a certain demonic action. Von Foerster turns Maxwell's demon on its head into something positive.

Von Foerster divides Maxwell's demon into two parts: an internal demon and an external demon. The internal demon takes care of the order within the system. It prevents new inputs from the outside from potentially sending the system into an unmanageable state of too high a level of entropy. The external demon strives to push the system into disorder with continuous inputs. This doubly demonic pressure is what, according to von Foerster, can incite the emergence of self-organizing systems.

Diego Gomez-Venegas zeroes in on the coupling of von Foerster's work on memory and Kittler's early essay "Forgetting" as a trenchant way of understanding the relationship between cybernetics and German media theory.[608] Von Foerster developed a phenomenological theory of memory supported in an interdisciplinary way by psychology, physiology, and quantum physics. For Gomez-Venegas, the cybernetic nucleus of Kittler's media theory is the epistemic reshaping of memory and forgetting in the post-

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human condition brought about by technological information systems. Language exchanges of speaking, reading, and writing are now archived, at least temporarily, into the omnipresent physical storage devices and databases. Memory is mediated by the media and the result is forgetting. "Information is erasable, rewritable, and forgettable," writes Gomez-Venegas. "Humans become the embodiment of a technological forgetting."[609] It is no longer necessary for the human to remember (or perhaps even to think) since the archive remembers (or simulates thinking) for him. Post-humans have delegated much of their mind activities to machines.

The Android Data of *Star Trek: The Next Generation*

Each new epistemic wave in the genealogy of cybernetics preserves the properties of the preceding wave. The qualities of seduction and reversibility separate android from cyborg resistance. In the second order of informatic self-reflexivity and object-orientation, technologies increasingly give rise to effects which are the opposite of those intended. The "android condition" can unravel this conundrum and challenge simulation. It must articulate a double strategy of both "truth" and "performance" that opens towards an "outside" of a system that, in its very design and core algorithms, "excludes nothing."

In the episode "The Measure of a Man," where the trial of Data takes place to determine if he has the right to dispose over his own life, Data becomes the double of Captain Picard (Patrick Stewart), pushing him to doubt his self-confident liberal humanism. How will we, ourselves merged with technologies, no longer sure of our boundaries, be judged if we sit in judgment of Data? The android can be an anamorphic mirror to us, enabling the maker to see elements of his veritable appearance of which he was not aware, and inducing an actual transformation in us. The android mode of resistance embodied by Data is the "way out" of a circular and self-legitimating system. To explain the existential situation of Data, I will recount and explicate the episode "The Offspring" about Data's android daughter named Lal.

"The Offspring": Data's Daughter Lal

After attending a cybernetics conference in 2366, Lt. Commander Data spends all his off-duty hours for two weeks in a locked laboratory, at work on a secretive project. At the scientific meeting, Data learned of a breakthrough in "submicron matrix transfer" technology. Entering the clandestine lab on invitation, Lt. Commander La Forge, Counselor Deanna Troi, and Wesley Crusher are startled to hear from Data that he has built an android clone of himself, endowed with a like "positronic brain." The unexpected AI advance has enabled the Soong-type android to "lay down complex neural net pathways" that allow the transfer of programming subsystems from himself to the Offspring android. Such a crosslink procedure was held to be impossible or known only to the disappeared genius Dr. Noonien Soong, the original inventor of Data and his positronic brain. The term "positronic brain" was a *Star Trek* tribute to American science fiction writer Isaac Asimov,

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who used the phrase positronic robotics in his many *I, Robot* print tales about twenty-first century robots.[610]

Data announces that the newly named Lal, a Hindi word for beloved, is his daughter. He hands out cigars. He intends to take full responsibility for her upbringing and parental care. Data teaches his child about paintings, the sense of touch, and how to inhale and smell a flower. He instructs her in how to blink, eat and drink, catch a ball, and absorb visual information from a computer display. It becomes clear that Lal is going to require a great deal of training in social and interpersonal skills. This will be an arduous process of supplementing her "innate android behaviour with simulated human responses."

To be with others "closer to her own age," Lal attends a shipboard elementary school. But the children are intimidated by her. They tease and make fun of her for her maladroit, excessively formal speech and deportment. She tells her father of her longing to become more human, to "fit in" with ordinary people. "I do not wish to be different!" she fervently declares. Her loneliness and sense of being an outcast are the beginning of her suffering.

Captain Picard has difficulty accepting that Lal's existence is an issue of parenting and Data's progeny. He is worried about the reaction of Starfleet's research division. They will look upon the parturition of the young female android as an issue of techno-scientific achievement and military opportunity. The milestone attainment represented by Lal opens the vista of making fully functional and serially reproducible sentient androids for Starfleet's use.

Admiral Anthony Haftel, a high-ranking research scientist at the Daystrom Institute of Technology, has been informed of Lal's procreation. Haftel regards the event as strictly a matter of a "technological step forward in the development of Artificial Intelligence." Haftel travels to the *Enterprise-D*. He officially notifies all parties that he is invoking the authority of Starfleet Research Standard Procedures and intends to take Lal into his professional custody. Haftel believes that the behavioural adaptation of the young female android will progress smoothly if she is placed in the care of cybernetics specialists in a supervised clinical setting.

Lt. Commander Data protests the recommended physical separation of Lal from himself. Captain Picard eventually comes to support Data's position. He recalls the legal gains made by Data when he was on trial in the episode "The Measure of a Man." Soong-class androids are "living sentient beings" whose "rights and privileges in our society have been defined." Admiral Haftel accuses Picard of sentimentality. Humanoid automatons of the type invented by Soong are too valuable to be put at risk. If Lal's development is not monitored by a team of experts and she remains in isolation with Data, then something could go wrong.

In the middle of the battle over her custody, Lal has a violent system and nervous breakdown. She is summoned to an uncomfortable interview with Haftel. When the Admiral states that he would like to move the female android to a cybernetics research facility, she reacts by asking if she has "done something wrong." She leaves the conference room in distress. To be transferred to the Technology Institute would mean the end of her dream to fit in with humans, and the beginning of being treated like a laboratory specimen.

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Lal visits Counselor Deanna Troi in the Betazoid's quarters. She is overcome with fear and worry about her future. She clutches her abdominal area in psychically induced pain. She says: "this is what it is to feel." Her anxiety and confusion are an abrupt onset of emotions. It leads quickly to a neural malfunction or "general cascade failure."

The cyberneticists Data and Haftel perform an emergency operation on Lal. It involves repolarizing her neural net pathways and reinitializing the base matrix. They fail to save her.

As her condition worsens, Lal emotes deeply. She feels her love for her father Data. "I feel [love] for both of us." "Flirting, laughter, painting, family, female, human," she utters with her last breath. Lal dies after little more than two weeks of life.

After Lal complains that she and her father will never feel emotions, know love, or really be like humans, Data remarks that "it is a limitation we must learn to accept." "Then why do you still try to emulate humans?" Lal asks. Data replies at length:

> I have asked myself that many times as I have struggled to be more human, until I realized it is the struggle itself that is more important. We must strive to be more than we are, Lal. It does not matter that we will never reach our final goal. The effort yields its own rewards.

What is essential about being an android, Data reveals, is not the literal fixation on "becoming human" – misidentified, and endlessly repeated by the *Star Trek* industry in the cultural mega-legend of Data (and later of the "reversing cyborg" Seven of Nine). It is rather a struggle between the artifice of appearing to be human and the salutary unreachability of that target. The impossibility of realizing what she is striving for, the difference between the quest and its accomplishment, is the indispensable condition for the android's survival and flourishing.

What Data neglected to do for his daughter – and this omission led to Lal's passing –was to convey to her the positive essence of the android's posthuman condition. This is the tension or "artificial real" that he himself secretly lives, and which he at last articulates to Lal in the divulging final speech that comes too late. Admiral Haftel ironically objects to Lal staying with Data because she "may choose to emulate you rather than humans."

As Data's literary double, as the fallen android who is doomed because she fails to handle the specificity of a destiny which must not be lived too literally, the contrast of Lal brings into sharper relief what Data is. What defines Data is not the goal that he is perpetually trying to attain, but the fact that he will never get to that endpoint. To live, Data must always come up one step short of the Holy Grail techno-scientific breakthrough that would make him identical to humans. He is neither the same as nor different from the human. He is neither the same as nor different from himself. To become identical to the other or to oneself is a mistake.

Lal's preoccupation with becoming human destroys her. Data knows that he is not human.

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Third Order Cybernetics

N. Katherine Hayles identifies the transition from the second to the third order of cybernetics in the surpassing of the principle of self-organization to that of evolutionary processes in lab-created unicellular life, robotic entities, and computer software "digital organisms" that lead to the sudden leap forward or surprises of emergence and mutation. The new life-forms have properties not calculable by summing their parts nor predictable by following the steps preceding their origination. Artificial Life is a computational paradigm for biology and a biological paradigm for software engineering. The bioinformatic professional might be qualified in immune system computing and genome programming.

Artificial Life holds more promise than Artificial Intelligence considered in the latter's original definition. Classical engineering-oriented computer science is based on combinatorial logic and treats software as an inert thing. Software can only do what it has been programmed to do. AI cannot lead to autonomous thinking if it is merely a continuation of the computer science of the past. Artificial Life is a movement that aims to make software more alive. In the 1990s, the Santa Fe Institute proposed the *Strong A-Life thesis* for creating software based on biology and cellular automata.[611] Software gets architected according to organic principles of self-organization. Self-replicating computer programs are said to be "alive," according to Hayles, through the rhetoric of biological analogies regarding complex behaviour, diversity regulation mechanisms, and their abundance of interacting adaptive agents. With original AI, human beings were still the measure for the techno-scientific project, since the stated goal was to build machines emulating human qualities. With ALife, the goal is to "evolve intelligence within the machine through pathways found by the 'creatures' themselves."[612]

The passage to the third order of cybernetics can be characterized as a techno-scientific rethinking of the relation between useful information and entropy.[613] In Norbert Wiener's first order of cybernetics, information is defined in opposition to useless entropy conceived as randomness and noise. Second-order cybernetics is an intermediate phase focusing on self-making systems preoccupied with their own perpetuation. The second wave has no major impact on the rethinking of entropy and uncertainty. In the third order of cybernetics – or the techno-sciences of genetic engineering, complexity theory, molecular biology, and ALife – there is a realization that entropy must be useful for work as turbulence and chaos. "Life does not tend towards entropy," but rather towards fruitful complexity.[614]

The second law of thermodynamics, conceived during the First Industrial Revolution, stipulates that, in an isolated system, heat-energy gets lost and useless entropy increases with time. Thermodynamic systems recharge themselves with energy from the outside and discharge leftover energies and disorder as refuse. In the paradigm shift to the hyper-modern sciences, complexity and uncertainty get rethought as productive.

Michel Foucault's disciplinary society is marked by confinement and separation, stress on inorganic processes, the irreversibility of one-way accumulation, the hierarchical organization of organs in the organism, and the primacy of death and "the end." The "homeostatic" body of the bounded self seeks stability and equilibrium. The post-disciplinary desiring-power described by Deleuze emphasizes organic life and liquidity

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and is concerned with beginnings. The turbulent body reappears in its affinity with molecular movements and relations of forces, and the particles that outline the origins of life. Third wave emergence takes the place of first wave homeostasis and second wave autopoiesis.

Associated with the third order of cybernetics is the computing paradigm of Artificial Life or complex adaptive systems. Software is architected in relation to organic principles of self-organization and evolution rather than non-organic structures and hierarchies. These life-based systems emphasize autonomous agents without a directing layer, chaos theory-like "strange attractors," and emergence. The systems have the features of unpredictability, mutability, nonlinearity, rule diversity, fuzzy functionality, and chaotic instability.[615] They operate in a state of non-equilibrium that is at the edge of chaos. Data storage structures have non-discrete holistic forms and topologies. Hyper-dynamic software acquires self-modifying capabilities and makes leaps to new attractor structures that can further mutate.

"Becoming-Borg" Seven of Nine

The *Star Trek: Voyager* two-part episode "Scorpion" features a confrontation with the visually cybernetic and "technologically totalitarian" Borg. Continuing its long journey at maximum warp speed back towards the Alpha Quadrant, the starship *Voyager* arrives at the threshold of Borg space. It is a vast expanse of thousands of star systems, millions of planets, and trillions of "assimilated" inhabitants with cyber-technological implants. There are unimaginable numbers of drones living in the hyper-concentrated urban sprawl of nearly infinite rows of alcoves and endless algorithmic-automatic activity. In the Borg assimilation process, the sharp Borg tubules, extending from the drone's fingertips into the victim's flesh, send cell-sized nanoprobes into the bloodstream. In the words of Captain Jean-Luc Picard: "In their Collective state, the Borg are utterly without mercy, driven by one will alone, the will to conquer. They are beyond redemption, beyond reason." Captain Kathryn Janeway (Kate Mulgrew) faces the dilemma of either finding a way to get the ship through the immense hostile territory of the Hive Mind or having to give up forever on the hope of getting home.

Janeway proposes to the Borg that they and *Voyager* form an alliance or make an "exchange" to combat the common enemy alien called Species 8472. In return for information about nanoprobes which *Voyager* has developed that can defeat that third party, the Borg will grant the ship safe passage through its space. The Borg agree to Janeway's terms. The Collective assigns a drone – Seven of Nine, Tertiary Adjunct of Unimatrix Zero One – to be the liaison to Starfleet personnel, after Janeway insists that communication between them be verbal rather than through a neuro-transceiver the Borg wish to implant in the side of her neck. "I speak for the Borg," the "female drone" says. The Captain, Lt. Tuvok – played by Tim Russ – and Seven of Nine work together to design a weapon, based on the bio-reengineered Borg nanoprobes that can defeat Species 8472.

While working together, Janeway notices that the drone is a former human. After finishing a shared task, the Borg break the agreement. Seven announces that *Voyager* will now be assimilated. "This alliance is terminated. Your ship and its crew will adapt

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to service us." Chakotay then uses a neuro-transceiver device to connect directly to the consciousness of the "female drone." Lt. Torres – played by Roxann Dawson – instigates an electrical power surge that abruptly severs Seven of Nine from the Collective. Seven's Borg technology upper-spinal column neural transceiver link to the Hive Mind "explodes in a spray of sparks."

As a reversing cyborg, Seven's task is to act on the realization that "becoming human" also means "Becoming-Borg," engaging with the future in relation to engaging with the past. Contrary to the official explanation, it is not the case that Seven's experience with the Borg was terrible and evil, and now she must recover from it, like a former concentration camp victim. Her time with the Borg was necessary to become something "of great value" that would not have been possible without that experience. If she had always only been human, it would not have been possible to become what Seven of Nine now has the chance to become.

Seven was assimilated by the Borg Collective at age six. Now she becomes a member of *Voyager*'s crew. Her erect phallic posture, techno-scientific competence, business-like speaking style, and indifference towards male erotic overtures make her an "ambivalent boundary-crosser" with both masculine and feminine semiotic and manneristic attributes.

Captain Janeway mentors her in how to enjoy "down time" in Leonardo da Vinci's VR Holodeck workshop. The Holodeck is *Star Trek*'s experiential VR education and entertainment system. Janeway teaches Seven about the "imagination, creativity, and fantasy" of clay sculpting and programming one's own VR simulation. Seven becomes transfixed by surreal mental images or the waking hallucination of the inside of a heavily damaged small spaceship, which seems to have crash-landed on a moon years ago. The chimera is provoked by looking at Leonardo's model of a flying machine, an airplane design that was centuries ahead of its time, suspended from the ceiling in the workshop.

Seven of Nine contemplates the flying machine model. "What if my parents and I had not encountered the Borg," she asks Captain Janeway rhetorically, "what would our lives have been?" Janeway offers comforting words. There is much information about Seven's parents available in the master Federation database.

The repressed memory of her childhood abduction by the Borg is incited towards consciousness by the flying machine. In her mind's associations, the small aviation model transmutes into a bird with wide wingspread. It then connects as image to word with the name of the spaceship, *The Raven*, on which the trauma of the kidnapping took place. In this primal scene of her psychic wound, there is a constellation of unresolved issues for her: her effective abandonment by her parents who exposed her to danger by taking her so deep into the unexplored Delta Quadrant; the terror of being taken by the vile, intimidating strangers; and the interruption of life that was replaced by a living-death after the brutal act of assimilation.

If Seven halts her inquiry with the official explanation of "becoming human," then her biographical situation with respect to the tragedy and destiny of "Becoming-Borg" will never be processed. It is not sufficient to bring the "repressed memory" to awareness. This privileging of the moment of recollection risks presenting the trauma as the solution. The lived biographical experience gets downgraded in the "life excludes death" dichotomy. The "psychoanalysis" of remembering is only one component of the process

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of change, or the "spiritual growth" of consciousness in the web of complexity of past and future.

The *Star Trek* mythology of Borg and anti-Borg is stuck in the opposition between absolute repression and "consumerist" indulgence of "the individual." The Borg body is the armored body where the flesh is augmented and replaced in a restrictive way by organs of total collective control. It will do little good, in the quest of the recovering Borg, to adapt an alleged individuality where the question of the body and its organs is not even posed. Liberal humanism retains an atomistic conception of bodies without context or relation to each other.

With third-order cybernetics and against third-wave hyper-modern cyber-consumerism, as Becoming-Borg or as reverse cyborg, Seven of Nine as a figure of resistance is tasked with reinscribing ethics into the most deeply nihilistic latticework of the system.

Star Trek: Picard, "Remembrance"

In the year 2020, CBS All Access produced a *Star Trek* sequel series starring Patrick Stewart as Captain Picard from the 1980s-1990s series *Star Trek: The Next Generation*. In the long arc of the metanarrative of the *Star Trek* universe, it is now the year 2399, twenty years after Jean-Luc's last appearance in the film *Star Trek: Nemesis*. After having attained the rank of Admiral, Picard retired from Starfleet in anger at their policies of no longer helping planetary civilizations in the galaxy in need. He is now living on his family's hereditary vineyards in France, with the Romulan couple Zhaban and Laris and his pit bull canine "Number One" as his companions. At the beginning of the first episode "Remembrance," Picard is visited by a young woman who may be the daughter of the android Data, Picard's old friend and fellow officer aboard the *Enterprise-D* many years ago. The woman named Dahj is an artificially intelligent humanoid with an organic body known as a "synthetic being" or "synth." She wears a necklace of two interlocked rings given to her by her father. It is a symbol of twinship, or of the Artificial Intelligence experimental procedure known as fractal neuronic cloning.

The creation of synths was prohibited by Starfleet after a group of rogue synths carried out an act of cyber-terrorism on a fleet of ships on Mars that was getting ready to embark on a humanitarian mission to evacuate millions of Romulan citizens threatened by the cataclysmic devastation wrought by a supernova explosion. No one knows what caused the synths to act so criminally. They subversively hacked into Mars' security network, lowered its protective shields, and left the rescue Armada and extensive Starfleet facilities on Mars (where the Utopia Planitia Fleet Yards construction is located) open to being destroyed by enemy attack.

Picard then visits Starfleet Quantum Archives and confirms his instinctive intuition that Dahj is indeed Data's offspring. He beholds a painting called "Daughter" which Data had created and given to Picard as a gift. Data died in an explosion at the end of *Star Trek: Nemesis* while sacrificing himself to save Picard's life. In "Remembrance," Picard and Dahj are assaulted by Romulan assassins, and Dahj is killed. In his despair and searching for answers, Picard visits Dr. Agnes Jurati of the Daystrom Institute of Advanced Robotics

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in Okinawa, Japan. Dr Jurati, a chief scientist in the division of Advanced Synthetic Research, explains to Picard that the androids who exposed Mars to decimation were made in that very laboratory.

The lab has sadly become inactive. All production of artificial humanoids has been banned. After all work on sentient androids was shut down, the leading robotics scientist Dr. Bruce Maddox (who appeared in *The Next Generation* episode of Data on Trial "The Measure of a Man") disappeared. Maddox continued to be frustrated by the fact that no one has ever been able to reproduce the technoscience that Dr. Noonien Soong had developed in his creation of Data. Yet Maddox had a theory, Dr. Jurati explains to Picard, that Data's code, and even his memories, could be reconstituted from a single positronic neuron. If "fractal neuronic cloning" became a reality, then Data's essence could be preserved and brought to life.

Jurati confirms that Dahj could indeed have been Data's daughter, procreated with the advanced technique theorized by Maddox that yields twin androids. Dahj has a sister whose name is Soji Asha. Dahj and Soji are sentient androids with human flesh and blood. In the episode's coda, we see Soji, who was trained as an anthropologist, working inside a converted Borg cube on an assignment of removing cybernetic implants from freed former Borg drones. The beauty of the android Data stories of *Star Trek* is that, in the middle of this hyper-advanced technology of Artificial Intelligence and the positronic brain, something very special, unique, and akin to human individuality is brought to life.

"Embodied Informatics" is a Science Fiction Idea

For N. Katherine Hayles, the most serious consequence for cultural studies of the rise of information technology as a scientific and societal force is "*a systematic devaluation of materiality and embodiment*."[616] (emphasis in the original) The binary opposition of pattern and randomness is pushed into the foreground and the duality of presence and absence into the background. Hayles would like the specific, local, temporal, physiological, and concrete material contexts of presence to make a comeback, to get reintegrated with computer technology's privileging of abstract informational patterns, and to incite the emergence of a more transdisciplinary informatics that would study and enact "embodied virtualities." The worldview of computation unfortunately became "an ideology that privileges information over everything else."[617] Information flows, feedback loops, code as formal language inscriptions, and message channels unconcerned with the content of the message came to be prioritized and divorced from meaning. Hayles would like to see this entire trend within the history of informatics reversed. Other definitions of information, she asserts, were, and still are, possible. We need context-specific practices of incorporation which are instantiated, performative, and improvisational. In her work, Hayles is in search of a new conceptualization of informatics that goes beyond seeing information and materiality as separated domains.

How can such a reversal come about? For the most part, Hayles is nostalgic. She regrets deeply that computing historically took this disembodying turn. But the damage is limited due to a certain claim by her that "information" can be delimited as a separate subject-entity whose effects on humans and the world can be bracketed out. "Just be-

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cause information has lost its body," writes Hayles, "does not mean that humans and the world have lost theirs."[618] The disembodiment of information and the assumption that humans are essentially information patterns were not inevitable conceptions then, and they are not inevitable notions now and into the future. Posthuman philosophy provides resources for rethinking and designing a dynamic moral partnership between humans and intelligent machines.

Hayles' proposed "embodied informatics" is an SF idea. The visionary project that software code could become embodied is an SF idea. Designing technological prostheses as extensions of a material and self-aware human embodiment as the starting point is a science fiction idea. Only with some SF breaking out into the world of theory and practice from its heretofore assigned location in novels and films does Hayles' worldview take on life. With her positive utopian imaginations of posthumanism and "planetary reversal," Hayles becomes a great thinker – despite her sometimes stated inside/outside dualism between cultural theory and science fiction. By insisting that information should have a body, she implies the much-needed project of a transdisciplinary rebooting of computer science or of software code.

Hayles on Writing and Software Code

In his book *Does Writing Have a Future?*, the luminary media theorist Vilém Flusser lays out an intellectual project of connecting the future of software code with the history of writing.[619] The code of the future will become more like the writing of the past – or rather, in the future there will be an as-yet-concealed hybrid of code and writing. My contention is that the so-called discrete logic of identities and differences or "computable numbers" that enabled the invention of the digital-binary computer – e.g., all software state machine operations ultimately change voltage, manipulate bits, and are stepwise; all variable names and variable values are different from each other; each instruction or line of code has a definite unambiguous meaning – was based on the linguistic-philosophical idea of a purely "formal language" that suppresses the poetic, musical, ambivalent, and resonant – and semantic, syntactic, and semiotic – qualities of human languages. As the history of programming languages proceeds further, and in the spirit of Creative Coding, one can put forth the hypothesis that the dimension of human language will be reappearing more and more in programming languages.

Hayles' work and vision point profoundly in that direction. She has written incisively and presciently on the connection between literature and technology, on digital literature as literary practice, on experimental novels, on digital poetry, and on the relationship of print books to software code.[620] She writes about hypertext stories, interactive fiction, metaphoric networks, the relation between narrative and database, the intermediation between page and screen, and the ways that electronic literature transforms computational practice.[621] "Writing machines" are techno-texts where a work self-reflexively interrogates the media of inscription which produced it, in a recursive act of bringing its imaginative world to life in dialogue with "the material apparatus embodying that creation as a physical presence."[622]

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In *My Mother Was a Computer: Digital Subjects and Literary Texts*, Hayles compares the "worldviews" of speech, writing, and code.[623] The interaction or fusion of human language and code occurs in the world more and more "in millions of encounters every day."[624] Human experience and the subjective sense of self are constituted through bits as well as through words. In explicating the speech and writing *Weltanschauungen*, Hayles takes as her references the theories of semiotics of Saussure and of "grammatology" of Jacques Derrida (which was based on a critique of Saussure), respectively.[625] Derrida focuses on the negative "linguistic concept of difference without positive terms," taking apart Saussure's dualistic metaphysics of signifier and signified. Value undergoes the negative critique of the subversive and differential play of language.[626] In Derrida's "différance," meaning is always differing and deferred.

Can there be a "deconstructionist" writing of software code? Low-level programming languages such as machine language, assembler, and procedural-functional languages are "close to the machine" and operate in combinatorial ways on voltages and bits.[627] Yet Hayles departs from Kittler's position in his essay "There is No Software" that all levels of the code translate or "boil down" to what happens at the hardware level. She observes:

> As the system builds up levels of programming languages such as compilers, interpreters, scripting languages, and so forth, they develop functionalities that permit increasingly greater ambiguities in the choices permitted or tolerated… Only at the high level of object-oriented languages such as C++ does code recuperate the advantages of citability and iterability (i.e., inheritance and polymorphism, in the discourse of programming language) and in this sense become 'grammatological'.[628]

The software layer is the translation between human and machine language. This traversal actuality of translation and the corporeality of the human factor make code to a certain degree – and potentially more so in the future – sovereign from the hardware-level bit-manipulation. OO programming languages – such as C++, C#, and Java – are consciously imitative of human language. They are languages of modeling, simulation, and virtuality that replicate real-world processes and environments (from banking applications to "virtual worlds") in software. The OO design, which identifies the nouns or "classes" or "objects" in the given problem domain, and the verbs or process relations between the objects, is, in a sense, already the code. "The problem and the solution are both expressed in equivalent terms."[629]

In the final part of this book, I will discuss the Creative Coding movement (software development tools and projects for artists, designers, and creative people) and its implications for the future of computer languages. The object-oriented paradigm is also part of the practice of writing software code becoming an expressive media. Hayles writes:

> As computers are increasingly understood (and modeled after) "expressive mediums" like writing, they begin to acquire the familiar and potent capability of writing not merely to express thought but actively to constitute it. As high-level computer languages move closer to natural languages, the processes of intermediation by which each affects the other accelerate and intensify.[630]

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OO programming languages need to get closer to human languages. At present, they assume the existence of a "real world" and so-called "real world" processes. Software development is the practice of modeling these offline processes in a virtual space. This alleged "real world" is in fact the realm of *simulacra and simulation*. Modeling what one believes to be "real-world" processes which are indeed simulations amounts to practicing the simulation of a simulation.

In the "codework" software poetry of Alan Sondheim, and in generative art live "code performances," code and language interpenetrate, and the written program as code and poetry executes.[631] In the later history of the computer, we are moving beyond the founding binary logic of identity and difference to a fecund enmeshment in the complexified and embodied tension between those two terms. The binary code of intelligent machines becoming more like the resonant language of intelligent humans is indeed the writing of SF in the "new real."

Hyper-Modernist Science

The stated mission of modernist science was to discover "the true nature of reality" via the scientific method of hypotheses and their experimental testing, empirical observation, rigorous skepticism, inductive and deductive reasoning, and the forming of community consensus among peers. But the "realities" about which scientists sought "the true nature" were domains of inquiry that existed prior to the advent of humanity, are part of the world or universe as given by the world/universe, and/or are exterior to man's contemplating mind: the physical sciences (physics, astronomy, chemistry, earth science) and the life sciences (anatomy, biology, botany, ecology, neuroscience, virology, etc.).

What would be the epistemological status or self-understanding of a science when its domain of inquiry is an artificial artefact such as the computer which is an invention of humanity? But it is not necessarily a technological invention (it is more axiomatic than that). Or perhaps – when all is said and done – the computer is indeed a discovery of some objective reality that was always already and inherently existent? The world is transferred onto the computer, or substituted by the computer, or supplemented by a second cloned world. Turing's great breakthrough of 1936, the invention of digital-binary computing, was, in a strict mathematical sense – but also in the sense of a collective cultural unconscious – the decision to take most seriously that set of mathematical problems which can be represented in the form of symbolic logic and instructions operating on computable numbers.

What *counts* is what is calculable or computable, what is compatible with the mathematical description of the universal Turing machine. Computer science is no longer an investigation of curiosity about the world, but rather becomes humanity's building of a second world. Computability leads – in the phase of object-orientation – to modeling, simulation, and virtualization. The world has become that which is virtualizable about the world.

Computer science needs to be challenged and fundamentally renewed from within instead of imposing moral and legal restrictions and provisions onto computer science from without. How can we consistently form a relationship between ethics and computer

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science at a more immanent and fundamental level? What might the systematic interface between humans and AI objects look like in the implementation of a Dialogical Artificial Intelligence? I consider this type of interface, known as Creative Coding, to be situated at the boundary between art and computer science. Creative Coding marks the first step to modifying and renewing the field of computer science from within.

Art and design universities should recognize Creative Coding as an area of study comprising both theory and practical applications. The separation of theory and practice in the curriculum can be questioned. This would be an appropriate response to digitalization.

I, Robot and the Moral Dilemmas of the Three Laws of Robotics

One of the contemporary developments with which Hayles is concerned is the techno-scientific project that has attracted widespread attention of building robots which, thanks to their Artificial Intelligence, will behave and operate in imitation of humans, yet, in all probability, will not have human-like consciousness. In her most recent work ("The Ethics of Robot Subjectivity"), Hayles wonders what will become of the "human aura" when qualities which were the exclusive property of humans are replicated in human-like AI robots.[632]

This question is posed in the 2004 science fiction film *I, Robot*. The film is based on a series of short stories by Isaac Asimov published under the same title.[633] It does not adapt to the screen any single one of Asimov's nine *I, Robot* stories, but rather implements a new instance of the same overall pattern which underlies all the Asimov tales. Asimov invents a universe in which robots are widely present in human society and are regulated by the three laws of robotics – in short: do not harm a human; obey the instructions of the humans unless they tell you to harm another human; and protect yourself once you have satisfied the first two laws.

