CREATIVE MIS/UNDERSTANDINGS: EXPECTATIONS, OUTCOMES, AND FRICTIONS IN ASYMMETRIC ART/SCIENCE ENCOUNTERS

by Jens Hauser

Art/Science programs, residencies, funding schemes, and institutional initiatives are currently springing up like mushrooms worldwide, illustrating the trend of an increased, mutual interest between the arts and the techno-sciences.[1] Nevertheless, while for an artist these opportunities fall within the larger scope of *artistic research* or *arts-based* research, carried out from the viewpoint of various disciplines, the inverse perspective of a natural scientist in residency or one 'embedded' in an art institution does not appear as a symmetrical reality – the typical case of conservation science in museums notwithstanding. The four artists selected for the Biofaction residency program were all invited to collaborate with laboratories in specialized areas of synthetic biology, and not only faced the figure of an individual fellow scientist as their alter-ego, but also the whole context of collaborators and teams obeying lab-specific sociological patterns and hierarchies,[2] safety concerns, ethical issues, and what philosopher of sciences Hans-Jörg Rheinberger has

[1] The concept of 'techno-sciences' emphasizes that knowledge derived from scientific study is not 'pure', but deeply entangled with its technological tools and sociopolitical contexts. Philosophy points to the strong interactions in contemporary scientific research and development between formally separated theoretical science and practical technology. The term is most often ascribed to Gilbert Hottois who has coined the term in his article *Ethique et techno-science* (Hottois, 1978).

[2] Bruno Latour and Steve Woolgar were among the first anthropologists and sociologists to study the daily work processes of empirical researchers at a scientific laboratory. Their book *Laboratory Life. The Social Construction of Scientific Facts* was published by Princeton University Press in 1979.

described as "epistemic things" (Rheinberger, 1997) – tools and agencies, e.g., model organisms and technical apparatuses. Rather than the mantra-like or putative binary of art/science or stereotypes about mindsets, it may well be the asymmetry inherent in such institutional encounters that generates disturbances, interferences, or 'noise'. However, it may be these exact misunderstandings that might turn out to be fruitful and conducive to productive friction in the end (Hauser, 2021).

Mis/Understanding

Comparing artists Isabelle Andriessen's, Karel Doing's, Lara Tabet's, and Eduardo Reck Miranda's initial proposals and expectations with the outcomes and reports at the end of the four residencies reveals different degrees of accurate predictability, mis/understanding, and mutual adaptation unfolding into tangible results. Each case appears to be specific, encountering different types and extents of 'noise'. However, in philosophy at large, and in hermeneutics in particular, "injecting noise into the system" and the "necessity of misunderstanding" (Rasch, 1992) are often considered to be something positive, "an indispensable means by which information is generated [...] noise can be perceived to be something other than interference" (Ibid:66). French philosopher Michel Serres even describes noise as "a sign of the increase in complexity" (Serres, 1982), which "erases an order and reconstitutes another order. Noise destroys and noise can produce" (Ibid:243), so that informational parasites are always present and even "inevitable, like white noise. White noise [bruit de fond] is the heart [fond] of being; parasitism is the heart of relation" (Ibid:42). The central key in this argument is that the ideal of understanding, as tacit agreement or overcoming of distance, can itself have negative effects –

> "as a gesture to extinguish difference in its relentless pursuit of the absolute presence of unified knowledge. Rediscovering oneself in the Other, the argument goes, is tantamount to denying the absolute otherness of the Other." (Rasch, 1992:62)

Transposed to the asymmetric relationships between artists and (natural) scientists this means that by understanding each other too smoothly, "one has already surrendered one's otherness to the Other and become the Same, one has been swallowed up and made to agree in advance to one's own

appropriation" (Ibid:62). In this sense, one may even "include noise as an act of self-preservation" (Ibid:64). Such a position is based on information theory models, such as those outlined by Claude Shannon, which identify "information not with order, as one might expect, but with maximum disorder. To do so, the notion of information has to be distinguished from the notion of message. Information is seen as the total field of choices from which the choice of the correct message is to be made." Consequently, "an addition of noise, of perturbations in the system, means an increase in uncertainty and thus increase in information" (Ibid:65). When will an artist feel swallowed up, or a natural scientist within his institutional framework, protected and enclosed as though in the armor of legislations and health and safety concerns, will first and foremost wish for their message to be understood?

