4. Showing Off Robots: In/Animacy Attributions in Robotics Demonstrations, Science Communication, and Marketing

4.1. Demo or Die: Outreach, Engagement, and Accountability

Just as other scientists and engineers, roboticists routinely present their work to academic peers and sponsors, as well as to potential customers and the lay public – and they are expected to do so in an increasingly professionalized manner. They stage live and video demonstrations, are involved in science communication efforts, and those who are (also) entrepreneurs have to engage in public relations and marketing as well.

> "Researchers always have something to sell. … Those working in academia are looking for talk invitations, citations, promotions. … Those working in a large company will want to create interest in some product." (Togelius, 2017).

The present chapter will explore this context and show that, also in this professional environment, attributions of animacy to robots are an everyday practice – and not only as a reaction to robots' unique characteristics, but in fact as a constructive aspect of robotics demonstrations, science communication, and marketing.

Across all disciplines, scientists and engineers are required by overarching science policies and individual funding institutions to present and promote their research efforts – not only within their immediate disciplinary communities, but increasingly also to the general public. These expectations are part of a pervasive "rhetoric of 'outreach' [and] 'engagement'" (Weingart, 2019), which is reflected in broad efforts like the PUSH memorandum – a German initiative calling for a stronger engagement for the communication of scientific results to the general public (Wissenschaft im Dialog, 1999). Increasingly, specific requirements for public engagement are also inscribed in grant contracts with funding organizations. For example, projects funded by the European Commission under the Horizon 2020 scheme are required to "promote [themselves] and [their] results, by providing targeted information to multiple audiences (including the media and the public), in a strategic and effective manner" (European Commission, 2017, p. 71).

Consequently, demonstration and science communication practices have become increasingly professionalized and are often driven by institutions' longer-term strategies – not unlike corporate communication efforts (Trescher, 2010). Moreover, instead of just being able to delegate communication tasks to their institutions' press department, scientists are often encouraged, or even pressured, to act "as their own sender" (Trescher, 2010, p. 27; cf. Leopoldina, Acatech, & Akademienunion, 2014, 2017). One consequence of this is a growing relevance of social media for science communication, as it offers a relatively easy way for researchers to draw attention to their work and to connect with an interested audience (Leopoldina et al., 2017; cf. Könneker, 2019).

Roboticists, too, are under immense pressure to legitimize their work, in order to justify past and future funding, to ensure public support, and to meet their "democratic obligation of accountability" (Weingart, 2019). Consequently, "robotics researchers are investing considerable time and effort in 'engaging' publics" (Wilkinson et al., 2011, p. 367). Not only do they have to comply with funding institutions' requirements for dissemination activities. In robotics, even some academic journals require that each article is supplemented with a demonstration video. Also live demonstrations for sponsors, potential customers, and the general public are a regular aspect of roboticists' professional lives.

Robots on Social Media

Many individual roboticists, robotics institutions, and businesses present their work on social media. A practice rather specific to the robotics field is that of running a social media account not (only) for a whole institution, research group, or brand, but for just one specific piece of technology: for a certain robot model, or even for a singular robotic individual. NASA[1], for instance, has been running several Twitter accounts for over a decade. This does

1 National Aeronautics and Space Administration (USA).

not only include accounts for whole institutions, such as the Jet Propulsion Laboratory (JPL), but also accounts for individual pieces of technology. At the present time, there are at least six NASA spacecraft and three planetary rovers with their own dedicated Twitter accounts. These accounts give regular updates on the craft's activities and refer to information and news from the wider space flight community.

Crucially, the tweets posted by several of these accounts are written from the perspective of the spacecraft and rovers themselves. In 2008, JPL's social media team first started letting the Phoenix Mars Lander[2] "tweet" in the first person perspective, and discovered that these tweets gained more reactions from followers: "The first person robot is what breaks the ice and gets people feeling like there's a conversation going on" (Li, 2014). Since then, more NASA spacecraft and rovers, as well as ones from ESA[3] and ISRO[4], have joined the club, tweeting – with varying frequency, and with varying payoff – in the first person perspective.