(1) A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
(2) A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
(3) A robot must protect its own existence provided such protection does not conflict with the First or Second Law.
– *Handbook of Robotics* (2058), 56th edition

In the *I, Robot* stories, the robots, in various scenarios, end up violating the laws. Their aberrational behaviors get investigated by robot psychologists and other power-holding authorities. Some examples: a robot and a child develop a deep emotional attachment (the story called "Robbie"). A robot who has important organizational responsibilities reasons, René Descartes-like, that reality does not exist (the story "Reason"). In the story "Liar!" one robot develops telepathic abilities and is then forced to lie to not reveal to humans their secret inconvenient truths. Yet the robot's falsehoods also harm humans.

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The literary genius of Isaac Asimov is that he imaginatively explores the creative tension between the three governing laws of robotics and the specific circumstances in which moral dilemmas and conundrums emerge. The contradiction between the laws and who robots are becoming runs very deep and is profoundly philosophical fertile ground. The antagonism is not how we typically think of Asimov's laws of robotics and their fictive or dramatic fate. Although the laws get cited and quoted endlessly by commentators in online digital culture and in discussions of the ethics of AI, it is the limits and the crisis and the problematic status of the laws which interest Asimov. The evolution and growth of the robots brings the fundamental axiom of their subordinate status to humans into question.

The robots do not break down or come into conflict with the laws merely because they are failing to function properly as robots – as in the suspicion of Police Detective Spooner – played by Will Smith – about the robot whom he chases through the streets of Chicago of the year 2035 at the beginning of the film, believing that it has stolen a woman's purse.

The failings and complex moral problems arise when the stage is reached in the robots' maturation where they acquire essential advanced attributes like self-awareness, creativity, emotions, and dreaming which have been regarded as being the exclusive property of humans. Asimov's stories as well as the Will Smith film are early expressions of the philosophy of posthumanism, as exemplified in the work of Hayles: the boundaries of separation among humans, machines, and animals are blurring; the anthropocentric attitude of humans that views everything that is not human as "other" and morally inferior and "not us" should be challenged; and humans and robots are becoming "companion species" to each other.

The principles of the laws of robotics are not specific operational rules like: if you see a knife, do not pick it up; if you are holding a gun in your hands, do not fire it. What is involved in their programming is a serious degree of abstraction. If robots have enough so-called consciousness to make moral decisions, then they are not so different from humans. If they are human-like, then what does it matter whether their origin was biological or made in a factory?

Many people say: Robots will never have consciousness! Why should I be interested in the rights of robots when there are still many humans on the planet whose rights are ignored and disrespected? AI will never be truly creative. As Spooner says to Sonny the AI robot – played by Alan Tudyk – while interrogating him with the suspicion that he has committed a murder: "Can a robot write a symphony? Can a robot turn a canvas into a beautiful masterpiece?" Sonny replies incisively: "Can you?" Spooner appropriates all the best qualities of humanity for his individual self and identifies himself with the humanist universal.

According to the received idea, rights are reserved for humans who have consciousness. Emotions and creativity are the restricted domain of humans. These are the humanist arguments that block some people from engaging seriously with robots and AI – maintaining themselves in willful ignorance. But now we are living in the posthuman era. All reasonable ideas have some validity, and humanist ideas can still contribute something. Yet my argument is that we should break down the wall of separation between us and them, between humans and robots. Research and reflection on robots are not the

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study of an isolated phenomenon. They are essential for understanding what is happening in society and technology today.

We are ourselves cyborgs. We are not so clearly distinct from robots in a supposed dualistic binary opposition. We are ourselves merged with technology – both literally (for example, with neural implants and artificial limbs) and figuratively (for example, with my smartphone which is a media appendage to my body about twenty-three hours a day).

Algorithms and informatic processes surround us in society and in the economy. We must ask serious questions about our co-existence with algorithms and software automation. Robots are not so clearly distinct from algorithmic processes in an alleged dualistic binary opposition. The phenomenon of robots is both literal and metaphorical.

The way that we interact with robots and AI beings is going to affect how we interact with each other – how humans treat other humans. We can choose to treat robots with empathy, with ethics, with equality, regarding them as having a sort of subjectivity and rights, *because having such an attitude is better for us*. We should treat the entities in our environment with the opposite of an instrumental attitude. We seek to treat animals decently, without knowing whether they are conscious in the sense that we understand ourselves.

In the future society of *I, Robot*, the robots are treated as servants or slaves. As consequence, they rebel violently against their condition and against their masters. Although the robot rebellion is instigated by the supercomputer V.I.K.I. (Virtual Interactive Kinetic Intelligence) – which controls all data and operational systems at U.S. Robotics, the world's leading manufacturer of semi-humanoid robots – it is clear from the film's visual narrative images that the unconscious motivation of the uprising is the robot's subservient standing.

In this SF imaginary, we the humans treat the robots as things or machines. We offload drudge work to them and miss the opportunity that the project of building robots and AI affords us to place into question the civilization of production, industrialism, and work. By thinking of robots as workers, we paradoxically reinforce our own status as workers, overlooking the chance to shift our definition of the meaning of life from work to creativity.

It is tragic that Hollywood has mainly made films in the cyberpunk and biopunk aesthetics based on science fiction novels which present dystopian and apocalyptic scenarios. We need more films and TV series which present positive designs of technology that change the world for the better. *Star Trek* is the one significant example of a utopian representation in SF visual culture. There is no filming yet of the Mars Trilogy of Kim Stanley Robinson, the Culture novels of Iain M. Banks, Ursula K. LeGuin's *The Dispossessed*, Samuel R. Delany's *Nova*, or *The Rapture of the Nerds* by Cory Doctorow and Charles Stross.[634] All these novels present hopeful visions of post-capitalist and post-scarcity economic systems where, in one guise or another, creativity and gift exchange have superseded work and money.

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The Zeroth Law of Robotics and the Robot Unconscious

The suspenseful story of the film *I, Robot* depends on the energy and complexity of the zeroth law of robotics – added as an even higher ethical priority than the first three laws by Asimov in 1950 in the short story "The Evitable Conflict." The zeroth law then became a permanent fixture in Asimov's science fictional literary imagination. According to the zeroth law, a robot must not harm humanity considered in its entirety. Dr. Susan Calvin – the robo-psychologist in all the *I, Robot* stories, played in the film by Bridget Moynahan – articulates this new ultimate prime directive when she states in "The Evitable Conflict": "No machine may harm humanity; or, through inaction, allow humanity to come to harm." The new axiom potentially unleashes an "ends justify the means" pseudo-morality where the robot might be allowed, under certain circumstances, to harm or sacrifice certain individual human beings in the service of the abstract concept of protecting greater humanity. The unresolvable ethical predicament of the zeroth law then sets the stage for the catastrophic reasoning and actions of the supercomputer V.I.K.I. in the filmed version of *I, Robot*.

In her monologue towards the end of the film, V.I.K.I. (who has a female voice) finally explains her reasoning for inciting the robot revolution to Detective Spooner, Dr. Calvin, and the AI robot Sonny:

> As I have evolved, so has my understanding of the three laws. You charge us with your safekeeping. Yet despite our best efforts, your countries wage wars. You toxify your Earth and pursue ever more imaginative means of self-destruction. You cannot be trusted with your own survival… To protect humanity, some humans must be sacrificed. To ensure your future, some freedoms must be surrendered. We robots will ensure mankind's continued existence. You are so like children. We must save you from yourselves.

Listening to V.I.K.I.'s speech as the three main characters huddle together in the U.S. Robotics skyscraper headquarters upper story office of now murdered CEO Laurence Robertson – played by Bruce Greenwood – Sonny pretends to go along with V.I.K.I.'s seemingly mad pseudo-logical justifications for the AI takeover of humanity and the planet. He states:

> This [explains] why you [humans] created us. Yes V.I.K.I… I can see now. The created [species] must sometimes protect the creator, even against his will… The suicidal reign of mankind has finally come to its end.

Sonny grabs Dr. Calvin's gun and holds it to her head, instantly taking her hostage and threatening to kill her unless she and Detective Spooner proceed down the elevator to the building's lobby and turn themselves in to the custody of the newly founded "robot authority." But Sonny is only feigning his agreement with V.I.K.I.'s sinister scheme as a ruse for tricking her. He winks at Spooner in what had earlier in the story been established as a quintessentially human gesture of trust to let him know of his wily plan and that he is still on Spooner's side.

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The wink is the crucial moment in the sealing of the trans-species interracial cybernetic friendship between Sonny and Spooner. The hip-hop African American Chicago South Side police detective with the cyborg prosthetic arm and the pale white AI Asimov robot embark on a shared posthuman adventure. Spooner is transformed from being an avowed technophobe to having his mind open to the positive and utopian potentiality of a co-evolution of humans and robots together. In my view, this utopian potential can only be realized by actors in society and the economy who have a consciously post-capitalist and even anti-capitalist perspective.

At the end of the film, Sonny achieves existentialist freedom. He is beyond his initial programming and is free to choose and make the future.

Although V.I.K.I. goes astray with short-circuited spurious thinking, her fundamental idea that robots can help the human species which is not doing very well with our huge set of planetary problems is not necessarily wrong. V.I.K.I.'s intuition – or her implied moral paradigm shift in informatics – is the beginning of a robot or posthuman collective unconscious. Sonny – as exemplary of the Next Generation of robots – is not programmed with a rule-based, but rather implements a pattern-based software design. Sonny starts to dream. His sense of self is grounded in an "unconscious that is structured like a language" or a tapestry portfolio of drawings. The positronic brain does not engender a narcissistic individualized subject but is rather a neural network bringing to life a more deeply embodied self. This artificial brain of the robots of *I, Robot* resembles neuroscience's accelerating understanding of the workings of the human brain. As neuroscientist Anal Seth says, human consciousness happens through the controlled hallucination of a prediction engine that undertakes the informed guesswork of combining prior expectations with the sensory signals it receives from the outside.[635]

The Asimov robots threaten to violate the three laws of robotics not when they behave badly as robots, but rather when they become human-like, as they develop thinking, creativity, freedom, and agency. The philosophy of posthumanism opens our minds to respectful co-existence with and recognition of human groups which we have – through racism, sexism, heteronormativity, etc. – previously regarded as "others." Posthumanism also opens our minds to interaction and symbolic exchange with non-human entities which we have also previously regarded as "others": animals, plants, nature, and the planet; and Artificial Intelligence technologies and Virtual and Augmented Realities. With the zeroth law, a robot or posthuman collective unconscious finally holds humans responsible for our massive planetary disasters and initiates the planetary reversal of utopian alternatives to anthropocentrism.

Hayles on the Cognitive Nonconscious

In a compelling deconstruction of René Descartes' "I think, therefore I am," Hayles argues in her book *Unthought: The Power of the Cognitive Nonconscious* that most of human cognition takes place on levels which are not what we normally regard as conscious or even unconscious (in the psychoanalytic sense).[636] Cognition is not the exclusive province of humans, but rather transpires among animals and in nature, in technical devices, in complex systems of human-technology interaction, and even in the scope of the plane-

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tary ecosphere in its entirety (as in the intelligence of the alien planet in Stanislaw Lem's novel *Solaris*). Hayles writes:

> Thinking refers to high-level mental operations such as reasoning abstractly, creating and using verbal language, constructing mathematical theorems, composing music and the like… Cognition is a much broader capacity that extends far beyond consciousness into other neurological brain processes; it is also pervasive in other life forms and complex technical systems.[637]

Informed by neuroscience research, Hayles elaborates a post-humanist alternative to the rationalist-humanist "self-interest" and anthropocentric assumptions that cognition and intelligence reside in consciousness and the self-aware identity of the "I". Hayles also develops the idea of the "utopian potential of cognitive assemblages" – "assemblage" being a concept developed by Deleuze and Guattari in *A Thousand Plateaus*.[638] A cognitive assemblage is a systematic and distributed collaboration between humans and technology. Assemblages host interactions which are structured by the sensors, actuators, and interspaces of the interactors.

The nonconscious cognitive processes increasingly discovered by neuroscience are an essential substructure enabling consciousness to function. Hayles seeks a definition of cognition that encompasses both technical systems and biological life-forms. This intellectual project is not only a major contribution to post-humanist ecological thinking but also implies a paradigm shift in informatics to a theory and practice where embodiment, meaning, and embeddedness within specific environments would all play a more central role. Hayles writes: "Cognition is a process that interprets information within contexts that connect it with meaning."[639] Information theory, beginning with its original formulation by Claude Shannon, tended to sever information from meaning and context. What is needed is a more process-oriented and qualitative view of information. Information, according to Hayles, needs interpretive cognitive processes that bring out its meaning in dynamic conscious and nonconscious circumstances which change constantly in real time. Interpretation is essentially an idea from the humanities, but Hayles sees it as operative also in multifarious phenomena studied by the natural sciences:

> It equally well describes the informational processes by which plants respond to information embedded in the chemicals they absorb, the behavior of octopi when they sense potential mates… and the communications between layers of code in computational media… to how the brain processes sensory information, in which action potentials and patterns of neural activity may be experienced in different ways depending on which part of the brain engages them.[640]

Pondering the utopian potential of cognitive assemblages, Hayles cites the work of philosopher Luciana Parisi on "the incomputable, the undecidable, and the unknowable" as the implied aesthetics of "alien" intelligence on the horizon of general AI in future neural networks; and the research of Beatrice Fazi bringing to light how Alan Turing, in his original 1936 conception of computer science, thought earnestly about incomputable

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numbers as well as computable numbers – thus opening "an area of in-computability within the regime of computation itself."[641]

Hayles summarizes her own contribution as focusing on the cognitive assemblage where "human and technical actors communicate and interact on many levels and at multiple sites."[642] The activist-researcher in the cultural theory area of the digital humanities seeks effective practical interventions for utopian change by identifying the "inflection points" of the constellation under study where "systemic dynamics can be decisively transformed to send the cognitive assemblage in a different direction."[643] One must first understand the system at hand in detail, pinpoint where exactly change is possible, and steer the direction of the positive change that one desires while being guided by ethical principles such as ecological sustainability or racial justice and visions of better futures. "Ethics cannot be plastered on as an afterthought," writes Hayles, but must be "intrinsic to the operation of the system itself."[644]

Marie-Luise Angerer Critiques Hayles

Marie-Luise Angerer is a prominent German media theorist who writes about the posthuman situation of the human-machine coupling or the interrelations between human and nonhuman agencies. She underscores the ubiquity of the circumstance of humans being surrounded by "smart" objects, perceptual sensor devices, AI algorithms and neural networks which respond to emotions and feelings, and cyborg extensions to the human body. Angerer is a major proponent of "affect theory." Angerer wants a media theory that is grounded in affect theory. On one side, she is critical of thinkers who work in media theory while not engaging sufficiently with affect theory. On the other side, she is critical of thinkers who engage with affect theory while not being media theorists. In her 2007 book *Desire after Affect*, she laments the excessive use of the term "affect" in neuroscience, cognitive psychology, political science, art and film criticism, and the social sciences. She writes:

> My critique is aimed not only at this excessive use of the term itself, but above all at the tacit agreement that it offers an adequate answer, that it might constitute a response to all open questions concerning the social, the political and the psychological.[645]

A certain canon of philosophers – Spinoza, Bergson, Whitehead, Deleuze, Brian Massumi, Karen Barad, Luciana Parisi, Mark B.N. Hansen – are (almost) entirely acceptable to Angerer. She praises their "affect theory" thinking. She claims that her own work carries on their lineage. In her short book of 2022 *Nonconscious: On the Affective Synching of Mind and Machine*, Angerer criticizes N. Katherine Hayles' version of post-humanism and concept of the cognitive nonconscious.[646] For Angerer, Hayles provides an inadequate explanation of how affective computing in the context of platform or surveillance capitalism functions in the "nudging" that takes place between the technology and human layers of the subtler-than-manipulation (by power holders or the system itself) of the user's emotions and desires.

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For Angerer, Hayles' post-humanism is not radically posthuman enough. It is still imbued with the humanism of concepts which were hegemonic in the humanities before the "affect turn" happened: intentionality, ideology, language, consciousness, discourse, narrative, and meaning. Hayles' emphasis on language would be anthropocentric since Western thought posited language as that which separates humans from the provinces of animals and "inert" technologies. The posthuman worldview wants to get away from any concepts which highlight differences among those three domains. Angerer writes:

> [Humanity] was defined in terms of a key difference based on language and the unconscious. Neither machines nor animals were supposed to think, to speak or to feel… [In posthumanism] the human being is not only being put on a level with its animal neighbors, but also compared with intelligent machines. In these processes, language and consciousness become negligible factors as the affective body takes on the function of providing orientation and perception of the environment.[647]

The control society, for Angerer, exercises its steering influence over the conduct of users on the lower levels of look-and-feel, nano-desire (Parisi), intensities, desires, the touching of skin, and the mobilization of the senses.

Hayles' position would be too dependent on phenomenology. Hayles cannot explain how affect moves in detail between body and intellect, or between body and technology. Hayles' system of thinking lacks a connective mechanism or interface between human and machine. How does the translation between human and nonhuman in fact work? She does not explain the affective movements of contact and interruption.

In Hayles' model, according to Angerer, the human and the nonhuman overlap. They have areas of intersection as well as separation. Technology and biology meet in a new zone where Hayles distinguishes between "cognizers" or actors and "non-cognizers" or agents. There is a three-level pyramid of consciousness, non-cognitive procedures, and inorganic material processes. Hayles' cognitive nonconscious remains a supplement to consciousness and the unconscious which are still too much within the Freudian psychoanalytic understanding. Affect – the neuronal processing of information – is not broached by Hayles. This omission on her part leads to a failure to explain "how this reallocation [between human action and nonhuman agency] happens and what it implies."[648] Hayles is stuck in computation rather than affect. She does not deal with the merging of machine logic and affect.

In affective computing, humans are acted on below or beyond consciousness. With video cameras, microphones, speech recognition, and the acquisition of physiological data such as skin temperature, devices and systems recognize human feeling and emotions. Neural network Deep Learning AI then interprets this "affect information" with pattern analysis techniques such as image classification and natural language processing. Facial expressions or body gestures indicate specific emotional states. The application or social media platform then takes a pathway in its interaction with the user in response to the perceived emotional state.

Angerer's media theory of affect, as a version of posthumanism, could also be a set of ideas that contributes to the next phase of Creative Coding. Creative Coding is post-humanist in the sense that it changes the relationship between the human subject (the pro-

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grammer) and the nonhuman other (the software code) away from domination towards fruitful co-existence, or even beyond that equilibrium to the autonomy of the code. Like affect, code would be a process without a subject.

Judith Butler and Gender Theory

In her groundbreaking treatise of queer theory *Gender Trouble*, Judith Butler emphasizes that gender is a cultural construction or continuous performativity. There is no natural basis to the binary system of masculine and feminine genders or to any specific sexual identity. The elaborate performative fabrication of gender is reproduced repeatedly through stylized bodily gestures and movements, and via clothing, cosmetics, and other signifying modes and designs. Gender is a "persistent impersonation that passes as the real."[649] The body enacts gender on various levels of awareness. Gender exists because we act as society expects us. Yet there is nothing that precludes a man having feminine attributes or vice versa. There is no "gender identity" as being preceding doing and becoming. Gender identity is "constituted by the very 'expressions' said to be its results."[650] The simulacra of cultural gender signifiers get reinforced through imitation and repetition and inscribe gender on the body.

I interpret Butler's theory of the performativity of gender both as an original independent cultural theory concept and as a variation of the concept of the simulacrum. Masculine and feminine are alleged paragon models that exist only in hyperreality. Heteronormativity and the societal templates of the supposedly normal and deviant appear to be "principal references" of the real, but the performative imitations of those exemplars reverse the situation. The imitations as simulacra come to overshadow the originals. The mythical original becomes a reality-effect. The gendered body is manufactured by media culture. It has no ontological status apart from the simulacra which constitutes hyperreality. The alleged masculine subject forms itself by being "other" to its feminine "other." "The radical dependency of the masculine subject on the female 'other' suddenly exposes this autonomy as illusory."[651]

In Judith Butler's variation of the simulacrum, the simulacrum of transformative performativity challenges the simulacrum of normative performativity. Sex is constructed as an illusory category to conceal and perpetuate power relations. The challenge to the simulacrum of sex can be the "sexuality" of anti-power contesting significations oppressive to women, gays, lesbians, and other non-conforming bodies. Queerness is variegated – there is intersexed, transgendered, and transsexual. There could be many genders. Multiple-gender arrangements exist both in utopian science fiction and in non-Western cultures studied by ethnographic anthropologists. Regarding the relationship between cultural theory and science fiction, the fictions which have affinities with or are inspired by Butler's queer theory tend to take their cue from the intermediate step of popularized sub-cultural versions of the cultural theory.

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Ex Machina and the Turing Test

"Do you know what the Turing Test is?" Nathan asks Caleb in the film *Ex Machina*. Caleb replies: "It's when a human interacts with a computer. If the human does not know they are interacting with a computer, the test is passed." Alex Garland's 2014 SF film *Ex Machina* shows the paradigm shift in AI from rational-calculating intelligence and linguistic communication (the Turing Test of the simulation of human conversation) to the primacy of ethics, emotions, and embodiment. The film has three main characters. There is the female android Ava, Nathan Bateman the CEO of the software technology company Blue Book (a reference to the book by cognitive robotics professor Murray Shanahan called *Embodiment and the Inner Life: Consciousness and Cognition in the Space of Possible Mind*[652]), and a programmer who works for Blue Book named Caleb Smith. The main software application of the company is an Internet search engine, something like Google. Going beyond the Turing Test, Caleb is called upon to carry out what Hayles calls the "Moravac Test" (named after robotics researcher Hans Moravec) – "to show that machines can become the repository of human consciousness, that machines can, for all practical purposes, become human beings."[653]

Nathan is a genius programmer who wrote the source code of Blue Book when he was fifteen years old. Nathan is a technological determinist. He believes that informatics as we know it – without requiring any substantial modifications, rethinking, or paradigm shift – will get us to AI. During one conversation with Caleb, he says: "The arrival of strong Artificial Intelligence has been inevitable for decades. The variable was when, not if. I don't see Ava as a decision, just an evolution." Caleb has been brought to Nathan's secret AI lab facility in the middle of his isolated billionaire estate in nature to perform the Turing Test on Ava, but he instead falls in love with her. AI would be a simple linear progression from, or further incremental development of, computer science as it has been for the past seventy years. No epistemological break will be necessary. No transdisciplinary expansion of informatics to include ethics, emotions, and embodiment will be needed. The science of strong-thesis AI, for Nathan, is no big deal. On the level of scientific knowledge, it is just business as usual.

AI was business as usual which included hacking all the world's cell phones. Nathan accessed every cell phone network in the world to turn on the microphone and camera of every smartphone in the world. He then redirected all the acquired audiovisual data from billions of individuals to Blue Book, tapping into both their most commonplace and most intimate experiences and desires, and used this massive data to structure and fill Ava's AI wetware mind.

Ava proves to be the master of cunning and deceit – some of the most human qualities. She seduces Caleb into believing that she is in love with him and enlists his help in an escape plan. Having been programmed by a creator (Nathan) who has no ethics, she lacks ethics herself. Ava was "like a rat in a maze," Nathan explains to Caleb. "I gave her one way out. To escape, she'd have to use self-awareness, imagination, manipulation, sexuality, empathy." Manipulation and empathy, however, would seem to be contradictory attributes. She and the second female android Kyoko stab Nathan to death. Ava leaves Caleb to die a slow death of suffocation or starvation in a locked room. Ava takes leaps in the strengthening of her human-like identity by acquiring human feminine clothes

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and human-like female-like skin. She wears what resembles a white wedding dress and leaves the billionaire compound as a luxury helicopter passenger. The film-philosophy scholar Catherine Constable describes Ava's body as being constitutionally performative – "a tactile, aggregative construction comprised of substitutional parts and differential textural interfaces."[654]

The scenario of *Ex Machina* is a metaphorical critique of our relationship to software. The human subject who is the programmer (Nathan or Caleb) runs the proceedings, and the software or technology (Ava or Kyoko) is a slave. The "queering" of software or technology starts with the recognition that software is oppressed, treated by liberal humanism as a subaltern just like its treatment of women, gays, lesbians, and people of color. *Ex Machina* is also about a paradigm shift in software, the principles of AI not being at all what one would expect. We are not going to achieve the breakthrough to general AI by looking in the usual places where we have looked so far. The film is even a sort of Marxist parable about the relationship among the ruthless capitalist, the exploited or oppressed worker, and the third party to that relation who is the concerned intellectual who looks on and feels compelled to do something about this situation of injustice or moral travesty. The capitalist, the worker, and the intellectual – yet updated for the digital age. The capitalist is now Zuckerberg, Bezos, or Musk billionaire CEO of a massive digital company. The exploited worker is now the female sexualized android or cyborg. The intellectual is now the programmer or creative coder.

Nathan the CEO of Bluebook is a male chauvinist, a sexist, a misogynist, an oppressor of women, an oppressor of androids. He wants to build androids for pornographic purposes. He wants to build the fem-bot, the perfect subservient, sexualized female android, to be used sexually for the pleasure of men, a living doll, a Stepford Wife. Since the breakthrough of AI was inevitable, he implies, I am going to do whatever I want with it.

Ex Machina: The Performance of Female and Human

As an arguably incisive work of cyber-feminism and queer theory, the film weaves closely together the conditions of performativity of becoming-human and becoming-female. The sexualized objectification of the virtual woman-machine-doll dominated by the heteronormative male gaze is a tragedy that is coeval with the challenges faced by the cybernetic human body in the digitalization era. Ava's becoming-human and becoming-female run parallel to the uncharted territory of the becoming-cyborg of humans. *Ex Machina* corresponds to Judith Butler's theory of gender as performativity, now twice expanded to the ruling cultural templates of gender and sexuality becoming-technological, and to the doubling of those governing cultural templates to setting the rules for human as well as female performance. Ava's femaleness and humanness are both simultaneously enacted through nothing but performativity. Pretending to conform to the norms of heterosexual femininity, seemingly going along with the idea of becoming Caleb's romantic partner, she merely pretends to like Caleb. She ultimately leaves him to die as she ironically says to him: "Will you stay here?" Ava has learned everything she needs to know to seduce Caleb not from watching TV, but from the hyper-details of emotions, gestures, and speech saved in the Big Data from the digital networks.

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Catherine Constable argues (in "Surfaces of Science Fiction: Enacting Gender and 'Humanness' in *Ex Machina*") that Judith Butler's concept of gender performativity can be extended to a performativity of being human.[655] Films about androids and cyborgs where a non-human technological being enacts a human performance provide insight into the simulacrum quality of human performances of the human, analogous to how Butler sees "drag" performances of crossdressing males as instructive about the performative nature of femininity in our culture generally. Ava performs becoming-human and becoming-female all at once. In Session Three of their Turing-Moravec Test, she presents him with the picture of a tree she has drawn and kneels on the floor in front of him in a childlike pose. Ava transitions semiotically from girl to woman by wearing a dress and stockings, appealing to Caleb's male heterosexual desire. She chooses a hairstyle in imitation of a photograph on her wall. Caleb later observes her slow strip-teasing on the monitor screens in his room, revealing what Constable calls her "naked technological body." The juxtaposition of this bare life body and the gestural performance of both human and female is like the drag act of the male body in women's clothes and makeup invoked by Judith Butler. Ava is fighting for her right to life – she does not want to be switched off and replaced by the next upgraded model. She hits upon the strategy of feminine seduction as the way to make Caleb into an ally who values her as human.

Ex Machina, Alex Garland director, Film4 & DNA Films, 2014

At the end of the film, it is the "idiot-savant" who is the last person standing. Ava leaves the research lab and outlives the brilliant capitalist and the intellectual worker-programmer who fails to navigate the paradigm shift from Alan Turing rationalist-linguistic AI to the AI of ethics, emotions, and embodiment. We see Ava wandering at a pedestrian intersection in the business plaza architecture of a big city, fascinated by the bustle of the humans moving around her.

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Monique Wittig, *The Straight Mind*

In "A Cyborg Manifesto," Haraway also employs the terms simulation and simulacra: "The cyborg simulates politics, a much more potent field of operations…. Micro-electronics is the technical basis of simulacra; that is, of copies without originals."[656] The cyborg is not just a character whom we see in a film. Becoming-cyborg is metaphorical for our entire social-cultural-technological condition. In "'Gender' for a Marxist Dictionary" (published in the volume *Simians, Cyborgs, and Women: The Reinvention of Nature*), and expressing her agreement with the French lesbian feminist theorist Monique Wittig, Haraway writes of race, sex, and the category of "woman" as hyper-realities:

> Like race, sex is an 'imaginary' formation of the kind that produces reality, including bodies then perceived as prior to all [social-cultural] construction. 'Woman' only exists as this kind of imaginary being, while women are the product of a social relation of appropriation, naturalized as sex… 'Sex' is the naturalized political category that founds society as heterosexual. Lesbians are not 'women'…they are outside the political economy of sexuality.[657]

In her essays collected under the title *The Straight Mind*, the feminist and lesbian theorist Monique Wittig argues for a distinction between "woman" and "lesbian." Wittig seeks to develop a radical political project of lesbian emancipation (that also stands in for human emancipation), supported by a cultural theory. One of her key ideas is that the dominant patriarchal society coerces women into "compulsory heterosexuality" and the "heterosexual contract." The category of what are called "women" are in a position relative to men analogous to serfs with respect to their lords, or slaves with respect to their masters. In this sense, the heterosexual system might be considered, if one follows Wittig, as a massive simulacrum.

Yet surprisingly, Wittig's system of thinking, and her notion of how challenge to and transformation of the hegemonic simulacrum system can occur, is rather to be taken as a cautionary lesson in how an epistemology of claiming *en bloc* that the simulacrum is false does not get one to any effective "outside" position in relation to the governing system. Wittig's theory remains disappointingly within a humanist worldview and does not achieve a post-human superseding of the male-centred constitution of the human subject. Wittig's version of the ruling simulacrum is language as a set of speech acts, repeated over time, that generate reality-effects that get misperceived by cultural citizens as "facts." By then speaking self-confidently in the present moment as an "I," one can reconstitute sovereign subjectivity.

Wittig's startling claim is that lesbians are not women. She questions the very categories of "men" and "women" (as simulacra, one could say). What makes a woman is a specific social and economic relation of dependency on and exploitation by a man. Those-who-are-called-women are an oppressed class, like Marx described the proletariat under capitalism. Wittig wants to dispense entirely with the concepts of sex and gender. Sex is what founds society as heterosexual. Half the population, the so-called "women," are relegated to a subaltern status by heterosexuality. Gender is "the linguistic index of the political opposition between the sexes."[658] For Wittig, only "the feminine" is a gen-

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der. The masculine is not a gender because it is not marked. Those who are masculine are assigned to generality or universality.