Such encounters and entanglements may not be seen as a new paradise of interdisciplinarity. Instead, they continuously provoke misunderstandings – however fruitful they may be for all of the actors engaged in such relationships, as well as for outside observers – because their focus is often placed on different finalities and methodologies of understanding, researching, and communicating. Artists may be attracted not only by the scientific research questions at stake, but also by the sophisticated technological media and apparatuses made available to them. While some researchers in the natural sciences may consider art as a pluripotent catalyzer of thought for alternative problem solving, others may still stereotypically apprehend collaborations with artists in terms of 'beauty', 'creativity', 'virtuosity', or 'genius'. Alternatively, and driven by a clear utilitarian mindset, they might expect an artist to assist them in visualizing their findings or to communicate their results in a more convincing way to their community. There may also still be artists who, when crossing the threshold of a scientific laboratory, will first and foremost perceive of an army of technicians potentially at their service, inclined to materialize their preconceived ideas. Such misunderstandings will rarely be fruitful.

Questioning binaries

Binary thinking needs to be overcome in order to turn participants' different expectations and institutional constraints into productive tension. Is the art/science dualism, inherited from the two cultures debate initiated

by C. P. Snow,[3] the most prominent point of reference since the 1960s, even still a valid mode today, waiting to be actualized by a much desired "third culture" (Brockman, 1995)? Some fundamental questions need to be raised: Why is it that only the natural sciences are still considered the only 'true sciences'? Why does the very notion of the 'humanities' not include the status of science as claimed in the German term of *Geisteswissenschaften* coined by Wilhelm Dilthey[4] with the intention of considering research in the humanities to be of equal value to the natural sciences? Dilthey's goal was to establish *Geisteswissenschaften*'s proper methodological foundation, as distinct from, but equally 'scientific' as, the so-called natural sciences, which he considered to be at risk of becoming reduced to positivist cause and effect logics, thereby neglecting the complex relationships at stake with regards to human 'understanding'. To go even further: Why are the arts, then, so often associated primarily with the humanities, and not with engineering, while many practitioners today (especially in the media arts) have a background or a focused interest in the natural sciences, and highly specialized expertise in the most diverse technologies? How can one see the arts then, today specifically, as natural science's 'natural other'?

Natural scientists often aim to clearly distinguish themselves from engineers, though, in a way comparable to artists distinguishing themselves from designers. "Technology and engineering are about doing new things, i.e., bringing otherwise non-occurring items into existence. Technology both enables and empowers science, but it is not science," Víctor de Lorenzo writes in his contribution to this book.[5] Artists and scientists generally converge in their desire to reflect on *how they know what they know*, instead of straightforward utilitarianism with regards to the subsequent tools that they use. While the techno-sciences have themselves become powerful producers of aestheticized images, art is no longer merely concerned with the

[3] *The Two Cultures* was an influential lecture held in 1959 by Charles Percy Snow. Snow's main thesis was that Western society was irreconcilably split into two cultures – the natural sciences and the humanities.

[4] Wilhelm Dilthey (1833-1911) was a German philosopher known for his distinction between the natural and human sciences, claiming that the main task of the natural sciences is to provide causal explanations, while the core task of the human sciences is the understanding of the organizational structures of human and historical life.

[5] De Lorenzo, Víctor: "Towards a new covenant with nature – starred by environmental microorganisms"; this volume.

aesthetic transposition of knowledge, but with knowing and feeling *how knowledge is being produced*. In this sense, the very notion and finality of the term 'research' needs to be questioned too, taking art's inherent feature of criticality towards established structures into account: One can either conduct research to find a solution or an answer to a problem or analytic question, or conduct research with the aim of generating new questions.