This unique practice of making robots speak for themselves is highly instructive for the way narratives of robot animacy are utilized in the science communication and marketing context. They will therefore play a central part in the present chapter. While the described "space robots" (spacecraft and planetary/asteroid landers and rovers)[5] are by far the most popular examples, there are also many other types of robots with dedicated social media accounts. Some document the "lives" of bespoke humanoid robots serving as a kind of ambassador for their research groups. Unlike the spacecraft and rovers far away from earth, these robots are usually also regularly presented in live and video demonstrations.

Robot Demonstrations

Demonstrations, just as the communication efforts described above, are an increasingly mandatory and professionalized aspect of robotics research

2 https://www.nasa.gov/mission_pages/phoenix/main/index.html (accessed 2019-12-21).
3 European Space Agency.
4 Indian Space Research Organization.
5 These planetary and asteroid rovers and spacecraft are so-called mixed initiative or shared autonomy systems. While they receive high-level instructions from human operators, more low-level behavior, such as obstacle avoidance, is controlled autonomously by the rover/spacecraft (Richards & Smart, 2013).

and development. In this, they complement the infamous academic mantra "publish or perish" with "demo or die" – an idea attributed to MIT Media Lab founder Nicholas Negroponte, who demanded that researchers and engineers focus on producing artifacts (instead of only publications), which then could be demonstrated to the lab's corporate sponsors (DuVergne Smith, 2014; Markoff, 1996).

Robotics demonstrations typically consist of a robot performing specific tasks, often visualizing a use case relevant to the intended audience. Usually, the robot's task (such as "grip object and move to new location") is embedded in a short narrative ("robot serves drink to person") and a scenario fitting the application goal of the overall project ("at-home care of an elderly person"). In commercial contexts, the goal is to pitch the robot to potential investors or customers. In an academic context, demonstrations can have several overlapping functions and target audiences: They can be a routine part of the publication process, the audience being peers in the academic robotics community. They can also be targeted towards funding agencies and industrial sponsors (Rosental, 2005). A demonstration might be used to visualize current or anticipated robot abilities in a grant proposal, or as part of the reporting process of an ongoing project. Last, but not least, robot demonstrations can be geared towards the general public. On the one hand, successful demonstrations are used to legitimize past funding – "proving" that a research project was worthy of the funds invested in it. On the other hand, showing what robots can do can also be meant to "calibrate the public" and the robotics community itself to the current state of the art (Pratt, cited in Belfiore, 2014).

This shows how in robotics, science communication in the traditional sense (i.e. practices meant to communicate research results to the lay public) often overlaps with practices of presenting results to peers and sponsors in the scientific community, and with practices of marketing products to potential customers. It is not uncommon for roboticists to launch start-up companies, selling technology developed previously in an academic context. In these cases, demonstrations and science communication activities double as marketing activities. This is also observable in the combination of demonstrations and dedicated social media accounts, which are common in both academic and commercial robotics. Using the terms employed in the context of the EU Horizon 2020 program: in robotics, it is difficult to draw a clear line between the communication, the dissemination, and the exploitation of research results (European Commission, n.d.). This blurring of boundaries makes it necessary to take the different areas of practice into account together. The present chapter will show that they have the same functions (such as providing apparent proof of a robot's functionality), that they employ the same techniques (such as references to popular fictional narratives), and that in doing so they all end up "staging" robots' animacy.

4.2. Approach

Cases and Method

Many commercial robot developers not only present their robots in live and video demonstration, they also run social media accounts documenting their robots' "lives". Just as in the academic context, one can encounter both bespoke and small-series humanoid platforms, such as Hanson Robotics' Sophia and Boston Dynamics' Atlas. There are smaller humanoid platforms, such as Softbank's Nao and Pepper – which are by now robust, affordable, and easy enough to use to be marketed not only as research platforms but as programmable education, entertainment, and service robots. Finally, there are household robots such as iRobot's Roomba – featuring technology that is already decades old and by now cheap and robust enough to allow mass production and success on the mass consumer market. Together with the space robots introduced in Section 4.1, these robots make up part of the diverse sample on which this chapter's observations are based. A complete list of all cases is available in the Appendix.

These cases cover a wide spectrum of activity (ranging from one demonstration video every few months, to several social media posts every day), success (from barely any engagement, to millions of followers and video views), professionalism (from a lone researcher dabbling in social media, to a team of trained marketing and video production staff), and interactivity (from quietly posting a video and leaving it be, to complex scripted interactions with other communication teams across multiple platforms and lively engagement with social media followers).