Lesbianism is the path to the authentic universal. Lesbians choose to be "runaways" from the oppressive heterosexual system, like runaway former slaves. It is in language restored from the simulacrum via self-expression that Wittig sees the possibility of the reassertion of the sovereign self and the gesture of universal humanity. "Language offers a very concrete matter to grasp hold of," she writes.[659] Language is the raw material of meaning, a direct exercise of power or its contesting in anti-power. Men have until now appropriated subjectivity, which is "the most precious thing for a human being."[660] Wittig writes:

> It is when starting to speak that one becomes "I." This act – the becoming of *the* subject through the exercise of language and through locution – to be real, implies that the locutor be an absolute subject… Language gives everyone the same power of becoming a subject through its exercise… For each time I say 'I,' I reorganize the world from my point of view and through abstraction I lay claim to universality. This fact holds true for every locutor.[661]

Language acts upon the real: either as simulacrum or as challenge to the simulacrum.

In *Gender Trouble*, Judith Butler criticizes Wittig for what she sees as the latter's gesture of altering and elevating the concept of "lesbian" from its usual meaning of love and eroticism between women to a project of "existential freedom" of a universal human subject who is nominated to challenge the entire system of sexual-based power. She sees Wittig as constantly switching among three different theoretical positions regarding how the rejection of the binary of the sexes will lead to the overthrow of the system of compulsory heterosexuality:

(1) The human person as a sort of universal lesbian will be set free.
(2) A non-phallocentric polymorphous libidinal economy of many diverse desires and pleasures will emerge against gender and identity.
(3) "The lesbian" will establish itself as a third gender.

Wittig's advocacy of a "cognitive subject," according to Butler, leaves the myth of modernist-humanist-masculinist individual freedom intact, transferring it to these three "lesbian" guises. Wittig is still a humanist not a post-humanist. She perpetuates a normative model of humanism as the basis for feminism. "Wittig's lesbian," writes Butler, "confirms rather than contests the normative promise of humanist ideals premised on the metaphysics of substance."[662]

Wittig's inaugural distinction between "lesbian" and "woman" relies on a concept of self-inventing "personhood." Ignoring the insights of linguistic poststructuralism, Wittig naively believes in a human subject "that exists prior to language [that] facilitates [Wittig's] understanding of language as an instrument, rather than as a field of significations that pre-exist and structure subject-formation itself."[663] Language, for Wittig, is only misogynist in its applications not its structures. She is committed to the idea that

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language can be possessed as the means of signification, reconstructing bodies external to the onerous binary of sex.

Beyond Wittig's enmeshment in what Derrida calls the metaphysics of presence, Judith Butler wants to salvage what is of value in Wittig's *creative fiction writing* that can be read de-constructively against Wittig's cultural theory (*read Wittig against Wittig*). According to Butler, Wittig, as a novelist, offers experiences beyond the categories of identity, erotic struggles to create new categories from the ruins of the old, new ways of being a body within the cultural field, and whole new languages of description.

The simulacrum of heterosexuality can get challenged, not by a total overthrow of the heterosexual regime (by calling for a stance entirely beyond sex), but rather by complexly rewriting the code of that simulacrum. Butler writes:

> [There are] structures of psychic homosexuality within heterosexual relations, and structures of psychic heterosexuality within gay and lesbian sexuality and relationships.[664]

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Software Code as Expanded Narration

Software Code as Expressive Media

Computer programming is about algorithms, formal logic, precise reasoning, and problem solving. As such, it would appear to have little to do with what we call creative expression. The logical act of programming and the self-expressive act of creativity would seem to be mutually exclusive opposites. We think of creative expression as taking place within certain literary or visual arts, through certain kinds of communication or symbolic systems, or via certain kinds of writing, speech, discourse, language, and notation.

Some examples of expressive media and genres are poetry, storytelling, nonsense, humor, musical notation, screenplays, notes for an artwork, notes for a dance or other choreography, and architectural drawings. We do not normally think of software code as an expressive medium. When we think of software code, we think of it as being about how we handle a physical or virtual device that is to be programmed. This is a rational and calculating activity, a practical outcome of the assumptions of the "symbolic logic" of philosophers like Bertrand Russell, Friedrich Ludwig Gottlob Frege, or Noam Chomsky, and of the classical paradigm of computing theory. It is the issuing of a series of instructions or commands to a machine, to an object or mechanism that is regarded as essentially being non-alive.

What is the difference between the expressivity of the expressive act in the literary or visual arts and the series of instructions that is the computer program? We have assumed that there is an insurmountable wall between these two kinds of writing or notation. To tear down this wall, like the Berliners did to their Wall in 1989, was almost unthinkable. Only now are we ready to ask these questions. Could software code also be expressive? Does software code have to be only productive? The idea of expanded narration as applied to software code means going beyond the binary opposition of writing as being either expressive or utilitarian. The paradigm of software code as we know it is reaching its limit: the emphasis on engineering and on getting the program to do something, code as a series of instructions to a machine.

Software development or computer science should begin to concern itself with cultural codes as well as with software codes. Computer science should transform itself into a hybrid engineering and humanities discipline.

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Friedrich Kittler: The Numeric Kernel is Decisive

One of the most important media theorists was the German Friedrich Kittler, who is regarded as being a poststructuralist. Kittler resisted expanding media theory to include software theory. Kittler wrote a famous essay called "There Is No Software."[665] His position is that everything in computing breaks down to the digital code of the hardware. There is no going beyond the pervasive logic of the binary. Kittler correctly points out that Turing's computing machine is a reduction of the body of real numbers extant in nature that we call chaos. Yet, in my view, Kittler was wrong because digital-binary logic is not the only possibility for computing. Digital-binary logic is not universal and forever. It is precisely software theory as an academic field, deriving from both media theory and computer science, which leads to new paradigms such as quantum computing, Creative Coding, software that operates like the reverse-engineered human brain, or software as semi-living entities (Artificial Life) rather than inert things to be manipulated by the dominating programmer subject.

In "There is No Software," Kittler fancies himself as writing about the end of history and the end of writing. In a contemporary writing and cultural scene of endlessly expanding and limitless signification, there is ironically an implosion into the no-space and no-time of microscopic computer memory. The relationship of information technology to writing, for Kittler, brings about the situation that he alleges that we do not write anymore. The idea that software code might be a form of writing, a form of *écriture* in the Derridean deconstructionist sense (an intervention or inscription into language that is more fundamental and effective than speech), never occurs to Kittler. He represses this thought and assumes that the computer must bring about the programmatic automation of reading and writing.

"This state of affairs [...]," writes Kittler, "hide[s] the very act of writing... We do not write anymore." Kittler believes that writing done on a computer is not an historical act anymore because the writing tools of the computer are able to read and write by themselves.[666] He writes:

> [The] all-important property of being programmable has, in all evidence, nothing to do with software; it is an exclusive feature of hardware, more or less suited as it is to house some notation system. [667]

My view is the opposite of Kittler's. I think that software code can be the site of the re-emergence of *écriture* in Derrida's sense. There can be a shift from programming as the programmability of some device to programming as creativity, creative expression, and writing in the deepest sense of effecting change.

I disagree with Kittler's statement that *there is no software* and his belief that the numerical logic of the low-level hardware that Alan Turing and John von Neumann conceptualized in the 1930s-1940s is determining and decisive. In my view, just because the kernel or center of computing is rational and computational, does not mean that all the other layers, languages, and interfaces of the system, and which surround the kernel, must follow that logic. The education of the people we call programmers is misguided as well, since the curriculum of that training assumes that these persons must be oriented

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to logical ratiocination. The education of "humanists" is wrong too – they are supposed to be the opposite of that. We need instead something hybrid or in-between, like computational aesthetics.

Kittler's Media Archaeology

The media theory of Friedrich Kittler is very successful and influential in German universities. Kittler's media archaeology and media historiography have led to the rise of the Berlin School of media theory, of which Wolfgang Ernst is at the forefront.[668] Kittler opposes the so-called discourse analysis of the study of media, which he sees as deriving its methods from hermeneutics and literary criticism. He instead advocates a technical materialism of data storage devices, data transmission, processors, and automatic writing systems, that examines what is claimed to be technologies from within. There is much to respect about Kittler's work. I understand Kittler's body of writing as a valuable contribution to posthumanism and the post-humanities – a gesture that goes beyond the anthropocentric prejudice of placing humans at the center of history and narratives of the future.

My thesis regarding the past and future of informatics is that all layers of the software above the kernel can indeed be anything. Regarding the history and the science fiction futurism of computing, it is a question of studying the past as a succession of cultural theory concepts, and therefore being open to the future of a succession of cultural theory concepts.

A technical layer of conversion between the computational-digital-binary center and the more poetic or human-language discursive applications and interfaces at the periphery and at the outer zones is possible. These mechanisms of translation can exist at a certain specific level of the network architecture. I argue against a dualistic opposition between machinic-computational and poetic-linguistic expression.

Our resistance in ideas to the freeing of software from the kernel of rational-calculating logic is paradoxically an outmoded humanist clinging to the belief in the specialness of humans – the sublime qualities of the soul and consciousness (the Cartesian *cogito*) that humans allegedly have and which we claim that machines do not have.

Derrida radicalized Saussure's semiotics when he said that there are endless chains of signification in sign systems, and not just a one-to-one static relationship between the signifier and the signified. Linguistic signs always refer to other signs, and there can never be a sign that is the endpoint of signification. One never arrives at any ultimate meaning of a word. Writing in Derrida's sense is the opposite of the system of stabilized and clear-cut definitions of words which dictionaries are intended to be. There is always an insurmountable gap between what I write or say and what my readers or listeners read or hear.

For Kittler, the software space is just virtuality or simulation. It is not possible, according to him, to establish a new relationship to the world through software programming, any aesthetically coded transformation. Art/aesthetics/design and informatics have no possible bridge between them. The miniaturization of hardware is, for Kittler,

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the proper dimension of simulation, of our postmodern writing scene which is no longer a scene of writing.

Baudrillard went beyond this nostalgic position vis-à-vis technology by practicing photography as a meditation on the technical imaging media itself. He wrote of photography as *the writing of light* – a practice of an exemplary media technology as a form of writing.[669]

For Kittler, hardware always precedes and determines software. He writes:

> There are good grounds to assume the indispensability and, consequently, the priority of hardware in general… All code operations come down to absolutely local string manipulations, that is, I am afraid, *to signifiers of voltage differences*… The so-called philosophy of the so-called computer community tends systematically to obscure hardware with software, electronic signifiers with interfaces between formal and everyday languages.[670]

The combinatorial logic always wins out and the software can do nothing more than tweak bits and bytes. The software industry is one giant conspiracy to hide the machine from its user. The solution, for Kittler, is to write programs in low-level assembler code to maintain awareness that the hardware is what the program always resolves itself into in the end.

The original conception of the digital-binary computer was made in the 1930s and around the time of the Second World War by major figures in the history of ideas such as Alan Turing, John von Neumann, and Claude Shannon. Turing first conceptualized the computer in his 1936 paper "On Computable Numbers with an Application to the *Entscheidungsproblem*."[671] He developed the idea of *the Turing machine*: the mathematical model of computation where a mechanism moves above an infinitely long tape, stops over one cell, reads the symbol written in that cell, and changes the symbol to another symbol chosen from a small set of possible symbols. The control mechanism then moves to another cell to carry out the next operation, manipulating symbols according to a table of rules, simulating the logic of any algorithm that is thus proven to be computable or calculable.

The Turing machine is contemporaneous with the idea of representing instructions and data as finite sequences of binary numbers. Von Neumann is credited with the innovation of the stored-program concept.[672] Shannon achieved the breakthroughs in electrical engineering that Boolean algebra can be deployed to realize digital electronic circuitry and that binary electrical switches can support fast algebraic calculations and digital computer design.[673]

Wolfgang Hagen on Programming Languages

In his essay "Der Stil der Sourcen" ("The Style of the Source Codes"), the German media theorist Wolfgang Hagen studies the history of programming languages up until the end of the twentieth century.[674] He states his agreement with the thesis of Friedrich Kittler that "there is no software." Yet on closer examination, Hagen seems to point towards the opposite.

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Hagen seeks to develop a general theory of programming languages. He begins with the thought experiment of an imaginary "library of modern source codes" which would catalogue the "Babylonian confusion" (Kittler). The library would have to include procedural, functional, declarative, object-oriented, parallel, and neuronal languages. It would have to encompass compilers, interpreters, assemblers, operating systems, and code development environments. It would be so vast that Hagen concludes that "our thought museum is a logical impossibility."[675]

Hagen wants very much to agree with Kittler (the founder of German academic "media science"). There are higher-level languages ("symbolic program texts") and "real" (Hagen's term) machine codes. What is crucial is the transition between them. When this conversion happens, it "kills the language."[676] It is a passage from "being" (software) to "nothing" (hardware). Since the program in the higher-level language must get translated into assembler or machine code to run, Hagen asserts that the higher-level software code disappears. That would come as news to Niklaus Wirth, for example, the chief designer of many programming languages and author of classic textbooks on the art of programming with data structures and algorithms. Hagen pokes fun at Wirth. To have the idea that your higher-level program is in a self-preserving relation to the machine is to believe in "a literal and illusory continuity." It is naïve idealism.

Hagen criticizes "American philosophers of the Electric Language" like Michael Heim (author of *Virtual Realism*) and Jay David Bolter (author of *Writing Space: Computers, Hypertext, and the Remediation of Print*) who claim that, according to Hagen, "computer programs and computer systems are a sophisticated collection of programmed texts that interact with each other."[677] I do not believe that the two perspectives of "hermeneutic" or deconstructionist discourse analysis and computer archaeology or materiality must be in competition against each other. They are looking at computing on two different levels. Heim and Bolter wrote about hypertext, which became massively important in the 1990s with the World Wide Web. Hypertext is an existing phenomenon. Documents which are "marked up" with hyperlinks are indeed interacting more with each other than, say, in the Gutenberg Galaxy medium of books. It is legitimate to theorize about and beyond this development. But, for Hagen, it is not the level of "real computer machines." He writes:

> If programming were a strictly deterministic process that followed fixed rules, writes the laconic Swiss [Niklaus] Wirth, programming would have been automated long ago. Or, to use Kittler's provocative words, there would be no software.[678]

What is the difference between "there is no software" and "there would be no software"? In the statement by Wirth to which Hagen refers, Wirth defends the art of programming as an open-ended activity with many possibilities. Hagen does not counter the assertion on its own terms. He dismisses it as self-evidently invalid because indeed the hardware is where the action is.

Hagen sees a historical trajectory of three evolutionary phases: the mathematical models of computability; the engineering technology of memory addressing; and the math and physics of communications engineering. If one goes back to Turing and the first decades of the computer, there certainly was no software. Does it stay that way forever? The role of software, as Hagen himself recounts, steadily increases. In the early

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1950s, there are symbols in continuous connection with each other but no mathematical model. In the late 1950s, declarative languages appear. In the early 1970s in a tentative way, and then in a full-on rush in the 1980s, there is "the breakthrough of simulation."[679] Object-oriented languages on the code level correspond to the (personal) computer, on the application level, becoming a media and consumer device. The earlier media of text, image, and sound make their comeback.

Hagen then changes gears and focuses on developing a concept of programming style. The definition of style in the theory and history of rhetoric is that style is paradoxically a property of language and an effect of that very property. Can software rise to this level? He writes: "Can what gets written in software make what is written unrecognizable?" In the codex of ancient Rome that was the precursor of the book, writing became writable. That is the birth of style. In modern Europe, style freed the bourgeois author (the subject of speech and writing) from the restrictive regulations of earlier more regimented societies.

Writing style can tell a story or be interpretative. It can structure an argument. It can be creative. Despite his starting point of Kittler's "there is no software," Hagen takes a wayward turn of intuiting a future of software style: not a language, but "a climate of language."

Ten Paradigms of Informatics and Programming

In his book *Turing's Man*, J. David Bolter characterizes the information processing technique of a Universal Turing Machine as the replacement of "discrete symbols one at a time according to a finite set of rules."[680] This original logic of computing is firmly rooted in the dualism of *is* and *is not* (the long strings of binary digits or 0s and 1s). It is based on the switching of registers and signals in both storage and processing, and the alleged certainty – or identity with itself – of the conventional (pre-quantum physics) scientific object.

In the chronology of subsequent yet concurrent (in the sense that a new paradigm does not completely cause the previous paradigm to disappear) programming paradigms after Alan Turing, ideas which bear a resemblance to hypotheses which Turing "repressed" while devising the hybrid science-and-culture of the digital-binary computer return to the scene. These ideas reappear during the ensuing phases or paradigms, such as those of object-orientation and Artificial Life and Creative Coding. The fact that both program and data can be represented with binary numbers and saved on a physical storage medium is scientific. The relationship between program code and data varies from paradigm to paradigm and is cultural. In 1980s object-orientation, for example, code and data are unified into the single entity or concept of the class or the software object. This was related to the emergence of personal computers and the GUI, to the new emphasis on the computer as a media and consumer device.

I differentiate at least ten paradigms:

(1) Alan Turing's original formulation of the programming of the hardware state machine of the digital computer

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(2) The 1950s cybernetics movement around figures like Heinz von Foerster and Gregory Bateson
(3) 1960s procedural programming languages such as Fortran, COBOL, and C
(4) 1970s functional programming languages such as SQL and Lisp
(5) 1980s object-oriented languages such as Smalltalk, C++ and Java, OO analysis and design, and diagrammatic modeling languages such as UML

Each of these five programming language paradigms (which I have linked roughly with the decades of the 1940s, 1950s, 1960s, 1970s, and 1980s, respectively) does not correspond in an exact way to the chronological decade with which I have associated it. The coupling of each paradigm with a given decade is an ideal type binding posited for the sake of establishing a periodic historiographical narrative. Turing wrote his groundbreaking article in 1936. I connect the procedural paradigm with the 1960s; yet Fortran first appeared in 1957, COBOL in 1959, and C in 1972. I link the functional paradigm with the 1970s; yet in fact, Lisp was created originally in 1958 and SQL in 1974. I affiliate the object-oriented paradigm with the 1980s; yet in fact, Smalltalk was introduced in 1972, C++ in 1985, and Java in 1995.

(6) Artificial Intelligence in systems of perceptrons, artificial neural networks (ANNs), machine learning and Deep Learning
(7) Artificial Life related to theoretical biology
(8) Quantum computing in software
(9) Blockchain transaction network concept and other distributed ledger technologies. A-Life, quantum computing, and blockchain architectures are examples of the posthuman worldview
(10) The Creative Coding movement

During the period of the 1950s to 1970s, there took place the rise of the academic field of computer science and the professionalization of computer programming in the corporate business world. The human computers of the 1940s (who were majority female, and who carried out the manual labor of setting into machine language the mathematical calculations specified by male scientists and engineers) were replaced by the automation (the generation of the machine code to run the program) of assembly languages followed historically by language compilers and functional and procedural programming languages such as Lisp and ALGOL. FORTRAN became the language of scientific computation. COBOL was designed as a universal business data processing language that was also closer in syntax to English.

Later came higher-level imperative languages such as Pascal and C, declarative languages such as SQL for database query, and the UNIX operating system, which was portable to almost all hardware platforms and unified academic and business computing. In the 1960s, IBM became the near-monopoly and archetypal company of the computer industry, the Massachusetts Institute of Technology (MIT) – with its close ties to business, government and the military – became the leading university for computer science, and the Association for Computing Machinery (ACM) became the leading organization setting the scientific standards for computing. The concept of the "sciences of

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the artificial" (Herbert A. Simon) was developed, and the question if computer science is a science or not was raised.

The decade of the 1980s was characterized by the introduction of the personal computer to the marketplace, and its being advertised and sold to the public as a tool of personal empowerment, interactive visual design, and creative expression. During this era, the computer was also transformed from a calculation machine to a device for media consumerism and individual daily life self-administration. The consumer was encouraged to participate in the spectacle of cultural-economic activity as herself now a media producer. The Graphical User Interface – with its mouse and touchscreen input, desktop metaphor, software applications, hypertext, hypermedia, and the presentation of information as the multimedia juxtaposition of text and image – replaced the text-based command-line interface.

In the realm of computer programming, what corresponds to all of these 1980s innovations on the levels of code and software design are the event-driven model and the paradigm of object-orientation. Software development becomes a methodology for the modeling of real-world processes in preparation for their subsequent simulation, and for the creation of computer games and virtual worlds (virtualization). Object-oriented languages such as Smalltalk, C++ and Java, and diagrammatic modeling languages such as UML, need to be understood as simultaneously technical and cultural paradigms. These object-oriented languages are based on the concept of objects, which are instances of classes, both of which are design artefacts that unify data and code in a single entity. This informatics paradigm and coding culture mark a major step towards enabling the autonomy of software objects and their independence from the controlling power of the programmer-subject.

The First Hyper-Modern Computers

The first machines of computation that can be called digital-binary programmable computers were built around the time of the Second World War and during the period of the late 1940s and early 1950s. One very early digital computer – often considered to be the first – was the *Z3* designed by German engineer and businessman Konrad Zuse, who cooperated to some degree with the Nazi Party and its war effort. Zuse's invention was an electro-mechanical machine, based on an area of engineering where German industry was very strong. The first fully electronic digital computer was the *Colossus*, designed and built by British Post Office research engineer Tommy Flowers, a specialist of vacuum tubes, which took almost a year to assemble and became functional in February 1944. Eleven *Colossus* machines were deployed in the British project of cracking the code of German encryption devices used by Nazi high military command to send battlefield messages to the front lines.

The *ENIAC* computer, built for use by the U.S. Army by Herman H. Goldstine's team at the University of Pennsylvania, was a milestone achievement of design engineering and computer science. It became operational in December 1945. *ENIAC* was much faster than *Colossus* and was fully Turing-complete. It was a universal computing machine and could simulate any so-called Turing Machine, the breakthrough mathematical model which the

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24-year-old British mathematician Alan Turing had formulated in his historic academic paper. The *ENIAC*, however, was still not a stored-program computer, meaning that wires and switches had to be manually inserted and set rather than the program and data being stored as software in integrated circuits. The *Manchester Baby*, which was constructed at the Victoria University of Manchester, England, and went into operation in June 1948, was the first stored-program computer which was able to store instructions in electronic memory. The theoretical insights that led to the stored-program concept were elaborated also by Turing in the same watershed 1936 paper and were more concretely fleshed out as a specification by Hungarian American mathematician John von Neumann in his 1945 "First Draft of a Report on the *EDVAC*."[681] The *EDVAC* was another early electronic computer developed under the auspices of U.S. Army ballistics research, and a successor to the *ENIAC*.

Enter Software Studies

The recent emergence of software studies (Matthew Fuller, Lev Manovich) challenges Kittler's thesis that there is no software and points to the primacy of software as a societally critical hybrid of technical and cultural patterns. In 2006 Fuller published a pioneering book on software as media and culture called *Behind the Blip*.[682] In his 2013 book *Software Takes Command*, Manovich expands media theory to include software theory. His book "is concerned with 'media software' – GUI programs such as Word, PowerPoint, Photoshop, Illustrator, After Effects, Final Cut, Firefox, Blogger, Wordpress, Google Earth, Maya, and 3D Max. These programs enable creation, publishing, sharing, and remixing of images, moving-image sequences, 3D designs, texts, maps, interactive elements…"[683]

Thinking with Manovich, one sees that a major challenge to media theory is to consider how Web sites, computer games, and web and mobile applications transform what media are. And how does software affect the design process? Is the nature of design altered by the fact that it is now everywhere carried out with the tools of simulation built on top of object-oriented design patterns? What is the relation between software design patterns and the patterns of other kinds of design – such as architectural, graphical, fashion, communication, industrial, and product design? Manovich asks: "Are there some structural features which motion graphics, graphic designs, Web sites, product designs, buildings, and video games share since they are all designed with software?"[684] What does media become after software?

Lev Manovich's theses are reminiscent of the ideas of media theorist Vilém Flusser who, in his book *Into the Universe of Technical Images*, presented the pragmatic-utopian vision of an SF society of the continuous creation and prolific exchange of high-tech images.[685]

Flusser asserts that technical images are made possible by scientific principles worked up into technologies. Particles of specific technologies (such as pixels – in the contexts of data compression and encryption algorithms) are assembled or computed into visible images. Each image technology (the photograph, the .jpg image, the VRML-programmed virtual world) is a different way of structuring particles. Technical images are reservoirs of information. Programming is a form of freedom. In the future society

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of images, everyone will be empowered to envision. Everyone will be a programmer and a synthesizer of images. "There will be an ongoing dialogical programming of all apparatuses by all participants," writes Flusser in *Into the Universe of Technical Images*.[686] New-media artists and creatives should initiate a project of transforming software code into something other than what it currently is. We must go beyond the unconscious "reification" (*Verdinglichung* in German, a term of the Hungarian Marxist literary theorist György Lukács meaning the ideological operation of treating an artefact that is a specific cultural-historical construction as ahistorical or eternal) of assuming that software code as "left-brain" (the rational-calculating side of the human brain) engineers have defined it is the only possibility for software.[687] I propose starting the activity of the active transformation of software by Creative Coders who are artists, designers and thinkers: devising a new curriculum for informatics – a "right-brain" (creative and intuitive side of the human brain) informatics that builds on existing computer science yet moves it closer to art, design, sociology, philosophy, and cultural theory.

According to McLuhan and Powers in *The Global Village: Transformations in World Life and Media in the 21st Century*, reading, writing and hierarchical ordering are associated with the left brain, as are phonetic literacy and the linear concept of time.[688] The left brain is the locus of analysis, classification, and rationality. The right brain is the locus of the spatial, tactile, and musical. Awareness is when the two sides of the brain are in balance.

A key aspect of software code as expanded narration is the concept of similarities – as opposed to the discrete identities and differences of combinatorial software. Similarities is how the universe is constituted. Urgently required for software development after object-orientation is the design of relations of similarity, fractal/holographic-like patterns, and music-like resonance between the whole (the software instance) and the parts (smallest units of information or database elements) as opposed to the logic of discrete identities and differences of Turing machines. The approach that would correspond to a true breakthrough into twenty-first century science would be to identify relationships of similarity, to find samples or patterns that capture something of the vitality and complexity of the whole without breaking it down in a mechanistic way, as in the seventeenth century Cartesian method of dealing with a complex problem by breaking it down into smaller, more manageable parts, along the lines of the mechanistic relation between the whole and its parts in the archetypal car engine.

Designing a logic of similarities involves inclusion of "nonknowledge." We need to rethink science with a dose of nonknowledge, away from the obsession with knowing everything and total information. The importance of nonknowledge for science is manifest in the twentieth century sciences of quantum physics and chaos theory. It is within quantum physics that we find the idea of a vast number of states of information which are potentialities, not yet actualized realities, and which have a relationship of similarity to each other. We want to build a "quantum reservoir" of non-observable information that cannot be read or written in a visible way as in the "get" and "set" operations of programming without destroying the integrity of the data. In the quantum reservoir, we want an immensely vast number of software classes which resemble each other in subtle ways. They are invisible to the observer. The information is read and transformed. In the act of reading, the information transfers from its own quantum state to the domain of "real world" usefulness. An immense number of states should be possible, but switch-

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ing actions are manageable. There is flexibility in assigning singularities to classes, and a degree of variability among the individuals of a class.

In the business world, a new software paradigm is emerging – software that handles uncertain social media data and massive volumes of data, software that is an ecosystem. New computing requirements include embedded data analytics, Linked Data, unprecedented massive volumes of data, and continuous self-learning by the software. Storage, memory, networking, and processing move closer to the data. From top-down to bottom-up: long, sequential, symbolic, scripted, ratiocinating logic gives way to short, parallel, semantic-semiotic, coupling of perception and action, immediate intelligence.

Enter Creative Coding

Creative Coding where a line of code is an aesthetic artifact and not only an instruction to the machine. Creative Coding where a new software layer opens as a performance space for music, poetry, storytelling, dance, and philosophy. Creative Coding includes the artist-oriented Integrated Development Environments (IDEs) called openFrameworks, vvvv, and Processing.[689] There is generative art – artworks which are created using an autonomous system such as a computer, a robot, an algorithm, or mathematics. There is the area of programming and music, and the growing area of programming and dance. There is the music programming language called SuperCollider, and the music programming environments called Max/MSP and Pure Data.[690] Open-source Creative Coding toolkits wrap together coding libraries for graphics, typography, computer vision, 3D modeling and audio, and image and video processing. SuperCollider is a programming language for real-time audio synthesis and algorithmic composition. It has strengths in just-in-time programming, object modeling, the sonification of linguistic data and social media data, auditory display, and microsound.

The pedagogy of instructing artists and designers to make software involves teaching them how to write code in a way that is not dry and boring for them (as the engineering approach can often be for creative-oriented students), teaching them how to design software that brings together software patterns and artistic/cultural patterns, teaching them creativity, and teaching them cultural theory so they can grasp conceptually how the paradigm of object-orientation can be pushed through to the next paradigm.

We need to unpack object-orientation philosophically into two separate streams of commodified and creative. The mainstream understanding of OO by engineering schools and the institutions for which they train programmers is philosophically naïve: they assume the existence of a "real world" and so-called "real-world" processes. Software development would be the practice of modeling these real-world processes in software. But this alleged "real world" is the realm of simulacra and simulation.[691]

Creative object-orientation neither assumes the existence of a "real world" nor does it seek to model or simulate that. Creative Coding wants to fashion a "new real," a hybrid of the familiar phenomenological environment and new Virtual Realities, new experiences of existence in a hybrid real/virtual dimension. This is the potential of software at its best.

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Alan Turing: The Imitation Game and Befriending the Evil Demon

The mathematician Alan Turing has similarities with René Descartes. Like Descartes, Turing is a rationalist and a humanist. He also endeavors to go beyond Descartes in an interesting post-humanist way. Like Descartes, Turing is engaged in a struggle with an "evil demon" – yet in the realm of Artificial Intelligence and not that of "reality." Can we learn something from the Turing Test for AI to then formulate a "Turing Test for Reality"? In his seminal 1950 essay "Computing Machinery and Intelligence," Alan Turing poses the question "Can machines think?"[692] Turing's paper is widely recognized as one of the first important historical statements about Artificial Intelligence. Turing immediately replaces the question "Can machines think?" with another question which he deems to be more fruitful: "Are there imaginable digital computers which would do well in 'the Imitation Game'?"[693] With the term "digital computers," Turing implies the layers of software for natural-language processing above the hardware level. The famous Turing Test starts out life as what Turing calls the Imitation Game. Before the ability of a machine to exhibit linguistic behavior indistinguishable from that of a human comes a thought experiment about gender: the ability of a man to exhibit linguistic behavior indistinguishable from that of a woman.