Productive noise

Among the four artists selected, Eduardo Reck Miranda (a musician and composer with a scientific background) probably encountered the lowest level of noise in his residency process. His original intention to "embody a metaphorical model" of bio-fluorination "to compose a symphonic piece" also anticipated the Technical University of Denmark's Center for Biosustainability Lab's supposed interest in producing in "an effective medium for public outreach and dissemination" and the prospect of "a paper for publication."[6] The digital composition process did not seem to have encountered any regulatory obstacles since a composition "informed and inspired by a metabolic process,"[7] which the artist got familiar with, used "data abstracted from phenomena other than music," rather than working towards a wetware-based performative piece, and the artist worked with the whole team of scientists to "articulate the role played by science in my creative process."[8] By contrast, Isabelle Andriessen's initial motivation to develop materials, larger scale and new-to-nature reactions, sculptures, landscapes, and public performances was put to a reality test when actually interacting with the Cronin Lab at the University of Glasgow: "I imagined the outcome of his research to be in a much more physical or material stage than actually feasible in real life." Since "[The Cronin Lab's] materials on a molecular scale [are] oftentimes only visualized in mathematic equations and, if you are lucky, recorded in petri dishes" and the artist's crucial aim is "the bodily encounter with the time-based sculptures," she radically changed her project and finally shot "an uncanny surrealist science-fiction film, in which the Cronin Lab functions

[6] Miranda, Eduardo Reck: Motivation letter to Biofaction, 2020.

[7] Miranda, Eduardo Reck: "Making music with enzymes"; this volume.

[8] Ibid.

as an environment or a landscape in which the film's narrative unfolds,"[9] embedding the lab's automated 'chemputers' as main actors in a narrative plot in which alternative life forms are created. While "the research team and surrounding staff members were very welcoming and helpful throughout the entirety of the residency," the artist regrets that during the artistic production time itself she "had very little or no response from Lee Cronin, nor any leads or follow-ups from him or his team members. This resulted in a lack of a sense of collaboration or exchange,"[10] and initially intended to exchange philosophical discussions about and critical views upon the perspective of synthetic biology, which her residency fell short of.

Likewise, artist Karel Doing's intention to work with the actual tobacco plants modified with genome editing techniques such as CRISPR/Cas9, agroinfiltration, and intragenesis at the Institute for Infection and Immunity of St. George's University of London knocked against GMO regulations and health and safety rules, so that he finally started to grow his own, non-genetically modified tobacco plants from seeds at home. However, since his interest was indeed in the "common ground [...] between the material and processual nature of both the arts and the sciences," he turned his collaboration with the lab toward "visualization techniques that can be used to confirm the manifestation of certain bacteria, viruses, enzymes, or proteins, [...] gel electrophoresis, dot blots, and Elisa plates," because "these methods rely upon biochemical reactions that are similar to the reactions that occur in analog photography."[11] Alongside the application of his own particular technique of phytography – using the tobacco plant's juices as developers to produce photographic images of the very same tobacco plant as metonymic self-portraits – he also employed classical photography to poetically portray lab equipment: "In this way, the lab suddenly turned into a space filled with sculptures, installations, and performances, simply by allowing for an artistic point of view to be included."[12] However, his interest and desire to exchange about the origins and social and spiritual significance of the tobacco plants in indigenous cultures was not met by his scientific

[9] Andriessen, Isabelle: "Souls from the deep: a survey through a sticky universe"; this volume.

[10] Ibid.

[11] Doing, Karel: "Tobacco: a mass of atoms, a biofactory, a generous friend"; this volume.

[12] Ibid.

counterparts: "They were mostly concerned about the image of tobacco as unhealthy, and public critique of GMO technologies, which could compromise their research,"[13] so that the final aesthetic outcome was formally compelling lab photographs, prone to produce positive outreach.