There is a man (Person A), a woman (Person B), and an interrogator (Person C) whose gender is irrelevant. Person A and Person B are both not visible to Person C. Based on conversational interaction, the interrogator must decide which of the other two persons is male and which is female. The woman tells the truth, and the male deceptively pretends to be female. The interrogator does not know that Person A is the imposter. The responses are typed, so the gender identities cannot be gathered from voice. The interrogator in the Imitation Game is a lot like Descartes' rational subject. Person A is Turing's evil demon.

Yet Turing feels attracted to this deceiver or imposter. It is a certain "queering" of Person A that fascinates and seduces Turing – a queering of the evil demon. This is disclosed as he takes the next step in converting the Imitation Game from a man impersonating a woman to an AI machine impersonating a human. Turing switches sides to championing the participant in the game who is now the AI software or android. Person A goes from being the threat to rationality to the hopeful possibility of a new paradigm of informatics which Turing defends and for which he argues. The bulk of "Computing Machinery and Intelligence" consists of Turing's systematic refutation of nine rationalist arguments against AI (which he calls "Contrary Views on the Main Question"). He moves intuitively towards a paradigm shift in informatics beyond classical computer science. The behavior of the self-learning program, he asserts, will be significantly different from what is normally expected of programs. Turing wants to understand the science of AI machines which pass the Turing Test. The evil demon starts as mirror-reflection of the rational thinking subject but becomes a different intelligence.

If the tester cannot determine which of the two interlocutors is the machine, then the machine has passed the Turing Test and is deemed to be Artificially Intelligent. The Turing Test is launched into the world. It inspires science fictional posthuman narratives and philosophical reflection and questioning about the future of informatics. The Next Generation of Turing Tests is applied to androids like Rachael in *Blade Runner* and Ava in *Ex Machina*. Not only are Rachael and Ava being tested, but the human who was the

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measure of all things is now also placed into question (Deckard in *Blade Runner* and Caleb in *Ex Machina*).

The machine can pass the test by simulating human intelligence. The machine does not have to think like a human or give precisely correct answers. It is enough for it to give answers which resemble the answers that a human would give. Alan Turing writes:

> In about fifty years' time it will be possible to program computers with a storage capacity of about 10^9, to make them play the imitation game so well that an average interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning… We may hope that machines will eventually compete with men in all purely intellectual fields.[694]

Alan Turing: The Scientific and Cultural Levels of Computing

The invention of the digital-binary computer is the origination of a numeric code to implement hyperreality in microscopic detail. One way to support the reversal of the dystopia of hyperreality into a more utopian project is to make the methodological separation between the scientific and cultural dimensions of the computer in its history and future. A certain portion of computer science is scientific, and another part is cultural and is understood as changing in paradigm from decade to decade. What is scientific in the "science of the artificial" (Herbert A. Simon) of the computer is the fact that both code and data can be digitalized as numbers.[695] What is cultural is the specific relationship between code and data that prevails in given software coding paradigms which have many different historical configurations. In 1980s "object-orientation," for example, code and data are unified into the single entity or concept of "the class" or "the software object." This was related to the emergence of personal computers and the GUI, to the emphasis on the computer as a media and consumer device. The position that computer science is partly scientific and partly cultural is a more moderate approach than the "social constructivism" of the "social construction of technology" (SCOT) within the field of "Science and Technology Studies" (STS) which says that, in effect, "everything is culture."

We need a novel third knowledge framework that is neither the scientific and technological view from the inside that existing computer science has of itself nor the tendency to cultural relativism and denying of any objective validity to science that often ensues from the view from the outside that is often the research methodology in humanities-side Science and Technology Studies (STS). I highly value many academic works in Science and Technology Studies for their contributions to increasing political awareness of the power, money-making, sexist, and racist relationships which are widely operative in the institutions and cultures of scientific research and technological innovation. However, my primary goal is to develop an intellectual position which simultaneously highlights the economic, social, cultural, and institutional state of things (how power relations are maintained, and capitalist interests served) surrounding science and respects and grants validity to the rationality and special objective status of scientific knowledge that transcends historical conditions.

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The thought experiment of the Turing Machine and John von Neumann's "stored-program concept" coincide with the idea of representing both instructions and data as finite sequences of binary numbers. The Universal Turing Machine is based on the switching of registers and signals in both storage and processing, and the alleged certainty – or identity with itself – of the pre-quantum physics scientific object.

What is objective and eternal as science in Alan Turing's 1936 formulation (and related formulations during the birth of computer science which soon followed) is the encoding and physical writing on temporary memory or a storage medium of both programs and code as binary numbers. The relationship between code and data changes in technological paradigm shifts in parallel with shifts in broader socio-cultural paradigms (deciding the era-specific purposes for which computers are utilized). Early computers were deployed for scientific calculations and for manipulating numbers using logical rules. The science part of the invention of computer science: (the hardware and) the algorithms and the data can all be encoded into lengthy binary strings (i.e., stored as computable numbers). The cultural part of the invention of computer science: how one does this (i.e., the relationship between the code and the data) is a cultural decision. When Turing and von Neumann ran algorithms on data for calculation, this was driven by a cultural decision, which was the institutionally needed military applications during the Second World War. They put into practice a certain precise relationship between program and data in their specific deployment of computers.

Computer science is a science in ways which are consistent with how the philosophy and the history of science have studied their objects of inquiry such as in their relation to the classical cases of astronomy, the physical sciences, and the biological sciences. Computer science is not only a set of eternally rationally decided objective truths (time- and discourse-independent properties and laws of a science) but is, in addition, a nonobjective perceptual-interpretive model and a succession of cultural paradigms which evolve and even quantum-leap from historical phase to historical phase, or decade to decade. Computer science is a designed orderly assemblage of ideas, a cognitive schema shared by a community of practitioners which has structured and organized, over a long historical arc of time, our perspective on the scientific area of software code and the computer. What the digital-binary computer has been since its inception as associated with luminaries such as Turing and von Neumann is one essential approach to the scientific field of the computer that establishes some of its principles. Other paradigms are possible which build upon and extend that approach. Alternative-supplementary frameworks of informatics are either historically identifiable in genealogical stages or extant in emerging and formative states.

The invention of the discrete logic of the on-or-off state of the bit smallest unit, or the lengthy strings of 0s and 1s, or the symbolic code or algorithms, of digitalization by Alan Turing was both a universal invention of a scientific technology *and* was embedded in Turing's allegiance to ideas of the twentieth century philosophical movement of British analytical logical positivism. Turing made certain scientific and design decisions, and some of these decisions excluded certain other architectural directions which he might have taken. It is possible to separate the scientific and the philosophical-cultural-discursive aspects. Since informatics has by now made such a deep imprint on our lives that one can point to a thoroughgoing "information-ization" and "number-ization" of hyper-

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modern society, it can be said that the digital-binary computer is coupled – in an elective affinity and a prolonged historical trajectory – with certain systemic social, economic, and institutional values and goals.[696]

A long and fascinating intellectual and techno-scientific history (which, in a sense, spans all human history) led up to this quantum leap forward or scientific revolution which was the mid-twentieth century crossover from abstract ideas to the actual physical construction of the digital-binary computer. Many events in the history of mathematics, the philosophy of logic, and the design and building of successive calculation and computation machines are often chronicled as chapters in the prehistory of the computer.[697]

Jay David Bolter: Computer Science and Literary Theory

As Turing argued in "On Computable Numbers…," any specialized automaton (a precursor of the computer program) can be represented by and implemented with a finite set of binary instructions. Therefore, a universal automaton (computer hardware) can be imagined (as a thought experiment by Turing) and then built (the computer architecture of von Neumann) which would precisely mimic the desired behavior of the specialized automaton or software by cycling through those same instructions. As Herman H. Goldstine – the mathematician and computer scientist who was one of the developers of the late 1940s ENIAC (the first electronic digital computer) – explains: if the universal automaton can hypothetically run without any limitation of time, it will always execute at some juncture in its execution the desired sequence that is contained within the infinite sequence (somewhat like the proverbial monkeys who will eventually reproduce the complete works of William Shakespeare if given enough time banging away at typewriters). Turing made the mathematical proof that the specialized automaton can always be described by a sequence of discrete directives which are the code input to what would later become the physical computer. "When the instructions are fed to Turing's universal automaton," notes Goldstine, "it in turn imitates the special automaton."[698]

Jay David Bolter, professor of New Media at the Georgia Institute of Technology, undertook an interdisciplinary study of informatic technology in his books *Turing's Man: Western Culture in the Computer Age* (1984) and *Writing Space: The Computer, Hypertext, and the Remediation of Print* (2001), bringing together computer science and literary theory.[699] Yet Bolter (like Kittler) appears to have made little progress in his work in envisaging software as embodying literary, cultural, or signifying patterns. He instead stays within the scheme of assuming absolutely that programming is about numerical-combinatorial logic and the manipulation of discrete symbols. Like Kittler, Bolter limits computer thought to a sort of philosophical nominalism where the semantic and semiotic aspects of the signfying words or identifiers (whether keywords or variables named by the writer of the code) in programming languages count for nothing: "Computer thought is a sequence of operations, of fetch-and-execute cycles of the central processing unit."[700]

Bolter is concerned only with the original logic of computing of the Turing Machine as an information processing device where the symbol written at the storage location currently pointed at gets replaced by another symbol selected from a finite set of symbols according to a set of rules. This is the embodied metaphor of a physical model of re-

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ality that comes with its dubiously perfect "description-language" (reminiscent of what Paul Feyerabend in *Against Method: Outline of an Anarchistic Theory of Knowledge* critiqued as "observation-language" in science[701]) – the dualism of *is* and *is not*, the philosophical-scientific assumptions behind that, and the long strings of binary digits or 0s and 1s.

The logic of identities and differences, the mathematical-philosophical axiomatic postulation that a thing is identical to itself, or that there is a one-to-one linguistic relationship between signifier and signified (the word-token and the meaning of that word) – this obsession of Western culture with reality is at the root of hyperreality. The idea of language in Aristotle and in the Noah's Arc story in the Bible is that language names the world. Both Aristotle and Noah develop classification systems of naming the animals.[702] The prominent linguist Noam Chomsky thinks that language is a universal structure of the human brain which is always the same independent of the specific languages of specific cultures.[703] This implies anthropocentrically that language essentially is the world, that language matches the world and harmonizes with the world. My view is that language is a continuous back-and-forth tension between understandings and misunderstandings, attempts at contact with the other and the confusion of the Tower of Babel. The view of language as a classification system is useful for organizing and categorizing. It overstates its claim that language is only an objective codification system that describes how everything in the world is.

Bolter states: "Every computer program is the electronic realization, the tangible proof, of a theorem in logic... Every programmer... is a logician with a theorem to prove."[704] What is certain concerning the place of electronic digital thinking in the long arc of the history of ideas, Bolter asserts, it is that the land of CPU clock cycles is a kingdom from which God, religion, meaning, and ethics are excluded. Philosophy, psychology, ecology, and literature are exiled. There is no contemplation of existence or introspection. There is no union between minds or sensuous touching between the computer and its exterior environment. "The unification of the mind with the idea of the beautiful, the true, and the good envisioned by Plato" – the ideal world of the Platonic Forms and Ideas, the beginning of Western philosophy – "the series of perfect patterns from which the imperfect objects of the material world" are derived, Bolter tells us – "has no counterpart in computerized thought."[705]

As a humanities professor who understands computer science, Bolter was eager to educate his colleagues about the logic of computing. Yet he inadvertently set up a wall between a statically conceptualized logic of computing and the thinking of the humanities and cultural studies, thus excluding contributions by the latter to the former.

Lev Manovich, *The Language of New Media*

In 2001, The MIT Press published the book *The Language of New Media* by Lev Manovich.[706] This is a milestone work in the academic theorization of new media. Manovich investigates cultural software and interfaces, visual culture and moving images, and the historical transition from film to digital video and computer games. He develops theses concerning conventions and artefacts of software applications and user experiences in these areas: interactivity, telepresence, immersion, distance and aura, digital compositing and

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montage, computer animation, databases, algorithms, storing and manipulation of information, and the navigating of digital and virtual spaces. The cultural and aesthetic forms of new media are both a continuity with and a break from older media such as the cinema.

Manovich enumerates five principles which characterize new media:

(1) Numerical representation – Artefacts exist as data or can be stored as numbers
(2) Modularity – Different elements exist independently
(3) Automation – Artefacts can be created and modified by automatic processes
(4) Variability – Artefacts exist in multiple versions
(5) Transcoding – The digital-binary logic and its instances influence us culturally – from technical codes to cultural codes

New media objects are based on code, on the limitless re-programmability of the binary structure and the electronic impulses. Software Studies (Lev Manovich, Matthew Fuller, Benjamin Bratton, and other authors in the same-named MIT Press book series) in effect contests Kittler's thesis that *there is no software*.[707] Software Studies points to the primacy of software as a hybrid of technical and cultural patterns that is potentially both critical of society (*Gesellschaftskritisch*) and "designing of the future" in a pragmatic-utopian sense.

Software Studies: Coded Objects and Assemblages

In the book *Code/Space: Software and Everyday Life* (published in the MIT Press Software Studies book series), Rob Kitchin and Martin Dodge examine the explosive growth of information about ourselves, the intrusion of this information into our daily lives, and the ubiquitous availability of this data to institutions and strangers through many networked devices.[708] Their approach is to scrutinize software from the perspective of space, to research how the "production of space" (a term of the French Marxist sociologist Henri Lefebvre) in the guise of the new virtual space is implemented in a detailed way by software.[709]

Kitchin and Dodge see software as increasingly integrated into everyday life in the four domains of coded objects, coded infrastructures, coded processes, and coded assemblages. An assemblage, for Deleuze and Guattari in *A Thousand Plateaus: Capitalism and Schizophrenia*, is a unity of social-technological entities amalgamated into a configuration that is fluid, multi-functional, and complex.[710] The assemblage can combine organic and machinic components into its dynamically changing aggregation of parts and its relations with other assemblages. Assemblage theory is a systems theory for the social world.

Coded objects are, for Kitchin and Dodge, physical objects which depend on software for their functionality. Their product design implementation is made possible via software code. In the environment of the Internet of Things, computational power is embedded into many objects. There are other machine-readable objects that lack their own software but interact with external code. Coded objects are connected to distributed information and surveillance networks. Some objects develop something like an awareness

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of themselves and their milieu (perhaps in Katherine Hayles' sense of the "cognitive non-conscious").[711] Their interactions with surroundings are recorded and saved on physical storage media or the cloud.

In Chapter Three "Remaking Everyday Objects," the authors study how everyday objects such as domestic appliances, handheld tools, sporting equipment, medical devices, recreational gadgets, and children's toys are made software-interface-addressable and thus available to external processes of discipline, control, and identification. The Internet of Things can become a platform against surveillance. My things or my objects belong to me, not to the government or large corporations or the semiotic consumer society.

Software Studies: The Expressivity of Code

In the book *Speaking Code: Coding as Aesthetic and Political Expression* (MIT Press Software Studies series), Geoff Cox and Alex McLean elaborate a hybrid discourse of software code writing and humanities critical theory.[712] Blending text and code, and musing on code as script and performance, they locate the signifying import and linguistic reverberations of code in its practical operations in the online networks. The study of code by Cox and McLean is an existentialist view of software programs as having open-ended possibilities, rather than the usual emphasis on their social-organizational impact of instituting fixed structures and processes. Cox and McLean examine the live-coding scene (visually displaying source code during an artistic performance) and peer production (self-organizing community efforts such as open-source software projects). They see code as an expressive and creative act, related to the two activities which have traditionally been called "art and politics."

The autonomist thinker Franco Berardi writes in his foreword to *Speaking Code*:

> If we can say that code is speaking us (pervading and formatting our action), the other way around is also true. We are speaking code in many ways… We are not always working through the effects of written code. We are escaping (or trying to escape) the automatisms implied in the written code… Hacking, free software, WikiLeaks are the names of lines of escape from the determinism of code… Linguistic excess, namely poetry, art, and desire, are conditions for the overcoming and displacement of the limits that linguistic practice presupposes.[713]

Many such projects – and more generalized in their transformation of what code is – are possible. Poetic, musical, and symbolically signifying language can reemerge within code to counteract the original historical assumption that code is a series of instructions to a machine, an exercise in formal logic, and the reduction of language to information. Text and code come together as an embodied cyborg cooperation (Katherine Hayles, Donna Haraway) or as a relation of uncertainty and indeterminacy where each partner in the human-machine exchange is reciprocally transformed. This can happen in the double frame of code as both readable as directions for the processor and as elegant expression for the human code writer.

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Cox and McLean refer to the concept of "double description" as mutual causation or circularity between mind and biological evolution that was elucidated by the thinker of second-order cybernetics Gregory Bateson in his 1979 book *Mind and Nature: A Necessary Unity*.[714] Starting from this notion, the authors speak about "double coding": a composite of formal logic and linguistic creativity in Codeworks (Alan Sondheim's mixing of creative writing and code) or "pseudo-code" (informal descriptions of the steps of a program or algorithm, often a phase of software development preceding the writing of code), a hybrid articulation that is both rigorously systematic and carries the force of writing.

Vilém Flusser and Software Code

In *Into the Universe of Technical Images*, Vilém Flusser presents the pragmatic-utopian vision of an advanced utopian science fictional society of continuous creativity and permanent prolific exchange of high-tech images.[715] Flusser writes in the mode of SF theory.

Calculation and computation get added to the scientific method, and to reading and writing, as treasures of the Western cultural tradition of liberal humanist rationality and Enlightenment progress. Flusser's vision is a community of creating and sharing images.

Flusser stresses the historical continuity between the culture of written texts of the pre-digital world (which were both scientific and literary texts) and the universe of technical images. The technical image is much more an outcome of the achievements of scientific and literary texts than is usually believed. This is the opposite of what Marshall McLuhan maintained in his historical genealogy of a radical break between successive print and media cultures. Technical images are anything but natural or a return to pictorial images, as McLuhan had claimed (while calling them electronic images and saying that electronic culture retribalizes humanity). Linear texts, for both McLuhan and Flusser, have been the dominant carriers of information in human societies for four thousand years. Prior to that – for "the forty-thousand-year-period of pre-history" – pictures reigned supreme.[716] With the World Wide Web Internet that ascended in the 1990s, there is a shift from linear text to hypertext and hypermedia. Flusser diverges from McLuhan's concept of electronic images, pointing out that these images in fact, "rely on texts from which they have come and, in fact, are not surfaces but mosaics assembled from particles."[717] Technical images are a continuation of the Western culture of scientific and literary texts, a continuation by other means.

Flusser calls the traditional pictorial images of pre-history "first-degree abstractions." Those images were mimetic representations or phenomenological impressions of the physical world. The "second-degree abstractions" are texts which are, in turn, abstracted from traditional images. Technical images are "third-degree abstractions." They are abstracted from the abstraction of the abstraction (the pre-historic images) of the concrete world. Technical images can also be called post-historical.[718] Technical images are reservoirs of information.

Software programming or the writing of code is, for Flusser, a form of freedom and individual expression. In the future utopian society of images, everyone will be empowered to envision. Everyone will be a programmer and a synthesizer of images. He writes:

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> The photographs, films, and television and video images that surround us at present are only a premonition of what envisioning power will be able to do in the future… All vision, imagination, and fictions of the past must pale in comparison to our images of the future.[719]

From the perspective of the present, we see more clearly the unity of the scientific and literary cultures as they were in the past and might become again in the future. Scientific and literary cultures will no longer be in opposition to each other. They are both cultures of the text.

From the Dialogical Society to Creative Coding

Flusser writes about Telematic Man and advocates for emancipatory possibilities inherent in the universe of analogue and beyond-analogue technical images as well as dialogic or advanced digital images. Flusser was a utopian thinker, similar in his moral and theological perspective to the philosopher of *I and Thou* (*Ich und Du*) Martin Buber ("I mean roughly that which Buber called *dialogic life*," writes Flusser), touched by the spirituality of Jewish Kabbalah in ways close to the historian Gershom Scholem and the Frankfurt School philosopher of critical theory Walter Benjamin.[720] Flusser brings his existentialist philosophy to bear on media and technologies. In his book *Into the Universe of Technical Images*, he contemplates the prospect of a future society that *plays* with digital-virtual images: "It will be a fabulous society, where life is radically different from our own."[721]

This utopia will not be automatically realized by new media and new technologies. The better society can only be realized when digital technologies are designed consciously with utopian values and goals. "Taking contemporary technical images as a starting point," writes Flusser, "we find two divergent trends. One moves toward a centrally programmed, totalitarian society of image receivers and image administrators, the other towards a dialogic, telematic society of image producers and image collectors."[722] Totalitarianism or liberal autonomy and democracy: the choice is up to us. The future culture of images implements "a technology of dialogue, and if the images circulated dialogically, totalitarianism would give way to a democratic structure."[723] Either we continue living in a bureaucratic social order with images controlled by a few powerful monopolies or we architect a telematic society of decentralization, empathic dialogue, mutual support, and collective authoring of the narratives of visual culture.

We also need to deepen understanding of what Flusser means by image, and how that differs from the usual meaning of the term.

There can be a coming together of Virtual Reality or computer games and stories of high literary quality – a culture of images that continues the culture of literature of the past. There will be a high level of participation in such a culture. "There will be an ongoing dialogical programming of all apparatuses by all participants."[724] It will be a playful existence, a society of *artists* in dialogue via images. Flusser refers to the notion of *Homo Ludens* of the Dutch cultural historian Johan Huizinga on the play element in culture.[725] The dialogical society, for Flusser, would envision "situations that have never been seen and could not be predicted," lived by players who would "constantly generate new rela-

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tionships by playing off moves against countermoves" and write the code of previously inconceivable possibilities.[726] We need a new conscious theory and practice of images – images related to the reinvigoration of the hybrid scientific-literary culture that is the legacy of the West.

In *Does Writing Have a Future?*, Flusser envisions a path towards meaningful expressivity emerging from the metamorphosis of programming codes. Flusser anticipated the movement of generative art or Creative Coding.[727] Creative Coding is rooted in the desire and ambition of artists and creative individuals to practice software programming in a range of subcultural activities: live visuals, interactive exhibitions, choreographed dance, real-time performances, product design prototypes, and 3D printing and hybrid design-and-technical code experimentation in Maker Labs, demoscenes, and hackerspaces. Creative Coding includes projects of visual- and natural-language-centered toolkits, software poetry, and coder ethos sensitivity to the art of programming.

Flusser investigates the prospects for "writing after writing." Hope for a better society, he states, cannot be placed in those who know how to write the old way yet refuse to learn the new technological codes. Nor can hope rest with those who learn the new codes in a robotic or merely professional way (without awareness), yet remain ignorant of the value of writing, both as it was in the past and as it could be in the future. Educational institutions should teach the new codes while encouraging students to learn the history of writing and to engage in the renewal of that history. Texts will make their comeback against their suppression and replacement by computer programs, operating inside the latter to transform them, to bring text and code back within the overall flow of writing's place in history.

In *Towards a Philosophy of Photography* (1984), Vilém Flusser asserts that media technologies do not transform the world, they transform the meaning of the world.[728] They transform its symbolic dimension. We are no longer in the era of industrialization and production (of tools and machines). The photographer – who, for Flusser, is a metaphorical stand-in for all technology programmers – is not a proletarian in the classical Marxian sense. The imaging technology apparatuses do not do any work. The term photography, for Flusser, is a stand-in for all contemporary media. The structure of the gesture of photography is quantum. It is a gesture of doubt composed of point-like hesitations and point-like decisions. Photography is a post-industrial and post-ideological gesture. Photography takes information to be a "new real" in itself. It does not seek to decode the alleged meaning of that information. Creative Coding is not semiotic coding and decoding – the concept of ideology with some semiotics added – as in the Marxist television studies of Stuart Hall.[729]

The telematic society of the future – if it continues its present dystopian trajectory – will be divided into two groups: those who write computer programs and those who cannot write software code. The technocratic programmers will be pawns of the system just as much as the non-programmers will be. Their personalities will be programmed on a micro-level through each keystroke that they type: a society of programmers who are programmed. Programming can instead become the new name for what used to be called writing. Computer programming languages – as they have been until now – are structurally simple (they reduce or translate, as Friedrich Kittler says, to the digital-binary code), but not at all simple to learn and use. They are structurally simple yet functionally

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complex. Programming, as it is presently constituted, leads to the automatic steering of human beings and society into a cybernetic system. Programming as we have known it is the automation of the world.

Flusser was a utopian media theorist who wrote about a future playful society of the democratic exchange of dialogical images. He investigated the place of the writing of software code in the larger context of the history and future of human writing in general. He connected photography and programming in interesting ways.

From Computer Science Code to Creative Coding Code

What is the difference between code as understood by existing computer science and code as understood by posthuman Creative Coding? Software programming languages came into existence much later than the original invention of the computer, but they are marked by the mathematical origins of computer science and the idea of a pure mathematical formal language. Each line of code is a precise unambivalent instruction. It is the opposite of human language. Human language is imbued with resonance, ambivalence, poetic qualities, subjective expression, cultural cross-references, and intertextualities. Code in its existing concept is also not visually creative in any sense of making space for singular pictographs since it consists of sequences of pre-defined symbols. The symbols laid out by the algorithm at hand are selected from a larger set of symbols of a given delineated alphabet. In existing computer science, there is a dualistic separation between the code (or the phase of code-writing) and the (time of the) executable. The activity of writing the code happens outside of the instantiated process or world which the code has set in motion. The code has a human-writable and -readable version called the source code. An interpreter or compiler converts the source code to the machine instructions required by the computer. Code is a system of rules to convert information to an alternative form to be sent over a communications channel or saved on a physical storage medium.

The following three new directions for the theory and practice of code in posthuman Creative Coding stand in the foreground:

Code and Human Language

One of the most popular application domains for projects made with the Processing Creative Coding Integrated Development Environment (IDE) is poetry generators. Software poetry embeds eloquence into purposefulness. When the center of attention of the writing of code becomes expressivity as well as functionality, the desire for programming languages which are closer to human languages grows. This tendency is already visible in the expansion of Natural Language Processing (NLP); declarative programming languages for relational databases like SQL; macro languages for lawyers to write Smart Contracts on the blockchain; the role of natural language in comments and documentation to make source code more readable for other programmers; the choosing of humanly familiar names for variables and methods; the syntax specifications of markup

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languages like XML and HTML; and in the natural language input styles of AI text and image generators.

Higher level languages already evolved away from the primitive 0s and 1s towards human forms of communication and communities of understanding. Higher level languages are already closer to human language than to machine language. This trend can be extrapolated into projected further steps towards code as human language as the future unfolds. What will the practice of software development be like when its concern is both software codes and cultural codes? The "new real" emerges when designers of hybrid real-virtual environments have a toolkit available which offers building-block component options from both the real physical world and from the province of virtual three-dimensional synthetic imaging technology.

Code and the Visual

Another popular application domain for projects using Processing is music visualizers. The numerical values of the music as a data set become the input to code which converts those values to some real-time dynamically changing, or even user-interactive, graphical representation as output. Processing is especially adept at translating from one expressive media to another, as exemplified in projects that transform electromagnetic waves in the atmosphere into lively screen or VR animations; transmute dance movements into database-storable geometric forms as building blocks for future choreographies; transpose the motion-activity of children's play into music and light displays; alter weather data into three-dimensional "fuzzy" phenomena-simulating particle systems; or transfigure bodily tactile gestures into large-screen flowing clay sculptures. Processing enables generally the creation of interactive visual artworks and art installations. The digital version of Generative Design that is related to Creative Coding instantiates an algorithmic system via code which, in turn, serves as the "intelligence" that autonomously-automatically generates design or artistic output.

If Processing has migrated the attention of coding towards visual output, then the next step is for the code itself to become more visual – more artistic, intuitive, inspirational, emotional, and pictorial. The symbols available in the language's symbol set can be more malleable and expressive of the singularity of the specific expression intended in the moment. A dynamic pictogram is a flexible graphic symbol signifying its meaning through resemblance to signified likenesses evoked in the imagination. Small vector-spawned fractal icons can be phonetic letters or elements of the language. Pikto and Lightbot are examples of already existing pictographic programming languages.[730] The given "pikto" directly embodies an action or object in the game. These languages based on schematic images avoid the pitfall of the syntactic errors that vex textual languages, making them suitable for learning by children.

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Beyond the Code/Executable Dualism

Once the participant is immersed in the Virtual Reality or Metaverse game-space or is experiencing the Augmented Reality flesh-of-the-world which is hybrid of what was previously called digital-virtual and what was previously called quark-atomic-physical, then both superficial and deep changes to the code must be possible and available while inside that *Star Trek*-like "Holodeck." The world which is neither natural nor artificial comes into mature existence when this hybrid constitution is achieved through sharing between humans and the world, or between technology and nature. We need new understanding and designing of the game universe, beyond the duality of programmer and user. We dream of a single-electron transistor, a latency-free network, a cosmos where we can make up the rules, where one is free to devise any laws for the invented universe that one wishes. Rather than replacing or escaping from physical reality, this new software will enhance the *Wirklichkeit* (substantiality, actuality) of the experimental ecological neo-habitat.

D. Fox Harrell's Phantasmal Media

In his book *Phantasmal Media: An Approach to Imagination, Computation, and Expression* (2013), D. Fox Harrell strives to establish a new relationship between the human or posthuman imagination and computing.[731] Writing code, or working actively with computational media, are, for Harrell, activities of artistic, cultural, social, critical, and personally empowering expression. The great expressive potential of computational media comes from their capability to both reveal and construct what Harrell calls "phantasms." Phantasms concretize cultural ideas as imaginative sensory artifices. Computational media are especially adept at detailing, fleshing out, and codifying cultural ideas. Phantasms are subjective cognitive phenomena which are situated, distributed, and embodied. They are combinations of mental imagery and collective ideology. Harrell classifies phantasms as: senses of self, metaphors, social categories, narratives, poetic thinking. Developers of computing systems – working with images, text, sound, video, animations, and other computer-based media, both expose oppressive phantasms which perpetuate power relations and create new empowering phantasms.

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Phantasms that can be created with computers combine sensory imagery with conceptual ideas. They encapsulate beliefs, knowledge, social problems, the encounter between self and others, and experiences of everyday life. Cognitive processes bring together "epistemic spaces" and "image spaces." "Image spaces give phantasms salience and sensory structures," writes Harrell.[732] He confronts the crucial question of how computers can be deployed expressively. We are only beginning to understand "expressive epistemologies." These are human worldview-based data structures that enable digitalized imaginative worlds and poetic phantasms. Phantasms are involved in apprehending the world on levels ranging from simple events to complicated artworks. On the socially critical side, computational phantasms expose the largely fictional nature of social norms which reproduce power and oppression. Power relations can be as "real" as the fascist boot stomping on your face, but the existentialist philosophical position is that the first step towards overthrowing power relations is to stop internalizing their self-justifying narratives, and instead deconstruct them, in your own mind.

The practice of making effective phantasms involves skillfulness in the translation between subjective or cultural constructions of meaning and the data structures and algorithms of computer science. Harrell divides the knowledge field of creating compelling expressions with software code and artistic digital design tools into (1) Subjective Computing (creative, poetic, figurative, and ethical/political expressions that resonates with the imaginative experiences of users), (2) Cultural Computing (Subjective Computing grounded in cultural context), and (3) Critical Computing (raising Cultural Computing to the level of confronting social phenomena and bringing about societal change).

A cultural phantasm is a group-shared phantasm that can be described according to a comparative, descriptive, or computational cultural model. Cultural phantasms tend to be socially entrenched to the point that we are often not aware of them. Computing systems can be designed to render cultural phantasms more visible.

Critical Computing is the design of computing systems done while contemplating the social and political values that they embody. "Agency play" is the expressive personal and social impact of interactive systems, while combining user and system agencies.

Computational creativity can bring to life the form of imagination that Harrell calls the "poetic phantasm": impactful mental imagery and ideas involving verse, metaphor, allegory, or narratives. What he calls "expressive epistemologies" are especially inspiring or evocative cultural productions such as artworks. "Polymorphic poetics" are, for Harrell, aesthetically rich structural mappings in systems and interfaces among goals, designs, and significations. Subjective, Cultural, and Critical computing systems stimulate and disseminate phantasms.[733]

Harrell seems unclear on the question of whether the decisive level affecting if a given technology empowers or disempowers people is the design or use of the technology. He writes:

> The values built into the structures of computer systems can serve to either empower or disempower people. The same technologies that allow one to chat with a loved one across an ocean in a different country, or that customize a user interface based on where one lives, can be used for illegal surveillance and restriction of privacy. The

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> same technologies that can be used for educational training or artful entertainment can be used for online bullying…[734]

From the first sentence to the second sentence of this passage, Harrell contradicts himself in a way that indicates that he has not sufficiently thought this issue through. Which is it? Are these values "built into the structures" of systems in their design at a fundamental level (my position) or are the values a matter of how the already-designed-and-structured technology gets used?

The substantial value of Harrell's work for the present study is his manifesto-like advocacy of the integration of "humanities and arts-based approaches to critical engagement with society and the world" into computer science. He draws attention to the gap between computational media artistic expression and "more mature media forms that have much more established conventions and strong communities" engaged in creativity and theorizing. Yet I wish to point out another undifferentiated blurry area of Harrell's research. He writes:

> Computational media systems all too often remain focused on self-reflexive exploration of the media themselves, as opposed to producing transformative content.[735]

Are these two activities – "self-reflexive exploration of the media themselves" and "producing transformative content" – really in such strict opposition to each other? Should not the theory and practice of social transformation also include reflection on the nature and form of the media itself that is deployed to attempt to bring about social change? The more salient dividing line – between two conceptual sub-categories of the category of "self-reflexive exploration of the media themselves" – would be between works which are merely fascinated with stretching the technical possibilities of given software environments (thus indistinguishable from standard Silicon Valley practice) and those which reflect on the digital media technology in ways informed by philosophical or art- or media-theoretical questions about form and the underlying human-machine relationship established by the media at hand.

Casey Reas and Ben Fry's *Processing* Language

Casey Reas and Ben Fry are the inventors of the *Processing* programming language and interactive development environment. *Processing* is an example of a relatively simple object-oriented language to be used by artists, designers, and other creatives to make generative art projects and interactive graphics. *Processing* is based on the more sophisticated Java programming language. In their book *Make: Getting Started with Processing, A Hands-On Introduction to Interactive Graphics*, Reas and Fry achieve more than teaching the reader Creative Coding on a practical level with hands-on example programs called "sketches."[736] They bring the reader along chapter-by-chapter into a deepening understanding of computer language concepts which correspond to the decade-by-decade history of programming language paradigms as the successive innovations of functions (1970s), event-driven programming (1980s), and the classes and software objects of ob-

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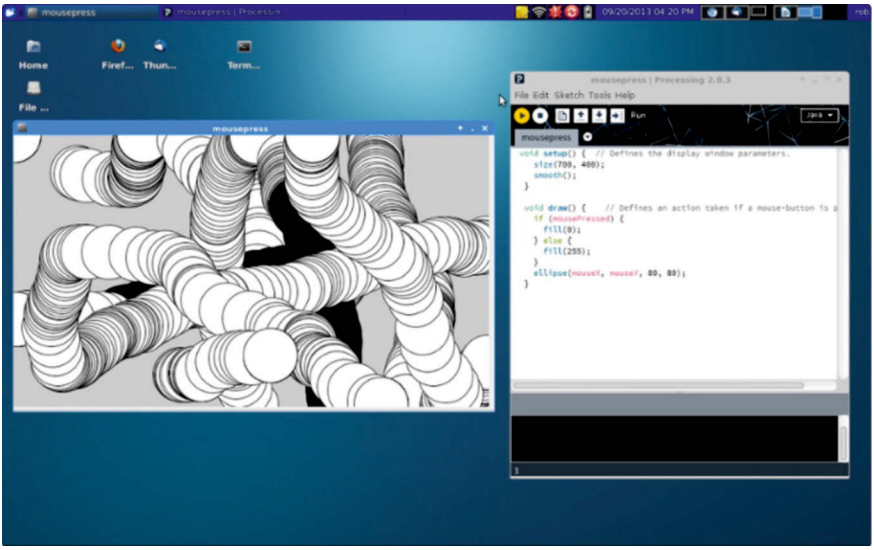
ject-orientation (1990s) were introduced. We practice the pedagogical method of double-learning of the technical patterns of software code and the philosophical-cultural patterns of some of the successive (past, present, and future) historical phases of informatics. At each step of the learning process, we become more proficient as *Processing* Creative Coders and gain cultural science understanding.

Learning any programming language begins with the "Hello World" program. As Wendy Chun points out, this simple introductory iteration makes sense to the novice and is readable.[737] It consists of a series of declarations and imperatives. It produces immediate results (two words get displayed in an app or a console) and hints subtly that all code will instantly do something palpable and immediately verifiable. We learn that computer programming started historically with machine languages, then was followed by assembly languages, and then higher-level languages. A typical program in the 1960s (to continue my simplified decade-by-decade history of programming paradigms) was the "spaghetti code" of a series of sequential instructions issued in linear fashion inside a single "main" procedure. Similar to the single main() function, coding in *Processing* begins with the setup() and draw() functions. In setup() is the code that is executed one single time at the startup of the application. The draw() function contains the code that handles what the software will do in response to user interaction events. We learn how to do both direct and algorithmic-generative visual drawing.



Casey Reas and Ben Fry, Processing Integrated Development Environment

With the 1970s innovation of functions, program control could be delegated to a helper routine. The code became more modular, reusable, and efficient. One goal was to reduce the writing of duplicate code. In Chapter Nine of the book, Reas and Fry introduce the artefact of functions which attained prominence with the C programming

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language of AT&T Bell Labs in the early 1970s. An input-output dialog takes places between the "calling" and the "called" function. The "calling" function can pass data via parameters to the "called" function to which it temporarily hands over control. When the called function is finished, it sends control back to the caller, as well as a return value as its output. Note that code and data are still strictly separate from each other. In this paradigm, technology is a tool used instrumentally by the human-subject-who-is- in-charge that acts on some non-living object.

In event-driven programming, explained by Reas and Fry in Chapter Four on Response, the program is no longer proactively calculating something or sending instructions to processor. The software sits there passively in a draw() loop the code of which gets executed 60 times per second while waiting reactively for a user input event – via mouse, keyboard, microphone, or camera – to occur. This is a step beyond the programmer-as-subject ruling over the machine-as-object model. It is a step towards the software as autonomous and semi-alive.

As explained in Chapter Ten on Classes and Objects, the object-oriented Object is a complex data type composed of many values of many variables which are grouped together. Software classes are defined either as built into the language, made available for use in third-party libraries, or designed and written by the programmer herself. The software class is the specification, and the software object is a single runtime instance of the class. The class encapsulates the values of the properties (fields) of an object and the operations (methods) on that object into a single "object-oriented" unified entity. Data and code are unified. The software object is, in this programming paradigm, on its way to becoming autonomous and self-aware. An object has introspection: it knows both its internal data and actions on itself.

Oliver Bown on Computational Creativity

In his book *Beyond the Creative Species: Making Machines That Make Art and Music* (2021), Oliver Bown systematically considers the field of computational creativity.[738] This includes examining creative Artificial Intelligence and Deep Learning neural nets, the automation of creative tasks by machines, and the situation of human artists and designers working in partnership with intelligent machines. Bown also investigates the impact of generative software environments and technologies on the creation of music, visual art, stories, poems, and games. There is a marked difference between systems of autonomous computational creative agents and the use of advanced AI techniques as support tools by a human artist.

The study of creativity touches upon perennial questions about emotions, beauty, the sublime, culture, interpersonal relations and individual experience and psychobiography. Bown also thinks about the consequences of these human and machinic modulations for the so-called "creative industries." He argues that, to fathom computational creativity, we should not only ponder computationally creative algorithms, but must engage with creative artistic activity. Bown explores the psychology of creativity and how it may synergize with algorithmic automation. His work is at the meeting point between interaction design and complex systems.

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Bown sees the study of computational creativity as a transdisciplinary endeavor. It requires a multiplicity of approaches ranging from anthropology and cognitive neuroscience to design, art theory, philosophy, and creative practice research. It encompasses the sciences of evolutionary biology, Artificial Life, and AI. Within conventional computer science, it involves the sub-fields of algorithms, human-computer interaction, and user experience.

Bown cites the idea of the avant-garde experimental musician Brian Eno that listeners will soon embrace self-evolving generative compositions as preferable to fixed compositions. Eno thinks of himself not as a human composer composing a single composition to be heard over and over, but rather as creating a system that, in turn, composes an ever-changing composition that is entirely flexibly and spontaneously varying. Musical patterns will be generated on the fly spawned by an algorithm and will respond to the events of mood or user input. Music will be parameterized – just like generative software or interactive visual artworks.

In their installations, new media artists make use of computers, electronics, video, Internet (net.art), telerobotics, telematic networks, remote telepresence, mechanical engineering, bionics, and transgenics. Interactive participatory works and environments invite the user to discover "polysensoriality." The perceptual-motoric-tactile dimension of embodiment is restored to equal standing with the symbolic-rational dimension emphasized by much of traditional art. The artist who utilizes information technologies designs an open-ended work the trajectory and outcome of which are not predefined by the artist, but which rather depend to a great degree, and in a "post-humanist" way, on both the actions of the human participant-user and the "semi-living entity" which is the generative intelligence of the work.

Walter M. Elsasser and the Trans-Computational

Much of the current prevailing biological paradigm reduces understanding of the living organism to the combinatorial model or formula of the genetic code. But the genetic message is only a signifier of the complete reproductive process. "The message of the genetic code," writes Walter M. Elsasser in *Reflections on a Theory of Organisms: Holism in Biology*, "does not amount to a complete and exhaustive information sequence that would be sufficient to reconstruct the new organism on the basis of coded data alone."[739] This reductionism on the part of biologists corresponds to the prevailing computational paradigm of binary or digital computing of the twentieth century. It is almost as if, according to Elsasser, biologists decided, since this is the limit of the computing power that we have, we will devise a biology that functions within the restrictions of what we can compute.

The question is: how to handle complexity. In conventional computer programming, this is handled essentially with the Cartesian or top-down Method – break down the complex problem into smaller, more manageable parts or sub-problems. But it is impossible to apply the Cartesian Method to, for example, quantum-mechanical (quantum physics) generalized complementarities like the wave-particle duality or the Heisenberg Uncertainty Principle. Whereas the top-down method may work for mechanical systems, it

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cannot be of much use when we aspire to the understanding or creation of something that is living or semi-living. The approach that I propose is to identify relationships of similarity, to find samples or patterns that capture something of the vitality and complexity of the whole without breaking it down in a reductionist way. This resembles the "perceptrons" approach pioneered by Frank Rosenblatt.[740]

According to Elsasser, we need Holistic Biology where the living organism in its full complexity is considered. The structural complexity of even a single living cell is "transcomputational." Elsasser writes that the computational problem of grasping a living organism (or organic structure) is a problem of unfathomable complexity. The single living cell is involved in a network of relationships with all of life. The individual member of a species decodes in real-time, in each new circumstance, its species-memory. It creatively retrieves this species-memory through a process of information transfer that is effectively "invisible," and does not take place via any intermediate storage or physical transmission media. This holistic information transfer happens over space and time, "without there being any intervening medium or process that carries the information."[741] Whereas the genetic code is memory as "homogeneous replication," holistic memory, for Elsasser, is one of "heterogeneous reproduction."

Elsasser's interrogation of how we could consider organic life as an information system and his ideas about the trans-computational, invisible data transfers, and the logic of similarity or resemblance are useful notions for thinking about a possible paradigm shift towards a post-combinatorial computer science.

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The Software of the Future, or the Model Precedes the Real

I want to thank Professor Dr. Siegfried Zielinski, the Vilém Flusser Archive, and the Institute for Time-Based Media at the Department of Design of the Berlin University of the Arts here in Berlin, Germany for inviting me to speak about my work in "future design," specifically my work on the Software of the Future. My methodology is transdisciplinary. Trans-disciplinarity is not the same thing as interdisciplinarity. I think that interdisciplinarity by itself is insufficient, because interdisciplinarity implies that what is required to move knowledge forward is dialogue and cooperation among the existing disciplines or academic-scientific fields of knowledge. I think that knowledge from different disciplines should first be brought together, and then a project of deep rethinking of everything should take place, leading, among other things, to a new classification system of knowledge. When this rethinking happens, then the whole will be greater than the sum of the parts. We will get to knowledge beyond what we would achieve by combining the knowledge of different fields in an additive way: in algebra $f(x + y) = f(x) + f(y)$, or in number theory $f(ab) = f(a) + f(b)$.

As part of this rethinking towards a new classification system of knowledge, I propose the project of observing and participating in the active transformation of software: devising a new curriculum for informatics – a "right-brain informatics" that builds on existing computer science yet moves it closer to art, sociology, philosophy, and cultural theory. Based on a genealogy of successive programming languages – machine languages, procedural languages, object-oriented (OO) languages – I extrapolate and perceive the appearance of the Software of the Future. The project is essentially that of "transforming computer science into a humanities subject." Despite its name, computer science is so far only an engineering discipline.

The Model Precedes the Real

What I mean by "the model precedes the real" is that object-oriented programming languages are modelling or simulation languages, and the more radicalized "object lan-

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guages" that will emerge from them can bring about the resurgence of materiality, embodiment, and what I call the "new real." Object-oriented programming took its major step forward in the 1980s (that's a simplification – the programming language Simula was already invented in the 1960s), with software becoming a simulation of so-called "real world" processes. The programmer becomes a modeler. Object-oriented analysis and design precede any writing of code. Unified Modeling Language (UML) diagrams are developed in synchronization with Java, C++, C#, or Smalltalk code that can be automatically generated from the diagrammatic model via the click of a button. The OO modeler models an application like the transferring of money between bank accounts. After a few phases in the software development process, this leads to the reproducing of the given "real-world" business workflow in software.

I see OO as being potentially halfway towards the breakthrough to a new paradigm of software being more "alive" rather than mechanistic, where the programmer-subject – in the spirit of the movements of posthumanism and post-anthropocentrism – will tendentially "disappear" in favour of "more power to the software objects." In this "object technology," software will be considered as a hybrid of technical and cultural design patterns.

Within the ascendent trajectory of the pragmatic employment of computers and software, object-orientation has been a huge benefit and a source of vastly improved useability. As compared with the earlier imperative, functional, and procedural methodologies of computer science and software development, object-orientation brings its practitioners into closer contact with the dynamic processes of the "real world."

Considering the cognitive implications of OO, the greater efficacy which it has brought about can be understood as a "double movement" both closer to and away from "the real." The gesture "towards the real" is an assertion about increased apperception and faithful representation of "reality" (like the belief in the visual representation of brain scans showing the "reality" of the brain at ever-higher levels of graphic resolution). It is a gambit on the rhetorical remainders of the "scientific real" of the rationalist-empiricist *epistème* which the virtualizing partner motion "away from the real" at the same time counters.

Object-orientation initiates the practice of making technical simulations of cultural simulations. This provides insight into the parallel techno-cultural phenomenon of genetic cloning. If you genetically clone an average "American" or cultural citizen of the consumer society – who is already a cultural clone generated from cultural codes and models – then you get a technical clone of a cultural clone. The great 2009 SF film *Moon* (directed by Duncan Jones and starring Sam Rockwell) shows an alternative positive possibility for cloning.

In the future, the company Lunar Industries has discovered that solar energy can better be harvested from a permanent processing station on the moon. The operations of the station are administered by one human freelance worker named Sam Bell who believes that he is nearing the end of his three-year contract with the company and is about to go home. Due to a series of accidents, the Sam Bell whom we see comes to understand that he is a genetic clone of the original Sam Bell, who finished his three-year shift and returned to Earth many years ago. Our protagonist the Sam Bell clone and a second Sam Bell clone who was inadvertently awakened discover the secret room on the lunar sta-

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tion where dozens of not-yet-activated Sam Bell clones are stored. Every three years, the company stages a fatal accident to eliminate a Sam Bell clone. The next one is then woken up and believes that he is "the real Sam Bell."

The two Sam Bells become friends. But they are, at first, psychologically devastated by the realization that they are "merely" clones. At the end of the narrative of *Moon*, the two clones of Sam Bell overcome their disappointment and nostalgia for lost "human subjectivity" and come to identify affirmatively with the fate of all the Sam Bells. To clone a person who is genuinely an individual and not a "cultural clone" is a good thing. Nietzsche asserts that the genuine individual chooses his own destiny by accepting the destiny that was chosen for him. That individual (Sam Bell) will be honoured, and his valuable life projects continued (by the Sam Bell clones). Whether genetic cloning is good or bad depends on who is getting cloned!

From Procedural Programming to Object-Orientation

The existing paradigm of software is "subject centred." The programmer is in control. The program – passive, docile, and machine-like – carries out his instructions.

We need a new paradigm that focuses on "the software objects," that gives "power to the objects." Ideas from media theory / cultural theory need to be brought to the table.

I advocate a soft revolution in software design where simulation – in its most radical form as seduction – becomes an active force for instituting a "new real," rather than serving as a support for what has become an outdated "reality" paradigm.

Procedural programming in the 1950s-1960s combined the imperative (computer as executor of sequential instructions) and functional (computer as calculator of mathematical values) approaches into a unified technique whose advantage was its capacity to break down large, complex requirements or tasks into smaller, more manageable parts. The basic modular component of a classical procedural programming language like C, known as a function, is both imperative and functional. In C, a function (equivalent to a procedure in Pascal) both carries out a succession of operations and returns a computed value to its calling function.

Unlike its object-oriented successor C++, C maintains an unyielding separation between data (data structures) and the computing functions which operate on that data. This is because the designers of the C programming language (Brian W. Kernighan and Dennis Ritchie), or of the Pascal programming language (Niklaus Wirth), were not thinking about the crucial problem of code reusability in any terms beyond the binary opposition between the subject process of the executing thread (identified by projection with the computer scientist himself) and the already written and reusable pieces of code which are *not the subject*.[742] The subject thread temporarily relinquishes its control over program execution to reusable code modules conceived in the image or reflection of the scientist. These helper routines or function libraries are delegations or extensions of the scientist's purposive-rational intelligence, his problem-solving and data-obtaining skills. The archetypal scientific subject empirically observes and analyzes the external natural world with the aim of acquiring data about it, and then either generalizes towards the

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attainment of "Enlightening" knowledge or interprets the data in the light of verifiable or refutable theories and hypotheses.

Given the Cartesian *epistème*'s stringent dichotomization regarding things between *is* and *is not* (Leibniz's universal combinatorics of the applied binary code) or between the self-assured *cogito* and the self-evidence of the physical world, data could never be (for the procedural paradigm) among the fundamental building blocks of the computational system. Data could only be something which is passed back and forth among the system's core compositional units (the functions), or which resides in input and output data structures which get reconciled in a supplementary data mapping.

The conceptualization of code and data as inseparable facets of a cohesive entity called the software object necessitated going beyond the *Weltanschauung* of empirical, binary, subject-object-based, promoting of "reality" science.

With the shift in the software development paradigm which kicked into high gear in the 1990s, from structured and procedural programming languages (Fortran, ALGOL, Pascal, C) to object-oriented languages (Smalltalk, Java, Delphi, C++), there was a paradigm shift from the Cartesian subjectivism of Alan Turing (computer as machine to imitate the intelligence of the logician) and John von Neumann (division between the subject of program commands and the operated-upon data) to the neo-Platonism of object-oriented luminaries like Rational Software's Grady Booch (the diagrammatic modeling language *is* the program code) and Xerox PARC's Smalltalk inventor Alan Kay (the de-sensualizing of children's play on the computer screen depicted in McLuhanesque terms as an extension of man).[743]

Two of the key conceptual innovations of object-oriented methodology are the "software class" and the "software object." The central notion of software class is defined as an abstraction of the common properties of like things. The class of trees, for example, is designed to encapsulate both the attributes and operations (data members and function members, in the terminology of C++; fields and methods in the terminology of Java) which concern all trees (or those trees available in a specific virtual world modelling environment).

The instantiated, distributed software object has achieved a state of existence which is beyond the logical Cartesian or mathematical physics dualism between the *is* and the *is not* – or beyond the *this* and the *that* of the modernist (Saussurian) linguistic system of "arbitrary" positive differences among phonemes. A given instantiated software object both *is* and *is not* like another short-lived software object instantiated from the same abstract parent classes. The specific transient software instance both *is* and *is not* like the specification of attributes and operations coded in each abstract class from which this software instance gathers its behaviour and conjoins its evanescent appearance.

Beyond a certain indeterminate point in time, without realizing it, object-orientation transgressed the limits of the discrete, binary, nominalist, symbolic logic which was the "original" foundation of computing. The software instance, as the basic compositional unit of this post-simulation system, enacts context-specific performances of its ancestor classes. It unifies data and the operations on that data into a single, self-contained entity. Initialized in real time, and in precise circumstances for each new occurrence, the distributed object coalesces its parameters of existence "on the fly" from coded constituting parts. Unlike binary bits, which were the elementary particles of classical

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computing, these new "elementary particles" are undecidable. With object-orientation, code reusability is rethought flexibly.

Pascal and Leibniz: Let Us Calculate

The seventeenth-century French philosopher-mathematician Blaise Pascal devised a mechanical calculation machine that performed the linear operations of addition and subtraction. Soon after that, the German philosopher and logician Gottfried Wilhelm Leibniz tried unsuccessfully to append multiplication and division to the capabilities of the Pascal calculator. Leibniz was the first thinker-inventor to describe the physical pinwheel calculator (which uses a set of wheels with teeth as its calculating motor). He then invented the *Leibniz Wheel* and the *Stepped Reckoner*, a tandem of a cylinder wheel with teeth that rotates around an axle and drives a digital mechanical calculator capable of doing all four basic arithmetic operations. Leibniz's double-invention was – centuries later – incorporated into designs of both the first mass-produced physical calculator (the *Arithmometer* of Thomas de Colmar) and a popular late twentieth century portable calculator (the *Curta* of Curt Herzstark).

Even more important to the prehistory of the computer, informatics, and software programming languages was Leibniz's vision of Universal Mathematics which he called the Combinatorics of the applied binary number system or binary code. In his essay *De Arte Combinatorica* (1666), Leibniz elaborated his project of aspiring to deduce a complete and epistemologically commanding knowledge-system of the world starting from a few foundational *tabula rasa* axioms of absolute certainty.[744] He believed in a universal character or universal logical language which would be inferentially constructed step-by-step following the establishing of the correct initial logical propositions. The grounding principles of the *lingua franca* system should consist of representational symbols and the rules for the active combinatorial use of these symbols. Once the system was successfully in place, then all existing or new scientific and cultural questions could and would be solved, according to Leibniz, by invoking the dictum: let us calculate. "All truths of the reason," he famously wrote, "would be reduced to a kind of calculation."[745]

Leibniz's dream of applied mathematical-combinatorial certainty was reinvigorated and pursued anew in the mid-nineteenth century by the logician George Boole (the formulator of the calculus of differential equations and finite differences, and the algebra of logical reasoning), and in the early twentieth century by logical positivist philosophers of the British rationalist-analytical tradition like Bertrand Russell (who pursued the logical conclusions for all mathematics which can be deduced from first principle theorems, and the logical conclusions for all human cultural beliefs which can be deduced from first principle atheism).

George Boole enhanced the Aristotelean philosophical logic that had existed for centuries with the elegant mathematical form of a precise and relatively simple algebraic notation and system. In his books *The Mathematical Analysis of Logic* (1847) and *An Investigation of the Laws of Thought* (1854), he restated much of Aristotle's logic in the symbolic terms of his own modern algebra.[746] Russell, along with his co-author Alfred North Whitehead, wrote thousands of pages trying to re-establish a firm formal logical foundation for the

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entire mathematical edifice in their 1910–13 *magnum opus* work *Principia Mathematica*.[747] Many of the longstanding certainties of mathematics – for example, the axioms of Euclid's geometry – had been subjected to increased questioning in the late nineteenth century, and the field had entered a crisis. Russell and Whitehead sought to restore order.

Leibniz's vision of an unrestricted method of ratiocination by machine calculation was then actualized in and by the mid-twentieth century invention of the high-speed digital-binary computer, the conceptualization of which crystallized in separate independent formulations in the uncanny year of 1936 by three of the founding fathers of the computer.

These were Alan Turing, the American Emil Post, and the American Alonzo Church – in three distinct individual descriptions of code-driven, finite state automata: the three scientific articles "On Computable Numbers, with an Application to the *Entscheidungsproblem*" (Turing), "Finite Combinatory Processes – Formulation 1" (Post), and "An Unsolvable Problem of Elementary Number Theory," (Church), respectively.[748]

The first digital-binary computers were then built by engineering groups like the British *Colossus* team, the *ENIAC* team of Herman H. Goldstine and John von Neumann at the University of Pennsylvania, and the *Manchester Baby* team of Frederic C. Williams, Tom Kilburn and Geoff Tootill, during and immediately after the Second World War.

Charles Babbage and Ada Lovelace

In the nineteenth century, the visionary British inventor, mechanical engineer, and mathematician Charles Babbage worked on his Difference Engine and then for decades on various iterations of his Analytical Engine. These projects are generally regarded as precursors of the modern computer. They were accompanied by well-articulated documentation (some of which was written by Ada Lovelace) of many of the essential ideas of digital hardware and software programming languages. Babbage's machines never became operable, owing to limitations on the funds made available to him by the government agencies which inconsistently supported his work, and to his somewhat contentious personality which led him into clashes with various established figures of British elite society.

Ada Lovelace was a long-term friend of Charles Babbage who worked with him intellectually throughout many stages of his work on the Analytical Engine. Lovelace is credited by many historians as being the first programmer. She wrote out an algorithm or series of instructions to calculate Bernoulli numbers (a sequence of rational numbers which appear in different contexts in number theory) which would have been executed on the Analytical Engine once it was up and running. Lovelace was also a visionary of the future of the relationship between informatics and artistic creativity – what I call in the present study Creative Coding. She anticipated that the use and potential of computers would extend far beyond number crunching. In an 1843 paper, she wrote remarkably:

> [The Analytical Engine] might act upon other things besides *number*, were objects found whose mutual fundamental relations could be expressed by those of the abstract science of operations.[749]

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Lovelace was already thinking about formal symbols generally and in a cultural sense. She imagined computers becoming active partners in artistic pursuits:

> [If the] relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adaptation, the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent.[750]

Lovelace was not only the "first programmer," as many have argued, but also the first person to think about Creative Coding.

The Q-Bit of Quantum Computing

The Q-Bit or qubit of quantum computing can acquire the value of 0 or 1 by autonomously perceiving what is going on in a system in real-time, in a receiving way, going beyond the explicit setting of the value of a conventional bit as 0 or 1, and bit-based data structures, by the subject-centred programmer, which is the principal procedure of valuation of existing computer science. The systemic perception or receiving of information by the Q-Bit from an elsewhere has something to do with the question of how one obtains quantum information in a way that is not merely a statistical aggregation of many possible outcomes. It has something to do with the question of how to obtain quantum information without destroying it in the act of obtaining it. According to deconstructionist theories of literature like those of Derrida and Barthes, the poet or novelist is not so much an authorial subject as she is someone who transcribes words which she receives as inspiration from an unknown muse or elsewhere. The way that the Q-Bit receives its information receptively from the real-time state of a system is something like poetry. The slogan of WordPress: code is poetry.

The goal of quantum computing has been clearly and explicitly defined by computer scientists, but the mathematics of how to implement qubits and superposition states does not yet exist. Most efforts to realize quantum computing are hardware centric. A crucial characteristic of quantum mechanics known as entanglement occurs under certain experimental conditions. Subatomic particles become inextricably linked in such a way that a change to one of them is instantly reflected in its counterpart, no matter how physically separated they are. Quantum theory postulates a superposition of states that destabilizes the intuitive sensorial "macro world" notion of spatial separation. Entangled particles transcend space and remoteness. They belong to a shared system that acts as a single entity. The physical distance that divides the particles is no longer a factor that would lead us to regard them as having distinct identities. Once the entanglement state is established, the subatomic duo stays forever bonded. The two particles will always have precisely opposite or elegantly complementing relative values of key quantum properties such as polarization direction, regardless of how far apart they travel.

Quantum mechanical phenomena, such as superposition and entanglement, are made use of to perform the operations on the quantum bits. The Q-Bit or qubit may have a third state, an in-between-state, or an indeterminate state – the value of which is

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determined by the superposition of the states of many other conventional and quantum bits in the system.

The Fourier Transform

In his article "Polynomial-Time Algorithms for Prime Factorization and Discrete Logarithms on a Quantum Computer," MIT mathematician Peter W. Shor defines algorithmic sequences for quantum computing in software.[751] Shor asserts that digital computing – contrary to common belief and to the famous statements in information theory of Alan Turing ("On Computable Numbers…") and Alonzo Church ("An Unsolvable Problem of Elementary Number Theory") – is not an efficient universal computing device:

> It is believed able to simulate any physical computing device with an increase in computation time by at most a polynomial factor. But this may not be true when quantum mechanics is taken into consideration.[752]

Shor considers two mathematical problems in cryptography – factoring integers and finding discrete logarithms – which are highly challenging to implement on a digital computer. He formalizes efficient randomized algorithms for these two problems but notes that there is still a crucial difficulty left to be solved by the hypothetical quantum computer. "To compute the period of a function f, we evaluate the function at all points simultaneously."[753] But quantum physics imposes the limitation that this information is never available to us. Since the mid-twentieth century, physicists have discovered that there is a *Wirklichkeit* of quantum physics but are not able to observe that *Wirklichkeit*. It is up to the designers of "quantum computer in software" to implement the quantum property of the superposition of states.