Finally, Lara Tabet's residency project also took a different direction than the imagined audio-visual art piece, combining gathered scientific data, footage, images, and sound – but, in her case, it turned into a concrete, hands-on experience of actually staging conceptually challenging lab micro performances (Hauser, 2020). Both works revolve around the question of "how can we discuss agency and labor in wet media art?"[14] In the first case, the artist, who also has a medical background herself, programmed bioluminescent *Pseudomonas putida* bacteria to 'commit suicide' upon voice command; in the second case, she used and genetically engineered her own fecal bacteria to produce a psychoactive neuropeptide, and speculated on its potential release into Beirut's water system in order to increase humans' resilience and reduce post-traumatic stress disorder. To comply with the regulations of the National Center of Biotechnology in Madrid, the solution was that the micro performances at microbial scale "should take both the specific demographics of the bacterial cycle of growth and the spatiality of the laboratory setting, in which contamination can be avoided, into account. This meant that the final work would definitely have to be the documentation of the performance, rather than the performance itself,"[15] as regularly happens when documenting human-centered performance art. These artistic projects "were the subject of countless discussions around assessing their technical feasibility, their safety, and the message to be shared with the general public" for the collaborating researcher – for whom "having an artist visit an experimental laboratory was as unusual and exotic as it could get" – since the question was considered legitimate and relevant from a scientific point of view, "whether or not the deliberate spreading of mood-influencing bacteria through a large human population could ultimately have serious social consequences, even political ones, given that our perception of reality could be modified at a large scale."[16]

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[13] Interview with the artist, Paris, 10.5.2022.

[14] Tabet, Lara: "Multiscalar forms of resistance: the molecular switch, the bacterium, the individual, and the state"; this volume.

[15] Ibid.

[16] De Lorenzo, Víctor: "Towards a new covenant with nature – starred by environmental microorganisms"; this volume.

Víctor de Lorenzo describes the mutual benefit of these exchanges:

> "We were thrilled to witness how bringing an artist like Lara to our laboratory inspired her creative agenda in directions that she had never probably explored previously. We should note, though, that inspiration was bidirectional: we also discovered perspectives that we had never contemplated regarding our intimate interplay with the microbial world by talking to her. "[17]

Analyzing motivations

Many initiatives that boost interdisciplinary artistic research embed 'hands-on' practice of discovering possible futures by addressing the techno-sciences' deceptively seamless influence which increasingly determine our world today, both physically and mentally, something that has been addressed by theoreticians such as Helga Nowotny as the "scientification of society" (Nowotny et al., 2001), while their pervasive entanglement with their technological tools and socio-political contexts are often overlooked.

In a similar way, the Max Planck Institute's recent initiative KLAS (Knowledge Links through Art and Science)[18] has been investigating the mutual benefits of art-science collaborations related to the vast research field of synthetic biology and its public perception and understanding. In order to justify its utility or usefulness, KLAS conducted extensive interviews about the participants' personal experiences in relation to their conceptual and methodological exchange.[19] Some typical patterns, which are indicative of asymmetric expectations, also appear in these interviews. Questions articulated by biologists include: "What I can learn from artists? To be designers. They could help design our microfluidics channels," and express affirmed utilitarian desires with regards to the tools of research themselves. Othersnatural scientists hope to benefit from artists' communication skills with regards to "public engagement: if the artists can help with our work, that would be useful" or "I have learned to better explain my work to people

[17] Ibid.

[18] For more info, you can visit: https://klas.polyhedra.eu.

[19] To see more: https://polyhedra.eu/wp-content/uploads/2017/12/KLAS_workshop_booklet.pdf.

outside my field." Some participating cultural practitioners, for their part, think that "artists can certainly contribute for the advancement of science, a field that requires both imagination and creativity." Interestingly, these interviews reveal aspects that show an enhanced willingness to engage in critical self-reflection on both sides. Influenced by the artists' presence, a biologist addresses their epistemological blind spots as follows:

> "One of the biggest temptations facing scientists today is the use of high-end technology instead of reason. [...] If we are given a 'technological' solve, we would rather just throw everything in a machine and see what comes back. A lot of artists have noticed this back and forth with technology, while a new technology can help us see something differently, it can also obscure or distract from the original intention."