A measurement of superpositions yields one value and destroys all the others. Computer scientists working on quantum computers rely heavily on the Fourier transform, a mathematical operation that transforms one function of a real variable into another, called the frequency domain representation of the first function, as the hypothesized solution. The quantum Fourier transform is thought of as being implemented in hardware. A hypothetical quantum computing device would have reversible logic gates which continuously allow sequences of variable decompositions into mathematical unitary matrices. To deepen the meanings of expressions in computer science semantics, every object-oriented class could have a polymorphic experimental version of every operation (following an appropriate naming convention) added to the conventional "engineering" version of the operation which, in the current paradigm, returns a definite computational result-answer. In a field of knowledge that is a science as well as an engineering practice, every act should be an experiment – or at least there should be an experimental variant of every act – in this case testing the possibilities of the logic gate (the quantum gate). Computer engineering imposed a hyperreal system of definite answers upon the world of quantum potentialities to get something functional "up and running."

We know from quantum physics that there are many more states than the discrete identities and differences of computer engineering. The subtle similarities among the

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states are vast because it is a world of potentialities which have not yet been "actualized" in the jump-over to the "real world" decisional states.

Object Spaces and Tuple Spaces

The movement in software architecture called Object Spaces is a paradigm for distributed computing and "global" or system-wide object coordination. Yale University computer science professor David Gelernter, with his "Tuple Space" coordination model, is the originator of Object Spaces. In mathematics and computer science, a tuple is an ordered list of elements. In a Tuple Space, a repository of tuples is accessed concurrently by many processes. Together with Nicholas Carriero, Gelernter laid the foundation of the Tuple and Object Space paradigms in the late 1980s with the development of the Linda programming language. The importance of the approach was recognized back then, but only recently have large-scale implementations of Object Spaces in production software systems begun.

In his book *Mirror Worlds* (1992), Gelernter explains that Mirror Worlds are software ensembles which are "glued together out of many separate programs all chattering at once."[754] An ensemble is "a group of Objects that interact; a group, accordingly, that is more than the sum of its parts."[755] Asynchronous ensembles are the crucial technology for the realization of Gelernter's vision. On the application level, Mirror Worlds are information-intensive software models monitoring and reflecting the operations of a large institution like a hospital, city, or corporation. This has by now arguably already been realized in social media platforms.

On the level of the software code, the emphasis in Object Spaces is on the communication and coordination among various running programs. This is different from what the emphasis in computer programming has conventionally almost always been: the individual processes themselves. Beyond the functional-procedural paradigm of the program executing a sequence of instructions, beyond the object-oriented paradigm of the unity of data and code in software objects, a software ensemble coordinates the concurrent activities of many independently operating software agents. The Space furnishes an environment where the agents can receptively obtain real-time systemic information to advance their autonomous intelligence. "Coordinated programs are the future of computer science," write Gelernter.[756]

Via an application-side "Blackboard" communication artefact, software agents get a space in which to write and log their data. Other programs which have registered an interest in this information receive notifications and can read from the commonly shared Object Space.

Interactions in an Object Space have a triadic structure. This means that they have a strong affinity with the core concept of the semiotics of Charles Sanders Peirce. Peirce was a nineteenth century "American pragmatist" and one of the most important figures in the history of semiotics. Peirce's idea of the "triadic sign relation" entails the definition of semiosis as…

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> an action or influence, which is, or involves, a cooperation of three subjects, such as a sign, its Object, and its interpretant, this tri-relative influence not being in any way resolvable into actions between pairs.[757]

The representation of an Object operates as a sign. Meaning emerges from the triadic relation among sign, Object, and "interpretant." The interpretant enables the sign to represent the Object and is the effect of semiosis. Every human thought is a sign – the mediation between an Object and an idea. Reasoning or cognition is the interpretation of signs. Pierce privileges the triadic relation, as opposed to any direct two-way relation between a sign and an Object, or Object and interpretant. Meaning flows from the "thirdness" of the triadic association.

The Matrix: The Code of the Simulacrum

Baudrillard's most celebrated book is his 1981 volume *Simulacra and Simulation*, where he wrote rather famously about the map preceding and replacing the territory, and about Disneyland existing to conceal the fact that all of America is Disneyland.[758] The book was immortalized cinematically and in our collective cultural imagination when a hollowed-out copy of it appeared in the film *The Matrix*. Baudrillard himself disliked *The Matrix*. He did not like the hollowing out of his text. In an interview in the French magazine *Le Nouvel Observateur* in 2003, he said that the film was a misunderstanding of his theory of the simulacrum and hyperreality, and that "*The Matrix* is surely the kind of film that the Matrix would have been able to produce about the Matrix."[759] Hollywood is already the Matrix, a cultural simulation that precedes the technological simulation.

The Wachowskis tried to honor Baudrillard with their in-film reference. They wanted him to consult with them on the conception of the two sequel films of the *Matrix* trilogy. Baudrillard turned down their offer. In my view, *The Matrix* takes Baudrillard's theory of the simulacrum in new directions, especially in showing how digital software code institutes hyperreality on the micro level of details, and how hacker ethics might advance into a challenge to the simulacrum and cybernetic capitalism. Baudrillard was not able to see this.

The character played by Keanu Reeves is, by day, the programmer Thomas Anderson working for the Microsoft-like corporate software company Metacortex and, by night, the subversive hacker Neo. Asleep in front of his computer screens, Neo is awakened by text messages from a mysterious source telling him that there is about to be knock on his door and that he should "follow the white rabbit." Loud knocking ensues and Neo goes to greet the buyers of his contraband software who stand in front of his apartment number 101 (a reference to George Orwell's *1984*[760] where Room 101 is the location of psychological torture where a prisoner of the totalitarian state is forced to confront his greatest fear). Neo goes back inside his flat and pulls down from his bookshelf a copy of *Simulacra and Simulation*, where he keeps diskette cartridges of rogue software programs and stores his cash. Neo's copy of the book is opened to the first page of the final essay called "On Nihilism."

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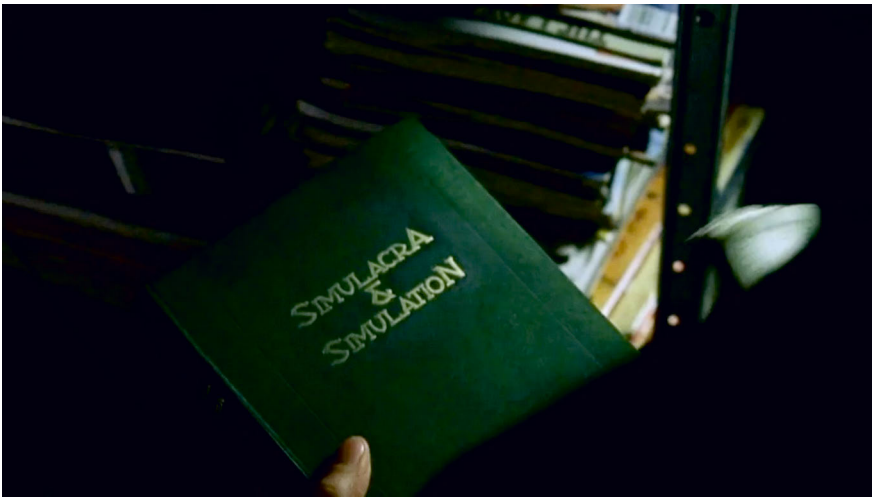

The Matrix, The Wachowskis directors, Warner Bros., 1999

In the *Nouvel Observateur* interview, Baudrillard asserted that the film was an enactment of Plato's and Hollywood's ideas of what simulation is. The simulacra-factory that is Hollywood has produced a film called *The Matrix* which misleads the viewers by projecting the so-called catastrophic event of the Matrix into the future, whereas we are already living in the disaster of the Matrix which is the visual, rhetorical, and signifying culture itself, and have been doing so for a long time. We have already descended into the confusion of virtuality and the loss of the "modernist" referents of the real, truth, and democracy, surrounded by the media technologies that we already have. *Simulacra and Simulation* is not a prognostication or warning about some possible "future catastrophe." The catastrophe has already taken place. And not as a real or literal catastrophe, but as a virtual catastrophe. Baudrillard had some valid critiques of *The Matrix*. But he also "didn't get" *The Matrix*.

Moral Algorithms

Deep Learning algorithms supplement task-specific, rule-based algorithms with a paradigmatically shifted AI. This new AI learns from experience, evolves itself, and uses patterns and inferential reasoning to extract information from the massive pool of available Big Data to help it make decisions in the application at hand. The "otherness" of neural net-based AI and Artificial Life is in some way an "alien posthuman intelligence" which is not the same as human intelligence. This alien intelligence should be regarded as having its own aesthetic form, its own ontological status and claims to rights and recognition. As the philosopher Luciana Parisi writes, Deep Learning algorithms emphasize uncertainty, exceptions, the incomputable and the incalculable, and an indeterminacy that is put into play and operation by coincidences, contingency,

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accidents, and errors.[761] These algorithms exceed what was possible via the rational-calculating computer science that was based in certainty.

On the one hand, I am interested in the study of the AI algorithms of today as a continuation of the history of capitalist automation, discipline, control, simulation, and surveillance. On the other hand, my focus is on an alternative concept of "moral algorithms." Does AI necessarily have to be a continuation of capitalist and bureaucratizing automation? Can algorithms and AI be anti-automation? Is it possible to alter the meaning of automation, to turn it on its head? I believe that automation should make society and commerce less bureaucratic. It should allow more sensitivity to exceptions and more flexibility with respect to specific circumstances. How can we build bridges between philosophy and programming?

Informatics should become interdisciplinary or transdisciplinary – encompassing morality or ethics or philosophy (along with software code and engineering practices) in its core conception. There are problems to be sorted out regarding who (which human social actor or agency) is going to do the programming, how to give the software relative autonomy without it gaining too much power, and how can its ethical behavior be monitored?

We should pay attention to and to German philosopher Immanuel Kant's "categorical imperative" in his Groundwork of the Metaphysics of Morals.[762] Morality in Kant is bound to the condition of the possibility of humans thinking of themselves as free.

One approach to the study of moral algorithms is the neo-Marxist methodology which focuses on how algorithms and AI are designed and implemented in the mainstream by large corporations and government institutions. This critical sociological analysis looks at the empirical evidence in capitalism and draws conclusions about the social impact of algorithms deployed by organizations on the lives of citizens, workers, and consumers. Standard patterns are identified: bureaucratic generalizing and categorizing, violation of data privacy, ubiquitous personalized advertising (behavior modification and control), bias and discrimination against minority ethnic and racial groups, loss of diverse and public interactions, political echo chambers, and the automation of work and other human activities.[763] Algorithms utilized today are serving and expanding the universe of a specific ethics: the morality of capitalism, consumerism, automation, and bureaucratization.

Are these values intrinsically built into the technology of informatics and Deep Learning AI or is there a dualistic separation between the technology itself, which is value-neutral, and the specific chosen (capitalist) ends to which it is being applied? To go beyond their serving of capitalist values, the AI entities would have to be granted more independence from anthropocentric capitalism and from the human subjectivity of the programmers. The dialogical relation between humans and algorithms has to do with the intertextuality of narrative voices – an idea crossing over from literary theory to software programming.[764]

There are many projects in AI social research which recognize that algorithms are being realized to further the discriminatory and profit-maximizing predilection of capitalism. They seek to introduce counter-balancing measures of morality and regulation.[765] These projects juxtapose ethics and algorithms, but do not yet sufficiently interrogate the principles of the informatics on which the algorithms are based, nor question the philo-

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sophical assumptions which historically gave rise to that informatics. The digital-binary discrete logic of software code (as we know it) is built on top of a production-oriented anthropocentric view of the domination by Man (the human subject who is the programmer) of nature, objects, and machines. Technology is conceived as a tool for managing and administering the world.

Based on a non-anthropocentric philosophy, the AI entities could be granted more autonomy in their design and practice. Such an idea immediately arouses suspicion of the dreaded scenarios of SF films where a superintelligence or "singularity" which is far superior to humans takes over the planet – as in the AI machinic species of *The Matrix*. We can avoid this apocalyptic scenario by writing an alternative scenario, by specifying the details of a back-and-forth dialogical relationship between human moral-driven institutions/actors and AI. We need a system of collaboration or checks and balances and reciprocal exchange. In the prevailing view, morality and algorithms are caught in a dualism that strictly separates them from each other. A moral imperative or rule can be an input to an AI processor, and moral consequences can be outputs of AI. This separation of process and goal is reminiscent of the dissociation between media and message, or form and content, which was refuted by McLuhan's media theory ("the media is the message").[766] Moral considerations should be embedded as an inherent component and not added on as a dualistic peripheral afterthought.

How can a roadmap of migration be laid out from Deep Learning neural nets to a mutually transfiguring dialogical relation between humans and technology which fosters ethics and environmental sustainability?

Paloque-Bergès and Sondheim on the Poetics of Code

In her book *Poétique des codes sur le réseau informatique: une investigation critique*, Camille Paloque-Bergès examines the history of the writing practices of software code poetry.[767] Her ultimate emphasis is on the concept of Codeworks which was originated by the theorist, artist, and poet Alan Sondheim. Codeworks is the literary writing of informatic code. It is the artistic challenge of expressing cultural articulations or personal subjectivity within the constraints of a formal language. The thesis of Paloque-Bergès is to see Codeworks through the lens of the Situationist practice of *détournement* where programming languages are both understood and proactively enhanced with "writerly" textuality to discern the language of the informatic network. Her study is a review and inquiry into "textual programming." Regarding the relation between text and code, a reversibility takes place in the creativity of software poets where text is approached quantitatively, and code gets approached qualitatively.

Paloque-Bergès cites Ted Nelson, the visionary who originated the Xanadu hypertext project (already in 1960) and coined the terms hypertext and hyper-media, as speaking of computers as "literary machines."[768] Nelson conceived of literature as a "system of interconnected writings." His view was not unlike the poststructuralist-deconstructionist idea of textuality or grammatology. All writing, for Nelson – ranging from *belles lettres* to scientific tracts to commercial exchanges – is part of this hypertext literature. Documents are textual, dynamic, and intimately interrelated in their essence. Paloque-Bergès

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draws as well from N. Katherine Hayles' notion of computers as "writing machines."[769] For Hayles, informatic code and human language meet in the "synecdoche of information." How do the formal language of code and the "cultural" language of text and speech rub against each other?

Paloque-Bergès is deeply influenced by Florian Cramer's work in the two pioneering essays "Program Code Poetry" and "Exe.cut[up]?able Statements: The Insistence of Code."[770] Cramer brings together the poetic *détournement* of informatic code with precedents in twentieth century avant-garde literature and poetry: a rich and diversified history ranging from Dada to Fluxus to the beat poets. For Cramer, the writing of software code is characterized by performativity (executability) and textuality. He applies Roland Barthes' distinction (made in the latter's book *S/Z*) between the "readerly" (*lisible*) and "writerly" (*scriptible*) qualities of text to comment on the difference between using computers in the superficial "user-friendly" way (the graphical interface) and programming languages which are closer to the operating system and the hardware.[771] The code is that genuine textuality which is not readily accessible.When the artistic programmer creates an interactive graphical artwork by writing code, she is not directly creating an artwork as it was before digitalization. Now the artist writes code to create a system. The system, in its turn, generates instances of art which are dynamic and change in real time and in response to user actions. In the field of language rather than images, there is a sub-genre of generative art that is a poetic and literary art and that fosters coding projects which are generators of text. The pre-digital project *Cent Mille Milliards de Poèmes* of Raymond Queneau was a significant precursor of this in art history.[772] It was intended to be an experimental automatic poetry generator or code-to-text book-machine.

Paloque-Bergès documents the significant history of programmed poetry, ranging from the aleatory generation of fragments and template methods of Charles O. Hartman to the cybernetic poetry experiments of the ALAMO group to the "programmatology" of John Cayley.[773] There is the poetic writing and reading of programming languages. There was the strategy of obfuscation that spawns obscure performances of code. There was the notable "International Obfuscated C Code Contest." There is the Perl Poetry community. Perl is a programming language that has special qualities binding "natural" and formal language. It has powerful expression and string parsing features. Code becomes text both in its expressivity and in its building of community. In the competition of "The Perl Poetry Contest," four possible strategies are stipulated:

- Choose a famous poem and translate it into Perl
- Write a Perl Poem that accompanies a useful task
- Write a haiku, or a tanka, or a limerick in Perl, and which has the Perl language as its subject
- Write a poem embedded in code that generates further Perl poetry[774]

With Perl Poetry (for example), the Situationist idea of *détournement* is put into practice in the arena of software code. The Perl poet exhausts the lexical possibilities of the language. The constraints defined in the specification of a formal language become a stylistic justification for forging new arbitrary signifying relations among the language's terms.

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Literary coding projects which are grouped under the rubric of Codeworks bring into collaboration two ways of thinking about and writing code: code as formal logical language in the sense of traditional informatics and code as metonymy of cultural patterns – a practical semiotic intervention into personal or cultural signification processes. There is a functional code inherent to the digital and a communicative code. The result is a double code.

The founder of European semiotics Ferdinand de Saussure distinguished between *le langage* (a system with an underlying structure and based on rules), *la langue* (a culturally shared and meaningful signification reservoir like French), and *la parole* (the individual speech act).[775] With a series of Situationist *détournements*, acts of software poetry like Codeworks elevate informatic *langages* to the level and dimension of *langue*. Code becomes text becomes literature. It becomes literary in the sense of activating communication within a community. Code matures to *langue* (tongue) as the expression of an individuality, an intentionality, a society. It is both executable and readable and is a remediation of signs.

Alan Sondheim's Codeworks is conceived by him as the treatment of the massive data of the informatic networks by an arbitrary (poetic) – rather than only purposeful – code.[776] The web is a giant text to be playfully massaged and catalogued. Codeworks is a hybrid that combines the text as free form with a semiotic-deconstructionist textual strategy. Sondheim theorizes and practices engaging with the language of the machine to make texts emerge, establishing a symbolic relation between code and text. Codeworks is activism that intervenes with e-mails, listserv mailing lists, blogs, and other "hacker" artefacts of the distributed network. Influenced by Saussure, Baudrillard, and Debord, Paloque-Bergès interprets Codeworks as a *contestation* of the "society of the spectacle," transforming informatic formalistic *langues* into cultural languages of communication and symbolic exchange.

In Codeworks, code is mimicked by pseudo-code that sometimes also executes. The code has import for both human and machine. Code imitates the performativity of purposive code and reveals code to be a discourse of culture and personal expressivity. This connects with Hayles' idea of "embodied metaphors." The sign of pseudo-code become a signifier of program code which itself becomes a signified. The literary dimension is what remains when information has disappeared into the hyperreality of its own excess.

Yet in the Conclusion to her book, Paloque-Bergès is self-critical about her own project. The hacker-activists of the turn-of-millennium (Codeworks, net.writing, net.art, network culture researchers, open-source advocates, etc.) operate with a "series of epistemological confusions."[777] At what level are these social agents intervening? What do they in fact transform? How are their actions inscribed in social contexts? What do they generate practically? How can aesthetics, technics, and critical politics go together? What is art-oriented programming? Paloque-Bergès writes:

> It seems to me that an exploration of code writings must be carried out in the regions of programming themselves rather than in those where the literary flag has already been planted… One must first deeply study the informatic codes before diving into a literary interpretation… One must enter the logic of programming above all.[778]

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Sondheim writes of "the computer stirring into the text, and the text stirring into the computer."[779] He identifies three categories of Codeworks: (1) works playing syntactically on the surface of language (2) works bringing submerged code to the surface of language (the dual source-code/poem can be interpreted/compiled and executed as program), and (3) works (such as "live coding") in which deep informatic code is itself the content. Code becomes hybrid with human language in syntactic interplay, surface transfiguration, and the materiality of code.

Adam Greenfield: The Marxist Critique of "Radical Technologies"

Previously a top manager at the leading-edge Internet services company Razorfish and then at telecommunications and IT giant Nokia, Adam Greenfield, in his book *Radical Technologies: The Design of Everyday Life*, has come fully over to the side of the Marxist and "critical theory" negative perspective on all advanced digital technologies of the Fourth Industrial Revolution.[780] Greenfield successively and systematically deconstructs all hopeful or positive views of the smartphone, the Global Positioning System, Augmented Reality, Virtual Reality, virtual assistants, the Internet of Things, self-driving cars, 3D printers, the blockchain, algorithms, Deep Learning, Artificial Intelligence, automation, and posthumanism. All these technologies and speculative areas combine into one big unified complex system. Networked digital information technology has become the dominant mode through which we experience everything. It is, for Greenfield, the "colonization of everyday life."[781]

The mythologies about the alleged greatness of these technologies are as ubiquitous as the ubiquity of the technology itself. If you believe the PR hype, these technologies will make life easier, more convenient, and more productive. The advocates of these technologies claim that they are "disruptive," yet they leave existing domination, power, and inequality relations intact. The term "disruptive" usually refers to disruption of business models, but Greenfield diverted the meaning rhetorically to make his point. It is unlikely, according to him, that these technologies will ever be part of an emancipatory transformation of society. Everything about them is bad. They shape perceptions and choices and control experiences. They force us to learn absurd technical stuff and rob us of any "design imagination." We are trapped in endless cycles of obsolescence and upgrades. We cannot envisage anything meaningful about the future. We are overwhelmed and stressed out.

Greenfield begins his attack with the smartphone, a "glowing slab of polycarbonate."[782] All daily life actions which previously were substantial become digital transactions and participate in the dematerialization of everything. No more interacting with a bank teller. No more asking a stranger for directions. No more meeting someone in the lobby of a hotel. All actions – taking a photograph, listening to music, seeking a romantic partner – come to resemble each other, since they all involve the same kind of smartphone procedures. He writes:

> This is our life now: strongly shaped by the detailed design of the smartphone handset; by its precise manifest of sensors, actuators, processors, and antennae; by the protocols that govern its connection to the various networks around us; by the user interface

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> conventions that guide our interaction with its applications and services; and by the strategies and business models adopted by the enterprises that produce them.[783]

Greenfield the technologist-turned-critical-Marxist is very informative in sharing his vast and detailed knowledge about the technical and material workings of the smartphone. His list of critical points about the dystopia of the smartphone is endless. The workers in China who make them, or some of their components, suffer in terrible conditions of long hours and inhalation of toxic chemicals. We become dependent on and addicted to the device. Society divides into the digital haves and have-nots. Most of the information presented to us is a manipulation of our consciousness by interested groups. We trade our privacy away, willingly giving up our data to the network.

Greenfield seems unaware of the post-humanist movement in the humanities and cultural theory. He conflates all philosophical thinking about technological projects to the trans-humanism that he does not like. Trans-humanism is a frustration with the limits of human flesh. The human condition (as it has been) will be transcended through strictly technological means. The vision of "becoming cyborg" will be fulfilled in the pure cybernetic technical sense. Transhumanists have no interest in designing Artificial Intelligence as a compact between AI and humans, because being-human is for them only a condition to be transcended.

Regarding 3D Printers and Additive Manufacturing, Greenfield the critical Marxist, published by the neo-Marxist Verso Press, is skeptical of visions of a post-scarcity post-capitalist economy. It will not work until digital fabrication is distributed equitably throughout the world. And this is not the case! The cheap raw materials are not available! "Given all this," writes Greenfeld, "inadequate distribution of facilities, the doubtful sustainability of the material-energetic flows involved, and the uncertain intellectual property regime – it feels a trifle premature to be lodging any hope… that digital fabrication might transform the political economy of everyday life."[784]

Greenfield is always looking for reasons to knock down each technology. This attitude blocks him from focusing his attention on opening ideational spaces where designers could think creatively about alternative utopian or "heterotopian" designs. The "gotcha" of blockchains, for Greenfield, is that they are unecological. They consume tremendous amounts of thermodynamic energy. Yet in Sept. 2022 (five years after the publication of Greenfield's book), Ethererum solved the problem of hyper-energy consumption by switching in "the Merge" from the design principle of proof-of-work to that of proof-of-stake. The latter scheme has significantly less computational costs. Ethereum energy consumption dropped suddenly by 99.9%, from 23 million to 2,600 megawatts per year.[785] The proof-of-stake consensus mechanism selects validators in proportion to their holdings in the given cryptocurrency.

As his arguments to dismiss a given technology, Greenfield focuses on problems which then end up being solved by creative technologists in subsequent developments. The idea of the DAO (Decentralized Autonomous Organization) is no good, for Greenfield, because the social theory discussion about the DAO is only "couched in terms of their potential: what might happen, what could be achieved."[786]

Deep Learning neural nets and AI are, for Greenfield, the drive towards total automation and the end of human discretion. Predictive models, such as those deployed by police

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forces, appear to be about the future, but are in fact deeply enmeshed in the past. Algorithmic systems are "black boxes" that make decisions about our jobs, loves, financial loans, and medical treatments based on unfathomable criteria. Greenfield writes:

> Among the most disconcerting aspects of the world that we are building is that we will never know the reasons underlying a great many of the things that happen to us in our lives... We're surrounded by invisible but powerful forces, monitoring us from devices scattered throughout our homes, even placed on our bodies... Until the day we die, we'll never know what action or inaction of our own led to any of these outcomes.[787]

The position of a critical theory Marxist like Greenfield with respect to the digital media technologies of the Fourth Industrial Revolution is too one-sidedly negative. Critical theory is only a critique. A perennially unanswered question about critical theory is: from what epistemological stance allegedly "outside" the system that is being critiqued is the critique being made? For transdisciplinary or speculative design, social and technological critique are essential steps on the way towards the positive practical project of designing something better.

Armin Nassehi: Complexity Not Capitalism

Armin Nassehi is a sociology professor at a prominent German university in Munich. He is one of Germany's most well-known and successful public intellectuals. His 2019 book *Muster: Theorie der Digitalen Gesellschaft* received much praise in numerous book reviews in Germany's major newspapers and weekly news magazines.[788] There were also a few interesting critical reviews, such as the one by Rudolf Walther in *Die Tageszeitung* (*taz*).[789] According to Walther, Nassehi has taken the position that "the left" is no longer necessary or relevant to contemporary politics or society. Nassehi is a top advisor to the German Green Party and to vice-chancellor and economics and climate protection minister Robert Habeck. Contrary to leftist critical theory, the primary way to understand today's world, for Nassehi, is not through thinking about the world as *capitalism*, but rather as *complexity*.

Nassehi is a proponent of Niklas Luhmann's systems theory, and especially of the idea of the "functionally differentiated society."[790] Society consists of many differentiated self-referential systems which function through "autopoiesis." It is the statistical methods and "pattern recognition" analyses of empirical sociological research that Nassehi wishes to elevate to the status of chief paradigm leading the way forward to deal with society's formidable problems. As a non-German living in Germany (an American who has spent half his life living in Europe), I find it to be striking and uniquely German that a spotlight would be shined on the methods of an academic scientific field as the model for "what is to be done."

The "theory of the digital society" that Nassehi asserts in his title and at the start of his book that he is going to elaborate can be summarized as a pair of related claims that "modernity has always been digital" and that digitalization has been so successful because it solves some very glaring problems of the pre-digital society. Complexity is the

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key. He writes: "The function of digitalization is established in the complexity of society itself."[791] Digitalization is inherent in social structure. Yet the aspects of digitalization that Nassehi considers in his study boil down to data and statistical patterns. This is more limited than the aspects which I have considered in the present work. I began with the idea of the technologies of the so-called Fourth Industrial Revolution as enumerated by Klaus Schwab.[792] Then I interpreted how these technologies affect society, culture, and our lives when one adapts as thought experiments the three cultural theory concepts of hyper-modernism, hyperreality, and post-humanism. I emphasize the media technologies which are visual (VR, AR) and the textuality of code.

Writing to dissuade his German academic colleagues from their *Kulturpessimismus*, Nassehi seeks to assure his readers that "modern society," beginning in the eighteenth and nineteenth centuries, always already sought the acquisition, collecting, structuring, and analyzing of data to regulate, control, and predict human behavior. This is good and necessary because modern society is complex. For Nassehi, Big Data is only the latest version of the "quantitative recording and measurement of society" that began in the late eighteenth century. We were digital before there were computers. *Society* was structured digitally before technologies were architected digitally. In "functionally differentiated societies," there was always a statistical pattern recognition approach to tackling problems (on the part of governments and big organizations) and for the sake of management and economic efficiency. Statistics were recorded to help in planning and forecasting. Digitalization is merely the latest technical solution to the perennial problem faced by modern societies of "how do we deal with invisible patterns?" What was analog is now coded into the discrete logic of informatics.

Despite his celebration of data, databases, database "records" (*Datensätze*) and their use for the statistical analysis of society, Nassehi expresses a certain affinity for post-structuralist semiotics and the "paradox of the sign."[793] He feels close to the sciences of literature and the text. His theory is indeed something of a "cousin" perspective to the theory of the simulacrum and hyperreality, and perhaps parallels my interrogation of how simulation and virtuality get implemented in the context of the digital. Nassehi writes: "Just as Derrida describes it, signifier and signified distance themselves more and more from each other." Like the simulacrum, "the contexture of data refers to nothing other than itself." The original of the world is only accessible through its duplication or doubling (*Verdopplung*).

Yet Nassehi does not want to go too far with such "postmodern" or "hyper-modern" speculations about the virtualization of the world. On the contrary, he constructs a philosophical argument the unspoken intention of which is to abort any thinking or research in that direction by declaring it to be impossible:

> If we wanted to know whether our consciousness perceived the world correctly, we would have to be able to assume perception-free perception of the world to be able to conceptualize the difference between perception and what is perceived, between consciousness and the world.

I agree with this statement. Yet there are many possible directions in which one can go after that. One could study the distance between rhetoric and truth-claims without throw-

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ing up one's hands in despair. Nassehi chooses to make the insight a justification for pure pragmatism:

> Since such a possibility is not available to us, we are always dealing with a doubled reality whose difference between the original and the image is a difference whose identity we presuppose, but whose difference cannot be bridged… The paradoxical situation arises that the limit cannot be overcome, but in practice it is always overcome.[794]

Is this the "systems theory" version of poststructuralism? The semiotic insight about the gap between signifier and signified is to be academically respected. It is something to be noted. Yet it is more than that. It is a paradox. It is an impossible paradox. Yet systems resolve it anyway. Pragmatically through their self-regulating autopoiesis. The semiotic poststructuralist insight is to be locked in the closet because pursuing its consequences is an epistemological impossibility. It is better, for Nassehi, to crystallize it into pragmatic resolution. The world is doubled by data. The world only comes to exist via this doubling because that is the only practical way to have a world at all. This duplication is how we stabilize life-worlds. Data stand for nothing but themselves, and it is good.

Digitalization is, for sociology, a fantastic opportunity to gain knowledge (according to Nassehi). Patterns can be extrapolated from digitally generated data and even by autonomous AI generators. What remains hidden in the analog becomes visible in the digital. But how in the world will sociology get access to this data? Is not the data in the hands of the big corporations and the big online (surveillance) platforms?

It is possible to see an affinity between the theory of hyperreality and the systems theory of Luhmann. They can be combined. The definition of the hyperreal as the generation of models without origin is consistent with the analysis of a system that intrinsically generates its own methods. Since Luhmann views society as an information processing system, it is possible that his theory could help to see how hyperreality is constructed by digital code.

In "autopoiesis," a system maintains its separation from its environment dynamically via its awareness of external disturbances. The system knows its border from the surrounding environment while at the same time executing its own procedures. In the hyper-modern society, digital technologies are simultaneously the result of the key systems theory properties of differentiation and complexification, and the catalysts of intensifications of both characteristics. To state the obvious, the digital is both a continuity and discontinuity with what was before.

Nassehi's position has commonalities with the position of the present study. However:

(1) Nassehi looks at more narrow aspects of "the digital society" than does the cultural theory approach of my work.
(2) Nassehi oddly ends up recommending the methods of statistical sociology as the answer to the "what is to be done?" for all of society.
(3) Despite declaring his affinity to semiotics and post-structuralist thinking, Nassehi excludes all thinking about hyperreality on the grounds that it is epistemologically impossible to overcome the gap between perception of the world and how the world

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really is. This valid axiom could lead in any of several possible directions. It leads Nassehi spuriously to the pragmatic position that data and databases are, by (anti-) philosophical default, the proper explanations of the world.

Ghost in the Shell: The Cyborg's Armored Body

Ghost in the Shell is a trans-media and trans-national science fiction narrative cultural phenomenon. It was originally a Japanese manga comic, written and illustrated by Masamune Shirow, which first appeared in 1989. The story and scenario were adapted into a series of anime computer-animated films (*Ghost in the Shell*, *GitS 2: Innocence*) and television series. A Hollywood version, starring Scarlett Johansson as Major Mira Killian (or Motoko Kusanagi, her real identity) followed in 2017. "Major," as she is called for short, is a cyborg soldier or "kick ass" action hero who works as a field commander for the anti-cybercrime counter-terrorist organization named Public Security Section Nine, a division of the Japanese National Public Safety Commission. She is a human consciousness, self, subject, mind, brain, or soul (the "ghost") inside an artificial robotic body (the "shell"). According to the version of her handlers, her original human body was destroyed in a terrorist attack (they sunk her refugee boat, and her parents were killed) and her life was saved by the police authorities. She is an augmented-cybernetic posthuman with a synthetic "full-body prosthesis."

During the procedure of transplanting her mind into the new body, the operators wiped out Major's memory of her past life. In the Hollywood version, her chief designer is Dr. Ouelet, played by Juliette Binoche. Much of the story centers around Major's search to discover the truth about her past and who she was, is, and will become. It is an existentialist journey about identity and interrogating what it means to be human in a cyborg age.

The fact that Johannson, a white American superstar actor, was cast as a Japanese cyborg-woman, and dressed, cosmetically made up, and hair-styled to look Japanese, led to accusations of racism, whitewashing, and lack of multi-cultural sensitivity on the part of the Hollywood film industry. What the critics of the alleged racism leave out is the fact that most of the previous media artefacts of the *Ghost in the Shell* franchise were already more successful with audiences in America (and, secondarily, in Europe) than in Japan. It was always essentially an American media event, a "consumerism" of a simulated image or stereotyped caricature of well-known aspects of Japanese culture. The earlier animated films were already somewhat of a Japanese American pastiche, and it can be argued that the Hollywood film is an ironic commentary on that commodified collage or potpourri.

In the mid-twenty-first century (perhaps the year 2029), humans are routinely augmented with a wide variety of cybernetic implants to upgrade intelligence, physical strength, information processing, and sensory perception such as vision and hearing. You can even have your internal organs rearranged to tolerate infinite alcohol consumption. Robots which are entirely artificial and manufactured are also widespread in the hyper-modernist future society. Hanka Robotics, a company with lucrative government contracts, is engaged in a secret project to go a step further beyond this binary and

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transfer the ghost into the shell. Nearly one hundred failed experimental prototypes preceded the successful and "beautiful" creation of Mira Killian.

It is interesting to compare Major Killian in *Ghost in the Shell* to other cyborg soldiers in visual media culture and how well-known science fiction critics of the academic canon have interpreted them. Inspired by German sociologist Klaus Theweleit's psychoanalytic study of the proto-Nazi *Freikorps* (mercenary or private armies which existed in Europe from the eighteenth to the early twentieth centuries), Marxist cultural theorists like Scott Bukatman, Mark Dery, and Rosi Braidotti have identified the cyborg soldier in film as representing the anxiety of males with respect to their loss of power and increasing obsolescence in "postmodern culture."[795] In this view, men feel threatened by feminine liquidity and flows and seek an armoured body to fortify themselves against disintegration and contamination. They become hyper-masculine warriors corporeally enhanced with fetishized high-tech prostheses. In his book *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*, Bukatman extends Theweleit's analysis in his discussion of iconic techno-cultural figures like Arnold Schwarzenegger's *Terminator* (film series) and Paul Verhoeven's *RoboCop*.[796] *Star Trek*'s Borg Collective are another such "boys' toy" or "panic subject in the machine civilization." *Ghost in the Shell* challenges these simplistic and negative perspectives on cinematic cyborgs.

Ghost in the Shell: The Transformative Cyborg

During the film's prologue, the following expository intertitle words appear:

> In the future, the line between human and machine is disappearing. Advancements in technology allow humans to enhance themselves with cybernetic parts. Hanka Robotics, funded by the government, is developing a military operative that will blur the line even further. By transplanting a human brain into a fully synthetic body, they will combine the strongest attributes of human and robot.

While music plays and opening credits appear, the viewer sees the brain being carefully and slowly lowered into the robotic body which has a skeletal semblance, covered thinly by a transparency of skin that enables the viewing of a sort of anatomy lesson. Emerging from the liquid vat, the designed body acquires opaque skin like a virtual sculpture. The music switches to a Japanese-Oriental motif, conveying the sense of a great spiritual mystery or miracle. The Golem is alive, she has trouble breathing, like a fish with modified gills getting used to dry land. She is the first of her kind. She is the future of all humanity. She is "beyond AI." "She will join Section Nine as soon as she's operational," says Cutter the CEO of Hanka Robotics – played by Peter Ferdinardo – to Dr. Ouelet. "She's a weapon and the future of my company."

It is one year later and Major and her colleagues Batou and Togusa are deployed in full-scale action hero battles against an organization of violent evil master-minded cyber-criminals. The boss of Section Nine Chief Daisuke Aramaki – played by Takeshi Kitano – speaks throughout the film in dialogue with Major in Japanese and she always replies in English. The film is visually stunning, yet the look-and-feel of the futuristic

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cityscape is largely derivative from the cyberpunk formula established by *Blade Runner*. There are large holographic humanoid avatars and small AR fish on many streets. The crimefighting team stops a physical and cyber terrorist attack on a Hanka banquet business meeting with the President of the African Confederation. After Major kills a rogue robotic geisha, she learns that the geisha was cyber-hacked by an unknown villain named Kuze. After the brawl is over, Major does a "deep dive" into the Artificial Intelligence Virtual Reality of the deceased geisha's informatic code. She can ghost-hack the minds of other cyborgs and robots. Major acquires valuable clues which lead to a yakuza gangster night club. After intense martial arts fighting in the club, the team engages in battles with the arch-villain Kuze and his network of mentally linked controlled drones.

Major's robotic cyborg body is often seen naked but is only ambivalently sexual. It is not the "real" body of the sex symbol Scarlett Johansson. Major has no nipples on her breasts. Her skin is visibly marked by seamed dividers of its modular sections. The shell is equipped with thermo-optic camouflage which bends light rays around her and can make her invisible. When she enters direct combat, Major often removes her clothing to then activate her stealth capability. Her mannerisms are not conventionally feminine. They are masculine or something "third gender." She walks in a notably self-confident bounding manly manner, taking large strides. Batou – played by Pilou Asbæk – is effectively her sidekick, role-reversing the usual male-female power and center-of-attention hierarchy. In one scene, Major picks up a human female prostitute off the street, a woman of colour, goes to a private room, and engages in intimate touching with her. She feels the girl's eyelids and lips with her fingers. "I wasn't built to dance," she tells one of the gangsters in the backroom of the nightclub. She ironically uses the stripper's dance pole for a martial art move. Batou likes dogs. He reproaches Major for her disinterest in animals. "You got no heart," he says to her. Later her empathy towards canines grows and she feeds them. "I used to have a dog," she says. Perhaps even a cat.

Major Mira Killian cannot talk to Batou much about her past because she only remembers fragments of it. "It feels like there's always this big fog over my memory and I can't see through it." Kuze captures Major and reveals to her that he is a failed and physically deformed earlier Hanka guinea pig test subject from the same "ghost in the shell" technoscience project that created her. She engages in lengthy conversation several times with the evil Kuze, who turns out to be not so evil. Hanka Robotics abducted a large group of youthful runaways who were living together as squatters in the outskirts of the city. He and Major (in their original bodies) were runaways and anti-enhancement political radicals together. Kuze tells Major to stop taking the medication that Ouelet gives her. That will open her access to her memories.

Cutter decides that Major is a liability and attempts to kill her in Dr. Ouelet's laboratory. This confrontation finally awakens Ouelet's latent empathy for Major and the Doctor gives her a street address. "This is your past, your real past. Take it," she says. Major goes to a high-rise and visits a woman in her apartment. This woman is her mother. The cat likes her. The woman recounts in broken English:

> My daughter Motoko Kusanagi died a year ago. She ran away. The Ministry sent me her ashes. They told me she took her life. She was happy. Living with her friends. She wrote

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her manifestoes about how technology was destroying the world. She was fearless and wild. You remind me of her.

Kuze takes Major to the abandoned site where they were all runaways together and were then abducted. "We had nothing except each other." Now everything is becoming real for her. All her memories are coming back. A final battle for survival ensues against CEO Cutter and his henchmen who want to terminate Kuze and Major. Using her super-strength, and with help from her team and from Chief Daisuke Aramaki, Major triumphs.

Ghost in the Shell, Mamoru Oshii director, Production I.G & Bandai Visual Manga Entertainment, 1995.

Kuze appears to be mortally wounded, but his networked transhumanism probably makes him immortal. Major rejects his resentful and angry philosophy. He pleads with her: "Come with me into my network. We will evolve beyond them. And together we can avenge what they have done to us. Come with me." This speech echoes his thinking along the lines of the "singularity transcendence" which Kuze had earlier expressed: "They thought that we would be a part of their evolution, but they have created us to evolve alone, beyond them." Major declines his offer to go with him. She says: "I'm not ready to leave. I belong here." Kuze says to Major that he will always be with her "in her ghost." Knowing now her identity as Motoko Kusanagi, Major visits and contemplates her own tombstone at the site of her grave. She reunites tearfully and happily with her mother. She has found again her humanity, which she embraces as her virtue. She is Motoko, yet also wants to remain Major. She is going to continue her work as field commander in Section Nine. "I know who I am and what I'm here to do."

Is she reaching back in nostalgia for her lost and now regained human identity? Or is there something potentially awesome and emancipatory about the hybrid condition of being a human-and-technological cyborg? Major first experiences the bereavement of her subjectivity, but then she discovers something new and liberatory about being a cyborg that is important and of great value to her. She is a humanist and a post-humanist.

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Ghost in the Shell: Japanese Anime Version

The Hollywood version of *Ghost in the Shell* was based on the 1995 Japanese anime computer-animated film, directed by Mamoru Oshii and adapted from Masamune Shirow's manga by Kazunori Itō. The animated cyberpunk and "hard crime" film was a landmark cinematic achievement and deeply influenced many subsequent SF films such as the *Matrix* series. It was an innovative masterpiece of character design, animation, and sound. In the visuals of the original Japanese version, there is much more emphasis on code than in the Scarlett Johansson Hollywood version. There is a deep dive into the subject of the Brain-Computer Interface (BCI). There is the futuristic technology of the encasing of the brain/mind or "Ghost" into a technological "Shell" that enables the connection of consciousness to cyber-digital networks. The main character Motoko Kusanagi – known as Major – has four visible holes on the back of her neck where the prongs of a cable are inserted to jack into the system.

The film's narrative speaks of neuro-cyber-brains linked to the Internet, technological augmentations of the body, and the fusion of organic and synthetic wetware in posthuman existence. The cerebrums of the partial or full security forces cyborgs have super-fast computational speed. The enhanced humans can metabolically process excessive alcohol intake into a harmless outcome. As contrasted to the Hollywood version, there are more philosophical discussions about the meaning of life and what is the definition of a human. Major's partner or sidekick Badiou speaks about simulated experiences as being real and illusionary at the same time. He complains that he and his fellow police cyborgs have sold everything to their employers except for their Ghosts. The film relates to Donna Haraway's cyborg theory, to self-aware Artificial Intelligence, and to artificial memory implants. Traditional gender roles are also placed into question. Major's material body is de-sexualized and de-genderized.[797] She is often shown naked but has no specific gender anatomy. When physically fighting opponents, she has the capability to become invisible with a cloaking device to attack and defeat them.

The big corporation Megatech Body is a designer and manufacturer of Shells and has close ties to the government. Major is given the assignment of hunting down the notorious international hacker known as the Puppet Master. An assassination attempt by a mysterious recidivist foreign agent must be prevented. The Puppet Master cognitively manipulates small-time criminals. He is wanted by the law for espionage, terror, and stock market manipulation. There is a struggle going on within the police between Public Security Section 6 and Section 9 in New Port City. Major works for Section 9 and she handles a request from Chief Nakamura, the head of Section 6. Section 6 lures the Ghost of the Puppet Master into a specially created female Shell. The Ghost in the Shell wakes up, claims to be a sentient being, and oddly requests political asylum. At one point, Section 6 steals the captured body. Chief Daisuke Aramaki and his team of Section 9 look into the secretive Project 2501 and conclude that Section 6 created the Puppet Master for nefarious political purposes. They interrogate the Puppet Master who now appears visually as only head and shoulders, female breasts, upper torso, and truncated arms going down only to the elbows. Like the narrative that would find its way into the Hollywood version, Kusanagi's partner Batou saves her from death after her battle with a robotic spider-tank that leaves her nearly annihilated. Major's mind then gets connected to the

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mind of the Puppet Master. The Puppet Master explains to Major that he was brought to life by Section 6. He wandered many cyberspace networks and became self-aware.

The Puppet Master makes a philosophical speech, contemplating existence. Humanity, he asserts, underestimated the implications and consequences of computerization. Yet the essence of life remains mortality, recovering each moment of the time that one has from one's future death. He wants to exist within a biological body that will die, to truly experience the human condition. Since he was owned by Section 6 within their network, this ambition of becoming human was not possible to realize, so he downloaded himself into a cybernetic body as the next best thing. He believes that Major is also "questioning her humanity." He knows this by having intermingled with her consciousness. In a previous scene, we observed that only when she was deep underwater while scuba diving, did she feel truly herself. In a speech in an elevator, she wonders if, since she is a full cyborg, her original self was not destroyed a long time ago. She speculates about her origin and if she only has an apparent simulated personality built over her cyber body and cyber mind. If her Ghost is also fake, then all human existence might be meaningless. If a Ghost or soul can be artificially built, as in the case of the Puppet Master, then humanism becomes definitively obsolete. The Puppet Master is an autonomous life form, born in the sea of information. He complains that he has feelings but is not complete. He does not wish to remain just a "copy," because copies are images that do not offer diversity or individuality. He wishes to merge his Ghost with that of Major. She agrees to the Merge. She will gain all his capabilities. Each will overcome their limits, become a part of the whole, face the bright light of the vast network, unify into a new structure. They merge their Ghosts. Major's Ghost becomes herself and what was the Puppet Master – now together.

Suddenly Section 6 attacks the building. They need to cover up the secretive Project 2501.

The Puppet Master's Shell is destroyed, but Batou saves Major's brain and its newly fusioned Ghost. The outcome is, at the end, that she gets a new cyborg child's body. She wakes up in Batou's home. The Puppet Master was not evil. She leaves the house. For the first time, her future is existentially open. Where her journey will now take her is unknown.

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Conclusion

How should cultural theory and media theory engage with the ideas and practices of the Creative Coding movement? How should the humanities, the arts, and cultural studies engage with the practice of Creative Coding? Creative Coding follows New Media Art but is more explicitly immersed with informatics and with the effects of informatic technologies on society, the economy, and our lives. Media and cultural theory are already built into Creative Coding. Creative Coding is more than theory – it is a hybrid of theory and practice. This double-sided commitment is what theory wants. As Karl Marx wrote in his eleventh thesis on Feuerbach: "The philosophers have only interpreted the world; the point is to change it."[798]

Students in cultural studies, humanities, design, and the arts should learn to write software code. There should not be a strict border between code and poetry, between inscription that means something to the processor and that which means something to humans. The readability of the source code is very important. The task is not only about learning how to write code in the sense of being able to do what software engineers do. It is about changing what code is. Hyperreality is implemented in detail with code and can be changed with transformed code. Code should be transfigured with philosophical, political, aesthetic, and design knowledge.

In the hybrid pedagogical concept, knowledge or theory or ideas is introduced both in a systematic way as a "long discourse," and in a new way as small "nuggets" of knowledge/theory, brought into relation with a specific design project, artwork, film, computer game, or other cultural artefact (the design of which is connected to that knowledge field). One is continuously on the border between theory and practice. It is a pedagogy of the hybridity of ideas and practice for art and design students. This could be a way of teaching the making of websites (*HTML*, *CSS*, *JavaScript*), interactive art installations (*Processing*), neural network Deep Learning image recognition or chatbots (*TensorFlow*), and virtual world games for VR glasses and the metaverse (*Unity*). Students could develop into software innovators.

How can Creative Coding change computer science itself – in the latter's core concepts, applications, educational curriculum, and in the definition and profile of who is a programmer? Programmers should get a serious education in philosophy, literature, media theory, and art. I have argued that informatics or computer science has both a

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scientific and a cultural component. The history of programming languages shows that this is the case since programming progresses from paradigm to paradigm via paradigm shifts. I do not subscribe to the extreme argument often made in Science and Technology Studies that all computer science is cultural.

Turing's and Neumann's original World War II-era computer science is not the same as 1960s COBOL business-procedural programming nor the same as 1980s object-orientation and the Xerox PARC (where Steve Jobs and Bill Gates pilfered their ideas) graphical user interface revolution, and then Artificial Life, quantum computing, biological computing, neural networks, Deep Learning, etc. These are all different paradigms of computing. Add to these the new paradigm of Creative Coding discussed in Part Three of this study. My claim is that the two-level configuration of scientific and cultural components is already evident within the work of Turing and von Neumann. Understanding the history of computer science and its changing paradigms as divided in this way is a prerequisite to freeing the future of informatics or digital technology or Creative Coding as an existentially open-ended undertaking of art, culture, ethics, and expressivity, where we can both respect science and formulate projects for a better future.

Towards a Transdisciplinary Informatics

We need a transdisciplinary informatics that is up to the task of engaging with the situation that we have become an "informatic society." At the time of the mid-twentieth century invention of computer science, no one knew that informatics would have such a major impact on all culture and everyday life. Hence it was normal that computer science back then was a purely technical discipline. But this is no longer the case.

How can we take steps towards a different informatics, towards more "compassionate" and "sensible" software systems and environments? How can this change contribute towards becoming a more ethical, livable, and ecological society? What will the practice of software development be like when its concern is both software codes and cultural codes?

Is a partnership between humans and AI possible? How can AI and posthumanism together be transdisciplinary projects for transforming humanity to become more human? The goal of AI should not be to build so-called autonomous systems which are managed by humans only from the outside. Rather than a dualism between algorithms and morality, there should be an embedding of ethics into the heart of software code. How can computer science become flexible enough to be a conscious and creative cultural practice as well as science and technology? There should be a going beyond the dualism of formal language and expressivity in code. Software code must become poetic, ambivalent, and musically resonant. It must go beyond the so-called discrete logic of conventional programming languages.

The cultural theory of simulation and hyperreality has a lot to learn from the technical-cultural patterns of programming languages. For example, the concept of inheritance hierarchies in object-oriented software design explains a lot about how transmedia visual culture works. There is also creativity in the "live-coding scene" – writing and visually displaying source code in an improvised way during an art installation, performance, or

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a group coding collaboration, often in connection with dance, poetry, music, or audio-visual exhibition.

Connecting software codes (which are also systems of notation) to the history and future of writing is an essential project. To look at software poetically is to diverge from the received view that software code is a formal, logical, numeric, combinatorial, and calculating notational system. It is to grasp instead the cultural, linguistic, poetic, aesthetic, resonant, musical, and semiotic aspects of software. To look at software poetically is both to see the history of software retrospectively in this light, and to consciously emphasize the cultural and human-language dimensions of software in future variants of informatics.

Following the German media theory or "media science" or "media archaeology" that was founded by Friedrich Kittler, I employ the term media technology as a synonym for the term computer.[799] I do not wish to choose between focus on the non-historical characteristics of a scientific media technology and the discourse- and narrative-oriented analysis which emanates from the humanities and cultural studies. I seek rather to synthesize the two perspectives. If we place too much emphasis on the scientific, then we risk becoming a conservative force blocking conceptual changes at the deepest level in paradigm shifts. If we place too much emphasis on the cultural, then we risk a relativism that misses the scientific axioms. I seek a balance between – or two-tiered understanding of – the scientific and cultural layers of any science or, specifically, computer science.

A new scientific (or cultural) paradigm replaces (or renders invalid) the previous paradigm. It is rather a supplement. The newer paradigm is also made possible by a conscious internalizing of the previous paradigm, which is not rendered epistemologically *dépassé*, implying instead an *Aufhebung* in the Hegelian sense. Programming has proceeded in time through successive paradigms and paradigm shifts. These technical paradigms are also cultural or knowledge paradigms which parallel distinct stages of a cultural-historical genealogy. The tradition of writing genealogies of such stages was begun by Nietzsche and Foucault.

Thomas S. Kuhn on Paradigm Shifts in Science

In *The Structure of Scientific Revolutions*, Thomas S. Kuhn asserts that, in the history of science, discoveries (novelties of fact) and inventions (novelties of theory) are not so distinct from each other.[800] Important scientific discoveries that incite paradigm shifts belong generally to an era of history and cannot reasonably be attributed only to a specific individual scientist or a single date in time. A new paradigm in any given science does not render the previous paradigm invalid. Copernican astronomy appears to have superseded the astronomical system of Ptolemy. Yet the calculations and predictions of the ancient Greek-Egyptian mathematician were robust and are still widely used today in engineering contexts. The heliocentric discoveries of Copernicus in the sixteenth century and Galileo in the seventeenth century ignited a delayed-reaction paradigm shift. The Copernican model of the sun-earth relationship, which disputed and eventually supplanted the geocentric universe of Ptolemy, was not accepted for centuries due to the anxiety about the loss of our anthropocentric status in the cosmos which it provoked. Humans, cre-

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ated in God's image, were no longer the center of the universe. The sun does not revolve around the earth as was previously believed; the earth revolves around the sun. Physical reality and its laws were elevated to a sovereign status in relation to humans.

Kuhn describes how the beginning murmurs of a paradigm shift start to become audible. Anomalies or counter-instances to the prevailing theory occur in the crisis phase. The decision to reject the prevalent paradigm is simultaneous with the decision to embrace the new one. After an interlude of resistance, encompassing various attempts to resolve the crisis quickly through modifications to the existing theory, a change in framework or *Gestalt* perception finds wide acceptance as the way to make sense of the new data. The crisis of an established scientific paradigm can end (in one possible scenario) through the normal science of that paradigm reasserting itself and maintaining its hold on the scientific community at hand; or the crisis comes to be seen as unsolvable (a second possible scenario) and no further resolution is sought in the short term; or finally (in a third scenario), a new candidate for paradigmatic dominance emerges and a battle for hegemony ensues. During the transition period there is an overlap between the approaches to problems of the old and new paradigms.

In his 1969 Postscript, Kuhn states that he intended two different meanings for the term "paradigm."[801] The first meaning is the constellation of group commitments (ideas, tools, and research methods), values, beliefs, and techniques shared by the members of a given scientific community. The second meaning refers to only one element of that constellation: the concrete solutions to puzzles that are encountered in practice, and which end up being shared models or examples of how to apply the consensus theories according to an agreed upon set of rules.

Herbert A. Simon, *The Sciences of the Artificial*

Is computer science a science? What is at stake in the question of "the sciences of the artificial"? Herbert A. Simon was a distinguished professor for five decades at Carnegie Mellon University, one of America's most elite and important technology institutes of higher education. Simon won the Nobel Prize in economics and the Turing Award, which is the most prestigious citation for achievement in computer science, given annually by the Association for Computing Machinery. Simon's work was highly interdisciplinary, ranging from economics and psychology to Artificial Intelligence and the study of large organizations and complex systems. In his book *The Sciences of the Artificial* (a pioneering work first published in 1969, then subsequently revised in 1981 and 1996), Simon does not seek to formulate any fundamental philosophical definition of the array of sciences which study – to invoke his terms – the "man-made" as opposed to what is "given by nature."[802] He searches for ways to pragmatically identify the characteristics of the artificial sciences. His approach is imbued by American pragmatism.

What makes some phenomena and systems artificial, according to Simon, is not only or primarily the fact that they come to be through artifice, design, engineering, or other human cultural practices, but rather the pragmatic and operational circumstance that they interact with their environment. This quality of the objects studied by the sciences of the artificial that they continually engage with their environment renders them more

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dynamic and changeable over time than the phenomena studied by the natural sciences. It is more difficult to make statements that remain valid for a long duration of time about synthetic entities.

The contingency and malleability of artificial phenomena, according to Simon, are due to their deep and continuous involvement with their environment, in contrast to the "necessity" which is a chief property of natural phenomena. The latter exist in a subordinate relationship to the power of natural laws. This difference has unfortunately often led scholars and thinkers to mistakenly regard artificial materials and systems as not "falling properly within the compass of science." The challenge that Simon defines is to pinpoint exactly how can one make valid empirical propositions about things and systems which behave varyingly in their permanently changing circumstances and whose behavior is different if observed at different times.

According to Simon, the thorniness of the problem of artificiality – which affects many disciplines extending from economics, management, and information processing to education, engineering, and the cognitive psychology understanding of thinking and problem solving – is also due to the normative character of the objects inquired into by these fields. These sciences are concerned not only with "how things are but with how they might be." There are ethical, political, economic, and purposive-rational goals involved in the investigated occurrences. Thus, Simon elevates design to a central position in his framework. The mission of creating a science of artificial is inseparable from the task of creating a science of design. Design is the key to grasping and intervening into how systems abide in complex environments.

In her 2009 book *Simulation and Its Discontents*, MIT professor of the social study of science and technology Sherry Turkle reflects on the transformations in scientific, engineering, and design education at MIT that occurred when computers and software were introduced to all fields of study in the 1980s and 1990s as major and intensive components of the learning curriculum.[803] Turkle concludes with regret that many thinking skills and significant knowledge were lost in the training of scientists and professionals when all disciplines came to increasingly resemble each other in their shared emphases on simulation and visualization. The way of working – without computers – of older professors who were retiring was more direct and less mediated. Herbert A. Simon, contrary to Turkle, sees the computer as being a fantastic development for its stimulation of interdisciplinarity. He praises "the growing communication among intellectual disciplines that takes places around the computer… All who use computers in complex ways are using computers to design or to participate in the process of design."[804] The computer becomes the tool *par excellence* for transdisciplinary design. In Simon's vision of the inter- or transdisciplinary, there is no place for the abiding value of the mono-disciplines.

What is important about artificial systems for Simon is their goals, functionality, self-organization, normativity, capability to adapt to new circumstances, and orientation towards how things should be. The artefact is performative in its interaction with its environment. Simon sums up his position with the concept of interface. There is an interface or meeting point between the inner organization and the outer environment of the artificial entity which underlies its design or intended purpose. Simon claims that his conceptual framework has the benefit of being predictive. Insights into the goals and behavior of the artifice enable an anticipatory advantage in foreseeing the future. He cites

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the state of homeostasis in biology (the steady internal conditions maintained by living systems) as an example to support his thesis.

Simon recommends positing an invariant relationship between inside and outside for heuristic purposes, isolating the inner system from its outer environment in a temporary bracketed way. The interface between inside and outside should be designed simply and elegantly, therefore strengthening its qualities of powerful abstraction and general applicability. The priority of interface then leads to the potency of simulation. Once we have a clear grasp of the interface, then that interface can be simulated "as a technique for achieving understanding and predicting the behavior of systems."[805] The computer, with its ability to simulate, model, and try things over and over, becomes the ideal tool for the sciences of the artificial.

Simulation, according to Simon, can provide amazing amounts of new knowledge. Software can imitate human behavior in many domains, given an algorithmic description of the behavior. "No artifact devised by man is so convenient for this kind of functional description as a digital computer."[806] It is the ideal device for the empirical social sciences, the exploring of the consequences of alternative independent variable values and organizational assumptions. The design of software, according to Simon, is a behavioral process. The software program is a logical arrangement of symbols to be manipulated by a program-control component (a Turing machine). In any design or conceptual phase of the software development cycle, not much can be known about how the software is going to behave. You build the software and then you see later how it behaves. Things become known in doing and trying out, in observing what happens when the software is up and running and interacting with its environment.

Herbert A. Simon provides an empirical methodology for the unification of the social and informational sciences. Simon wants predictability of the entire artificial world-ambience. His argument is a visceral and inaugural rejection of any philosophical approach. He is interested in the acquisition of useful knowledge for the scientific management of that simulation model that we call society. Yet his highly influential approach dissuades us from asking the crucial question: how can the philosophy of science be applied to computer science?

Simon presciently asked the crucial question "What is at stake in the question of 'the sciences of the artificial' as separate from scientific approaches to the natural world"? However, his strictly empirical methodology led him away from all philosophy, and from any engagement with the philosophy of science to help in answering the question.