This last aspect points to a specific, potential benefit that the arts can provide for the natural sciences, as highlighted by Hans-Jörg Rheinberger; namely, to work against natural science's (oftentimes) uncritical use of metaphors and 'media blindness':

> "There is a general tendency on the part of scientists to blend out the epistemic dimension of their work: the ever-changing means and media. [...] They tend to look through them, [...] to view them as allowing [...] immediate access to the 'findings'." (Rheinberger, 2011:95)

A taxonomy of role models

It is worth asking whether art/science interactions, which are often framed at an institutional level, can be abstracted from the constraints that are inherent to their respective individual or collective frameworks. Idealists may hope for new Leonardos[20] and Frank Malinas[21] to emerge, but such

[20] It is impossible to establish an exact number of publications or programs that evoke Leonardo da Vinci (1452-1519), the Italian polymath of the Renaissance, in order to idealize the reconciliation of artistic and scientific creativity.

[21] Frank Malina (1912-1981) was an American aeronautical engineer and painter, especially known for being a pioneer in both the art world and in the realm of scientific engineering.

hybrid figures, acknowledged by both sides for their expertise, remain extremely marginal. In addition, a sort of homogeneity is often misleadingly assumed with regards to what happens when a cultural practitioner crosses the threshold of a 'laboratory'. Oron Catts, artist and co-founder of SymbioticA, the internationally renowned laboratory at the University of Western Australia in which artists can acquire scientific methods, has criticized the vagueness of the term 'lab' and has described the (quite different) roles that an artist might take on when entering a life science lab:

> "1) the illustrator, 2) the commentator/representer, 3) the visitor/guest/onlooker, 4) the appropriator, 5) the entertainer, 6) the user, 7) the industry worker, 8) the hoaxer, 9) the hobbyist/amateur, 10) the after-hours/under-the-table, 11) the mail-order/ready-made, 12) the researcher/embedded in science/technology setting" (Catts, 2008:120).

In addition, artists in labs may be tempted to creatively turn their dealings with, or struggles against, their hosts into an attitude known in the context of art as the genre of 'institutional critique', thereby conducting their own laboratory studies in a resolutely post-Latour-ian way. Should all natural science labs have an artist-in-residence? What might be, then, natural scientist's motivations and roles when enabling such artistic residencies? Mirroring Catts' taxonomy, several postures come to mind:

> 1) the idealist believing in sharing creativity and curiosity *inter pares*, 2) the opportunist prone to appropriate virtuosity and celebrity, 3) the utilitarian trying to address ethical questions via the arts, 4) the epistemologist believing in alternative ways of knowledge production and discovery, 5) the PR manager employing art for public outreach and agenda setting, 6) the hidden artist striving for recognition by pairing up with artists, 7) the aesthete looking for stylish and beautiful art decoration, 8) the sociologist challenging lab hierarchies through the artist's presence, 9) the businessman engaging in spectacular co-productions, 10) the educator looking for alternative pedagogical strategies, 11) the designer looking for innovative solutions, 12) the philosopher aiming to question and critique techno-scientific reasoning.

However, while this current trend of an increased mutual interest between the arts and the techno-sciences might be addressed as an 'epistemological turn' – it not only results in the production of new forms and narratives but also unfolds in poetic and critical ways of alternative knowledge production, especially including hands-on practices with shared media, materials, and matters. Weary of the gilded cage of metaphor and representation, symbolic intervention, formalistic evocations, or critique at a safe distance, such techno-science related artistic strategies call for an analysis that is not based primarily on imagery, but on material media and epistemic connections; meanwhile, the techno-sciences themselves have become powerful producers of aestheticized images today. Phenomena that once assumed the form of artistic images are being translated, scattered, and fragmented into a variety of instances of mediality – they are not only means to an end, but are fully integrated elements of the aesthetic object itself.

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