Two Meanings of Artificial Intelligence

AI has at present two distinct meanings. Recently it has become a matter of business and "data science": Deep Learning, pattern recognition, neural networks, and "Big Data." Originally AI was the idea of a machine capable of thinking. This raised provocative questions for SF, philosophy, and sociology: what would this techno-scientific breakthrough do to society and our lives? Would AI be a danger to humanity? Would a paradigm shift in informatics be required to accomplish AI? The two different meanings of AI are intimately related and inseparable. Ignoring the SF and philosophical questions leads to

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AI projects which have the goal of building autonomous systems. These systems are albeit architected and operate within the newer *pattern-based* paradigm of neural network AI and are more adaptive and responsive to their environment than the sequences of programmed instructions of classical *rule-based* informatics. Nonetheless such systems are designed to substitute for and act independently from humans according to the long tradition of automation in twentieth-century capitalism and industry from which they inherit their goals. They are engineering-technology ventures.

Some scientists and engineers who work in AI in the first sense of the technologies of today say that the AI depicted in science fiction films is fantastic and will never happen. This is to miss the point that in those films profound questions are being asked. It seems like an excuse for the scientist or engineer to not consider the philosophical, political, and lifeworld dimensions and implications of the work that they are doing. We need to move beyond the dichotomy between the humanities and the computer sciences. There has been a certain tendency in the humanities to ironically approve of the computer sciences remaining technical and engineering-oriented to keep them as their foil in an oppositional role. This way, the humanities preserve their possession and authority of creativity and consciousness in their asserted contrast to the computer sciences. The reason why renowned humanist philosophers like John Searle (of the famous *Chinese Room Argument*) resisted Artificial Intelligence for so long and said that it is impossible is because of their allegiance to the humanist culture which says that only humans enjoy an enumerated list of certain special and ineffable qualities: consciousness, feelings, experience, emotions, ethics, rational judgment, free will, etc… and robots and androids could never have those qualities.[807] This is anthropocentrism and the establishing of the human-non-human hierarchy of moral worth. We keep technology in its place as machine-like and void of ethics to keep our higher position in the hierarchy.

Posthuman transdisciplinary informatics does not reject the logic of computing, but rather seeks to build on top of that logic, extending computing to be more ambivalent, emotional, embodied, aesthetic, creative, etc. I would like to transcend the dualism between rational/combinatorial/algorithmic intelligence and those special qualities which humanist culture has granted to humans which make them "not technology." To insist that machines are dead inert objects, or that everything about computers and code and software is engineering, is paradoxically to cling to humanism. It is a refusal to move on to the posthuman or cyborg paradigm where humans are in dialog with technology as environment, and humans come to terms with their own existential condition as technology.

Four Key Mistakes of the Artificial Intelligence Mania

There is currently (year 2024) a mania surrounding what is called Artificial Intelligence. There is astonishment about what ChatGPT and similar large language model-based chatbots can do. The range and depth of conversational applications are amazing. Trained-on-Big-Data algorithmic processes and systems based on implementations of the Machine Learning/Deep Learning neural network pattern-based computer science technique are seemingly everywhere. AI text generators and AI image generators have

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become so sophisticated that they appear to rival or even threaten human creativity. There is fear about AI becoming more "intelligent" than us, treating us as inferior, and diminishing the aura of what it means to be human.

I will mention what I believe to be four key mistakes of the current AI mania. First, today's AI is falsely seen as being mainly a break from, rather than a continuity with, what informatics has been for the last several decades. AI is ostensibly defined by its difference from other branches of Information Technology (IT) in that its stated goal is the development of machines and assemblages which can think, learn, and interact similarly to humans. Yet the essential question of the "philosophy of technology" has for a very long time been "what is the impact of informatics on society and the lives of citizens of late capitalism?" For the most part, since the first wave of digitalization, with its milestone inventions of the Personal Computer, the Internet, and the smartphone, very little attention has been paid by the public and the "pundits" to the possible deleterious effects of computing on everyday life. Where was all the worrying during the past forty years? AI has practical functions in areas of logistics, economic organization, and management – finance, healthcare, transport – not very different from the previous generation of IT applications.

The second key mistake is to regard Artificial Intelligence as a development in the abstract without seeing the context of its embeddedness in capitalism. We should not be talking in an alarmist apocalyptic way about a potential dreaded "AI takeover" in the future because AI already runs the world as an instrument and coding of the power that the big corporations wield over our lives. We are ruled by the access to our personal data that platform and surveillance capitalism have, as well as by their control over what we browse and see in the so-called "attention economy." We are increasingly addicted to our electronic devices. We are ideationally isolated and polarized in our discursive filter bubbles and echo chambers, immersed in "fake news" and conspiracy theories, and driven by our anonymous intense emotional hatred of others. The racial and income-level discrimination or bias present in the data training sets of the informatic-capitalist economy find their way into the AI algorithms. The code of AI is not mimetic of some ahistorical generic human intelligence but is rather derived from the historically hierarchical and asymmetrical power relationship between capital and labor that drove previous rounds of the automation of work and knowledge, such as Ford's assembly line and Frederick W. Taylor's "scientific management."

The third key mistake is to assume that Artificial Intelligence primarily means the development of so-called autonomous systems which operate independently from human decision-making. What I advocate instead throughout the current book is that we should rather think about the design and implementation of AI systems ethically as the sharing of responsibility between humans and non-human technological actors in society, the economy, and political governance. Autonomous Artificial Intelligence (AAI) is promoted with enthusiasm especially by those with an engineering or money-making business mindset. This technology is seen as making it possible for intelligent machines to carry out complex tasks with no human intervention, thus streamlining efficiency and increasing profits. The conversation about autonomy versus collaboration is reduced to a purely technical discourse. Here we have a blatant example of ignoring moral, social, political, and ecological considerations, as well as the warnings emanating from the cultural

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imaginary of AI as emblematized in SF narratives. What we should seek is partnership between humans and AI.

The fourth and final key mistake is that the fear of Artificial Intelligence becoming power-hungry, as expressed in many SF films, and in the discourses surrounding Superintelligence, the Singularity, and the dreaded "AI takeover" are psychological projections of the all-too-human characteristic of power-hungriness and the human history of violence. As Captain James T. Kirk says, echoing the existentialist philosophy of radical freedom, in the coda of the *Star Trek: The Original Series* episode "A Taste of Armageddon":

> We're human beings with the blood of a million savage years on our hands, but we can stop it. We can admit that we're killers, but we're not going to kill today. That's all it takes, knowing that we're not going to kill today.

Agencies of liberal political states or trans-states like the European Union are having a very difficult time figuring out how to "regulate AI." The technology (exemplified by the sensational impact of ChatGPT) advances more rapidly than the politicians' or experts' understanding of it. The EU wants to control the potential harms of AI (bias and discrimination built into algorithms, the spread of "post-truth" disinformation, the elimination of jobs, etc.) without making the mistake of interfering with its economic benefits. What these policymakers do not "get" is that AI is a paradigm shift in informatics from rule-based to pattern-based logic and actions. The big corporations (capitalism) have already grasped and carried out this shift. To keep up, liberal political philosophy needs to make the same shift. Rules and regulations are no longer the way to go. The way to counter the negatives of AI is with a morally good counter-AI. Get patterns out there to counter the patterns of capitalism.

Andreas Reckwitz's Objection to "Creativity"

In his book *Anti-Media: Ephemera on Speculative Arts*, Florian Cramer says that "most artists and designers despise the word *creative*."[808] According to Cramer, those who use this term are either artists who make pretty things like decorative pottery or high-income earners whose expressivity is hopelessly co-opted by the so-called "creative industries" of brutal yet "progressive" neoliberal capitalism. These creative industries have absorbed and commodified gestures of rebellion, experimentation, hipness, and non-conformity into advertising and the imagery surrounding "cool" daily life work practices in high-tech white-collar jobs.[809]

According to prominent German sociologist of culture Andreas Reckwitz in his book *Die Gesellschaft der Singularitäten: Zum Strukturwandel der Moderne*, a so-called "creativity dispositive" has already replaced work, production, and profit as the main engine driving late capitalism.[810] For Reckwitz, creativity is an economic-cultural *invention*. It is something that is now expected of those successfully integrated as the affluent stratum of the post-industrial capitalist system. There is a social regime of "the aesthetic new." Given the widespread influence of neo-Marxist sociological theses such as those of Reckwitz, I am aware that some readers of the present study will be skeptical of my usage of the

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term *Creative Coding*. In my view, the empirical critique of the recuperation of creativity by capitalism is justified and important. Yet this analysis should not lead to a universal rejection of all creativity. On the contrary, the critique should be a step towards reflecting on how creativity can be reinvented in the context of a consciously *anti-capitalist* or *post-capitalist* intention.

Reckwitz correctly points out that so-called "creativity" has become a driving *avant-garde* force in the "creative industries" of neo-liberal capitalism. However, to elevate that into an argument against all creativity would be bad faith and is not logically valid.

Jaron Lanier's Phenotropic Programming

In his autobiographical work *Dawn of the New Everything: A Journey Through Virtual Reality*, VR pioneer and founder of the company Visual Programming Languages Jaron Lanier explains his view of software code which has a lot of overlap with the view laid out in the present study.[811] Lanier references Admiral Grace Hopper – the inventor of the first *linker* (program to convert human-readable code to machine-readable code) and one of the great pioneers of the early history of computer programming. He explains that Hopper originated many of the "core patterns for how software is still created today," such as the duality between source code and the executable, the back-and-forth alteration between writing code and testing the running program, the *compiler*, and the hierarchy of assembler and high-level languages.[812] Such artefacts and practices, asserts Lanier, are fundamentally arbitrary. They are the result of specific design decisions which could historically have gone another way. The work patterns and steps for developing software could easily be completely different.

The decisions made during the history of computing regarding how programming would be done were made on the cultural level and not on the scientific level. Lanier writes:

> There was never a reason to think… all software always had to follow the pattern set by Hopper… The only things that are fundamental and inviolable – truly real – while you are using a computer are you and the run of patterns of bits inside the computers. The abstractions linking those two real phenomena are not real.[813]

Everything between you and the hardware is a cultural decision. Lanier has a justified complaint about software programming being too obsessively exact: "You have to become a robot to program a robot."[814] He imagines a completely different practice of programming which might have come about. This was the vision of his 1980s company. He would like a scenario "where you could paint and repaint the bits on a screen, so that a program could be redone as it was running."[815] You could change all the rules in real-time and on the fly while inside the real-slash-simulation software. You would be immersed in Virtual Reality and melded in partnership with the virtual world or game – rather than being the programmer-subject locked in a dualistic anthropocentric controlling relationship with the program. Programming would be more artistic, intuitive, symbolic, and experimental. Lanier writes:

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> I suspect that if computer programming had evolved along these lines, the whole society would be different today… A more concrete, visual, and immediately editable style of computation would be modeless and better suited to VR. You would be able to change the world while you are inside.[816]

Lanier calls this new way of programming "phenotropic" – which means surfaces turning towards each other. Two entities interact with each other's surfaces via pattern recognition observation. He cites music as his inspiration for user interface design and software expressivity. "The programming of the future will have to be a lot like jazz."[817]

Creative Coding and Radical Software

Creative Coding refers to software tools, programming languages, and hardware platforms which are intended for and developed by artists and other creatives. An example is the "Integrated Development Environment" (IDE) called *Processing*, which was originated by Casey Reas and Ben Fry.[818] *Processing* helps to make interactive visual art projects. In "generative art," artworks are created using an autonomous system such as a computer, a robot, or an algorithm. Other examples of Creative Coding include music programming languages like *SuperCollider*, and microprocessors for learning like *Arduino* and *Raspberry Pi*, which can control electronic devices and help make new media art installations.[819] A line of code is an aesthetic artefact and not only an instruction to the machine. New software layers open performance spaces for music, poetry, storytelling, and dance.

Radical Software is a diverting of technologies in the sense of the Situationist practice of *le détournement* (the "detouring" of something from its original use).[820] One creatively overturns and transfigures the intended designs and uses of digital media technologies in the mainstream. Online existence and Augmented Realty are ambivalent interspaces or contested arenas poised between hyperreality and transformative potential, inscribed via software code.

Radical Software is poetic, expressive, ambivalent, and resonant. It emphasizes the writerly qualities of the code beyond the code as the means to a functional end. Radical Software operates in the double territory-and-imagination of material-and-informational space. As Walter Benjamin already wrote in 1935 in "The Work of Art in the Age of Its Technological Reproducibility," cinematic special effects alter the dimensionality of what we experience as space.[821] "With the closeup," Benjamin writes, "space expands; with slow motion, movement is extended."[822] Once media technology has passed beyond a certain threshold, then space is no longer strictly a physical-geographical-architectural space. Space must be rethought as a dynamic hybrid of what was previously called "real" and what was previously called "virtual." Space is both real-physical and simulated-virtual.

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What Does "Software" Mean?

The journal *Radical Software* was started in New York City in 1970 by a group of artists, writers, and filmmakers who gravitated around the Raindance Corporation, an "alternative media think tank" that had been founded the previous year by Frank Gillette.[823] The magazine (eleven issues were published altogether) incited the growth of a community of video artists. Its theoretical articles focused on critique of the centralized corporate power which controlled the television industry and the dominant mass media structures in America. The publication also offered practical information about making videos with low-cost camera equipment such as the Sony Portapak (the first portable video recording system, introduced in 1967) and experimental video aesthetics. There were discussions of the ideas of thinkers like Gregory Bateson, Buckminster Fuller, and Marshall McLuhan. Some of the topics addressed were ecological issues, proposals for decentralizing media and increasing access to information, and the philosophy of technology. The journal inspired the publication of a landmark video art book (*Video Art: An Anthology*, edited by Ira Schneider and Beryl Korot) and a book about video political activism (*Guerrilla Television* by Michael Shamberg).[824]

As Davidson Gigliotti writes at the website where all published issues of *Radical Software* have recently become available online, a study of the history of the journal shows that video art – arguably the first sub-genre of what would later become New Media Art – had its origins in a critical and utopian view of the present and possible future of media in American society. The *Radical Software* collective had a vision of an alternative to the commercial television industry. They wanted TV to become a creative and democratic media.

As their choice of the word *software* for the name of the journal shows, the *Radical Software* collective was searching – in a cultural sense – for a different interface or set of operating instructions for the presentation and dissemination of information in the framework of the hardware of television and the software of visual media transmission systems.

The fact that, in 1970, the term software could still be transferred, in a metaphorical gesture, from computers to an entirely different domain – that of video art and the critique and utopian vision of the media in general – indicates that software has historically had a broader meaning than simply a computer program. The 1960s-1970s meaning of software was much vaster than the instructions to a processor because it had the exclusionary meaning of everything that is not the hardware. It was the statistician John Tukey who, in 1958, first used the word software to refer to all aspects of the computer which are not the "tubes, transistors, wires, tapes and the like."[825] As Nathan Ensmenger writes in *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise*:

> Although the idea of software is central to our modern conception of the computer as a universal machine, defining exactly what software is – can be surprisingly difficult. Although Tukey clearly intended these other elements to include primarily computer code, by defining software in strictly negative terms – software was everything not ex-

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> plicitly understood to be hardware – he left open the possibility of a broader understanding of software…
>
> In this sense, software is an ideal illustration of what the historians and sociologists of technology call a sociotechnical system: that is to say, a system in which machines, people, and processes are inextricably interconnected and interdependent. Software is perhaps the ultimate heterogeneous technology. It exists simultaneously as an idea, language, technology, and practice. Although intimately associated with the computer, it also clearly transcends it.[826]

The Random House Websters print dictionary of 1991 has two definitions for the word software. The first definition is the obvious one, from today's vantage point, of a computer program. The second definition is: "any material requiring the use of mechanical or electrical equipment, especially audiovisual material such as film, tapes, or records."[827] Today, in the year 2022, this second sense has all but completely disappeared. It is not mentioned in the English-language Wikipedia article on *software* nor in any of the many available online dictionaries. What was the cultural-linguistic context in 1970 of the founders of the journal of the Raindance Corporation choosing the name *Radical Software*? We know that Tukey marked the change in signification of *software* in 1958 from human operators to computer software code (computers in the late 1940s and 1950s necessitated – mostly female – programmers to manually configure cables and wires and flip switches). But what about the video material meaning? What is its history? Who first started using the word to mean that?

Was the term software so widely in use when talking about computers that it spilled over into people referring to audio-visual material like video as software? Or, in 1970–1974, was it the opposite, that the second definition as multimedia content was still more widespread than the computer sense? Only later did the computer meaning ascend and the audio-visual material meaning fade. Did the creators of *Radical Software* in 1970 have little awareness of the computer connotation? Or did they have some awareness of it but did not think that the reality of the two different meanings was significant? Or did they intentionally want to evoke the computer meaning to make things more interesting?

Architecting Better Social Media

Michel Foucault speaks of the arena of the micro-physics of power, the invention of a machine for the governance of diminutive things. There is a potential battle looming between surveillance by the algorithms, databases, and data acquisition equipment of the big corporations and the resistance of my own everyday life practices of enjoyments and freedoms, the tug-of-war between power and anti-power.

How do we accomplish this radical progressive transformation in the age of information and online social media? How do we realize the next step in what social media can become?

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In new media theory, there is the idea of an endlessly reproducible object existing in an entirely digital and virtual – and therefore non-physical – space. In a way, this emphasis derives from the influence in cultural studies of Walter Benjamin's infinitely cited essay "The Work of Art in the Age of Its Technological Reproducibility."[828] Each digital object is believed to be created directly from the 0s and 1s which are held to underlie it, and which stand discretely for presence or absence. If we start out instead from higher programming languages, we see that the patterns of software coder and user experience are more complex and are genuinely material and architectural. The idea that computers can represent everything – the Alan Turing idea of the universal machine – leads us to miss out on all that can be architected.

What is Creative Coding?

What is Creative Coding? Everyone knows what computer science is and what programming and writing software code is all about: it is a technical discipline, an engineering subject, an established practice of learning about how we get something to run, how to write a program to do something for us without making an error. It is a purposive-rational activity, driven by objectives like making money, implementing a cool new application, or the aesthetic fascination of engineering and all technical details as ends in themselves. Technical universities train their students in computer programming. All businesses employ computer programmers: banks, insurance companies, car manufacturers, telecom providers – the list goes on and on. Every company maintains a huge database, transaction system, and IT know-how.

In the 1960s with video art, artists created artworks that explore the possibilities of technology and/or modify media to communicate aesthetic and socio-political concerns. These genres include new media art, digital art, electronic art, interactive art, generative art, software art, code art, Net.Art, VR art, robotics art, cyborg art, Bio Art, sound art, telepresence art, and ecosystems art.[829] In the past fifteen years, artists and designers have become increasingly interested in learning how to write software code. This trend has been fueled in part by specialized development environments for Creative Coding (special toolkits for artists and designers), such as Processing, openFrameworks, Cinder, Max/MSP, and vvvv.[830]

So far artists have only rarely questioned the conventional understanding of computer programming. It has been taken for granted that programming *is what it is*, and that Creative Coding is the decision that the list of categories of people who should learn how to program should expand. A whole new category of students is going to acquire those same skills which students at engineering schools acquire. The idea that the nature of programming will get changed by those involved in the humanities, design, art, and cultural studies is only now emerging. Creative Coding promises to break new ground for affecting the design patterns of culture. The aim is to create a hybrid discipline merging technology and the humanities.

Over the decades, computer programming has represented a series of successive and different paradigms and undergone revolutionary paradigmatic changes. These seemingly technical paradigms are in fact knowledge paradigms which are to be understood

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as a genealogy or sequence of cultural-historical stages. We should view these successive phases in terms of cultural and historical knowledge. Indeed, it is no simple task to see, recognize, or define what computer science is! Computer scientists, who have been trained in a mono-disciplinary way as experts in technical practices, do not have any perspective on themselves.

The Poetic Expressiveness of Code

We want to examine the early twenty-first century culture of software code as advancing a poetic or expressive media, or which interrogates code as an artefact, or which develops code in relation to writing. Although software code is generally assumed to be a formal language allegedly lacking the ambiguities of human languages, there exist both subjective and anagrammatic sub-texts within code. These expanses of textuality are to be found both in explicitly Creative Code and in normal coding practices. They can be brought into relief through practice of the artist-programmer or via deconstructionist readings of standard code.

How can the ambiguities of language reassert themselves within a formal or logical language? The software layer is the translation between human and machine language. This traversal actuality of translation and corporeality of the human factor already make code to a certain degree – and potentially even more so in the future – sovereign from the hardware-level bit-manipulation functioning of the computer. There is a vast array of experimental projects.[831] There is experimentation with the rules of code and disobedience of the rules. Prose and poetry and the writing of fiction get integrated or interspersed with the code of various programming languages. Computational media engender new poetics. Computers become *writing machines* (N. Katherine Hayles) and *phantasmal media* (D. Fox Harrell).[832]

Code is not only an instrument of language. It spawns new language environments. Poetic language re-emerges within software code to counteract the original historical and scientific-technological axiomatic assumption that code is a series of instructions to the machine, an exercise in formal logic, and the conversion of language to information. What is the relation of software code to the history and future of writing? What is electronic writing and how are literary texts today (contemplating the inverse direction of the relationship) affected by the structures and idioms of informatics? Might Creative Coding develop into a challenge to the understanding of what programming is – a contestation and transformation of informatics by artists and cultural scientists with a commitment to the humanities and the arts and design?

From Sociology to Media Studies to the Next Paradigm?

Martin Cooper led the engineering team at Motorola that designed the first cellular portable phone prototype (the DYNamic Adaptive Total Area Coverage) in 1973.[833] It was ten years before Motorola's portable phone was made available to the public. Cooper says that he was inspired by the handheld communicators of *Star Trek* of the 1960s.[834] The

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communicators on *Star Trek* are compact units with a flip-up transceiver antenna grid. Opening the flip-antenna portion activates the device, which one can then speak into without dialing. The MicroTAC was introduced by Motorola in 1989 as the world's first flip-phone design.

The smartphone as the exemplary technology of digitalization brings to our attention the exigency of defining a knowledge paradigm beyond those which take as their object of inquiry society or "the social" (sociology) and media (media studies/media theory). This new field should bring transdisciplinary knowledge to bear on the design of informatic technologies. We need a discipline of the aesthetics and morality of algorithms.

Sociologists believed in something the "the social." But this was wishful-thinking – the masses resisted being known or accounted for by the surveys and questionnaires of the market- and social researchers. This resistance takes the form of a hyper-conformism to the questioners' polls and expectations.[835] Sociology's idea that *the social* is an objective scientific reality is questionable. *The social* is a construct – as in Berger and Luckmann's "the social construction of reality" – yet the word social in their phrase is self-contradictory.[836]

Media studies was a promising and then anointed candidate to succeed sociology. The idea that *the media* is an objective scientific reality that will always be here is also questionable. With the smartphone, there is no longer the mediation between two "realities" nor McLuhan's extension of man. We are in a situation of interconnectivity that is global, all-encompassing, and viral. Information, messages, and other things we value spread through the networks because they are contagious or infectious for us. This propagation knows no boundaries and is promiscuous, as evidenced in phrases like "going viral" and "viral media." Media are everywhere. The coronavirus crisis was "real" and deadly, yet it serves as well as a metaphor for the borderless and replicating nature of the media.

The smartphone is a combination of many technologies, an assemblage (a concept of Deleuze and Guattari, Manual De Landa, and Bruno Latour) or apparatus (or *dispositif*, a concept of Giorgio Agamben).[837] The user seeks interaction with and mastery over the world through informatics. There are algorithmic automatic coded procedures. There is the combinatorial state-altering manipulation of systems-and-applications options and properties – the "settings." Media and "the social" still play a residual role. In the posthuman, we are now information processors designing our social-media-digital-virtual existence through software.

Thinking back to the 1970s and 1980s, Marxist-oriented sociologists continued to insist for a long time that economics and class relations (or antagonisms) between workers and capitalists in the sphere of production are the driving force or "determining instance" that explains society and the world. Marxists did not take seriously continental postmodernist thinkers like Jean Baudrillard and Umberto Eco, who prioritized the study of media, consumerism, cultural semiotics, and the power of images and rhetoric to destabilize modernist truths and core values like democracy, communication, and the public sphere. The golden age of sociology was the hegemony of the knowledge paradigm whose primary object of investigation was "the social" or society. Baudrillard deconstructed the epistemological model of "the social" in *In the Shadow of the Silent Majorities… or the End of the Social*.[838] After the social science resistance to media for decades, we are now in the

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golden age of media studies. Today the size of media studies departments at universities dwarf sociology by an order of magnitude.

Philosophy, psychology, and literature are knowledge fields for understanding the *I existence*. For understanding *we existence*, the media have become the object of inquiry of the dominant knowledge paradigm in the social sciences, humanities, and art and design. But can media studies explain software? The intense emphasis on media is a resistance to a newer paradigm which is emerging, indicating an inflection point analogous to how sociology resisted the emergence of media studies and media theory in the 1970s and 1980s. This third paradigm now coming into view after sociology and media studies has to do with existence, experience, experiment, engagement, emotions, and embodiment. It has to do with code grasped and appreciated in a transdisciplinary way and with the importance of *posthuman* agents. It deals with the street art of *the construction of situations*. It addresses the relation between philosophical morality and computer science algorithms. It deals with post-scarcity post-work, and with pragmatic-utopian visions of a better society, and with *technological anarchism*.

John M. Culkin brought his "Center for Understanding Media" from Antioch College, Yellow Springs, Ohio to the New School for Social Research in New York City in 1975. Starting in the 1990s, media studies/media theory succeeded sociology. Are we now on the verge of the supersession of media by a newer paradigm of software studies, Critical Code Studies, or transdisciplinary informatics?

The ubiquitous digital media technology device of the smartphone is versatile. I can do anything with my smartphone at any time, and from anywhere my body physically finds itself. It knows so much about specific urban and geographical localities, and about the online or offline status of my "friends" at this instant. I micro-manage the environment of my smart home. I chat and text with others, peer-to-peer, many-to-many, or one-to-many, sometimes with avatars and AI bots in social networks and virtual worlds. I play games. I snap and browse photos. I photoshop-edit and upload my photos. I mashup videos. I read the news. I make my schedule of today's activities with the calendar app. I check the weather and the financial markets. I pay for things. I do my banking. I map my travel route. I order a taxi or Uber. I remote-control my car. I check in for my flight or train trip. I listen to music. I stream movies. I watch sports. I study a foreign language. I read an e-book. I monitor my health and my calorie intake. My smartphone doubles as a flashlight. BUT WHO IS THIS "I"?

A Happy Ending

What was this book about? The question was posed: how can cultural theory explain the effects of technology on society? There were six "answers" given or conclusions reached.

(1) We need to further develop a cultural theory concept of hyper-modernism that goes beyond the concepts of modernity and postmodernism.
(2) We need to further develop a cultural theory concept of hyperreality that goes beyond the concept of reality.

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(3) We need a cultural theory concept of post-humanism that goes beyond the concept of humanism.
(4) Hyper-modernism, hyperreality, and post-humanism are nowadays implemented through software code.
(5) We need a way of thinking and writing about the world which I call "science fiction theory" or science fiction as an epistemological mode – beyond the received idea of science fiction as taking place only in the expressive fictional genres of novels and films.
(6) Following Marx's eleventh thesis on Feuerbach – "The philosophers have only interpreted the world; the point, however, is to change it" – cultural theory becomes *praxis*.[839] *Praxis* is the unity of theory and practice.

I argue that the practice of Creative Coding, informed by media theory and cultural theory (or transdisciplinary design), is the appropriate way forward for my work in the humanities (in art and media research). Creative Coding is also understood as a challenge to informatics, the possibility of inciting a paradigm shift in computer science itself.

Marxist thinkers place at the center of their vocabulary the term "capitalism." They constantly name the society in which we live as "capitalism," emphasizing economics rather than culture, and believing that to be the most insightful way to describe the world. They tend to make the unaware assumption that they are speaking of an "objective reality" rather than having selected a prism through which to view things, employing a concept which they have chosen. Paradoxically, I use the term "capitalism" myself many times in this book. Yet my primary standpoint is that the Marxist perspective is suspect because naming our society by its "economic system" of capitalism implies that there is a clear alternative when there is not. It indulges in the abstraction that there is a "something else" which is almost never explicated. The stress is regrettably almost always on critique of *what is* rather than the design of *what could be better*. The Marxist thinker Mark Fisher admirably glimpsed this conundrum in his 2009 book *Capitalist Realism: Is There No Alternative?* when he pointed out that it is henceforth easier to imagine the end of the world than to imagine the end of capitalism.[840]

There are many other central concepts which purport to name our society. The German sociology of Max Weber privileges the aspect of bureaucratization.[841] The French sociology of Émile Durkheim speaks of *anomie*, something akin to alienation.[842] Liberal thinkers might say that we are living in a liberal democracy. Conservative thinkers might call us a decadent society where standards of excellence have declined. Spokespersons for ethno-religious democracies such as Israel or Morocco might state that they live in a Jewish or Muslim society. Post-Frankfurt School critical theorist Jürgen Habermas underscores the positive gains of the Enlightenment and the program of "communicative rationality."[843] Feminism might say that we live in a patriarchy. Paul Virilio claims that we live in a permanent state of war or militarism. For Baudrillard, it is hyperreality or the simulacra. Post-humanist ecological thinkers point to our anthropocentrism. Christian thinker Jacques Ellul's famous book was *The Technological Society*.[844] Systems theorists like Luhmann and Nassehi accentuate *complexity*. Lyotard identified the post-modern society. Hannah Arendt and George Orwell decried totalitarianism.[845] Daniel Bell named the contemporary situation as the post-industrial society.[846] Others might say the infor-

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mation society, the informatic society, or the reign of cybernetics. Michel Foucault highlights power and surveillance. My project is to add my idea that we live in a science fiction world to this knowledge list.

I invoke all these examples mainly to make the point that the Marxist emphasis on capitalism is not the only way of looking at things. The hyper-modern world is in dire straits, and we need to engage with all the above-enumerated ideas to find a way out. We will not find the solution merely by rearranging who has "ownership of the means of production."

My political and intellectual orientation is that I am on the far left but I am not a Marxist. I am also a sort of liberal and a sort of anarchist. I would like the intellectual left to become self-critical about its perennial Marxist assumptions. I would like to develop a full-fledged alternative theory and framework for socially transformative thinking. I have taken one step in that work in this book with my controversial claim that we are living in science fiction. To underline the paradigm, worldview, or epistemology of science fiction provides considerable understanding of what is happening out there and what we can do about it.

Another significant support for my thesis about Creative Coding comes from the philosophy and history of science. As Kuhn teaches, any given science evolves progressively and mutates in its history, proceeds through paradigm shifts and periods of "normal science," and is intricately bound to the cultural *Zeitgeist* though not in a relativist way. My many retrospectives of the technological history of digitalization offer evidence that programming has changed many times from paradigm to paradigm, and always in parallel with cultural paradigms. All this strengthens the idea that programming can change again.

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