This sample, and the analysis based on it, do not strive to give a comprehensive image of the whole landscape of robotics science communication, demonstration, and marketing. Rather, the cases examined in this chapter were chosen for their potential to illustrate this book's specific point of interest, that is, the attribution of animacy to robots. This is why, for example, industrial robots do not feature in the sample. For the same reason, the quotes and examples presented in the following sections focus more on social media activities, and less on other science communication and marketing activities such as press releases, articles and interviews in the popular press, trade fair visits, open lab days or science slams.

The websites, as well as social media, marketing and demonstration activities and media reports on each case were tracked for a time period including the year 2017 and the first half of 2018. Especially instructive events and documents from before and after this period of time were included in the corpus as well. A special focus was set on the Twitter accounts connected to each case, with all tweets from the specified time period documented and analyzed individually. As in the previous chapter, this corpus of material was systematically analyzed following a qualitative content-analytic approach (Mayring, 2010). Again, analytical categories were developed inductively and iteratively from the material, the central criterion being instances of animacy attribution to robots in the wider sense (including attributions of physiology, sensory experience, cognitive processes, intentionality, sociality, personality, emotion), as well as hints to practices of staging robot agency and animacy (e.g. in the form of a purposeful backgrounding of remote controlling of robot activity).

Here, too, the goal of this process was not to measure or quantify the "amount" of in/animacy attribution, but rather to document the qualitative range of attribution practices, in order to then identify the context, strategic function, and consequences of in/animacy attribution practices in each specific instance.

Chapter Structure

With the help of the cases introduced above, this chapter will explore how robotics demonstrations, science communication, and marketing practices skillfully utilize attributions of animacy and inanimacy to robots for their respective goals.

First, the chapter will show how a staging of robot autonomy and animacy, together with a backgrounding of human agency, are used to provide proof of robots' functionality (Section 4.3). Second, we will see that robots are embedded in scenarios of trouble-free use and narratives of desired futures in order to demonstrate their relevance and applicability (Section 4.4). Third, the chapter will show that robots are made tangible and exciting for the audience by embedding them in engaging narratives, featuring them as animate single entity personas capable of social interaction (Section 4.5). We will also see that, in all these contexts, practices of animacy attribution are not performed consistently, but are instead one aspect of a constant switching of narrative perspectives on the robot as an animate (appearing) autonomous being or a human-controlled machine (Section 4.6). Finally, the chapter will show that these practices are sometimes criticized for causing misconceptions and bias (Section 4.7).

4.3. Narratives of Agency: Proof of Functionality

In most academic disciplines, the default path of presenting research and engineering work to peers and the public is through the publication of written articles. A description of research methods, results, and conclusions, presented in a manner sufficiently convincing to reviewers, is understood to serve as proof for the reported findings and successes. In technology development, it is common practice to add another level of proof: In order to show that, for example, a robot is functioning as promised in a research article, funding application, or PR brochure, demonstrations are performed "to show the feasibility of a technological approach, the value or even correctness of a specific technological approach, … or the proper running of a prototype or product" (Rosental, 2005, p. 346). In robotics, providing a demonstration video is sometimes even a prerequisite for the publication of a peer-reviewed article.

Strictly speaking, a demonstration is only able to prove a robot's functioning in the moment the demonstration is performed. In practice, demonstrations also are understood to "imply that what might have only worked once will work anytime, anywhere and without the implicated networks of human and nonhuman actants" (Both, 2015, p. 1; cf. Suchman, 2007, p. 148). This has two major consequences: Demonstrations routinely are carefully scripted and rehearsed performances and any "unseemly" human intervention is usually backgrounded, or even concealed.

Especially in the context of robotics, autonomous and robust functioning is a central goal. However, technological progress in robotics can appear frustratingly slow to the uninitiated observer. Roboticists are usually aware that somebody outside of their specific field cannot appreciate the technological significance of a seemingly small and unimpressive improvement in robot performance. Thus, as a robot's performance in a demonstration is understood to stand for its performance in the future, it is crucial that everything proceeds perfectly as planned. As a consequence, robotics demonstrations often employ a variety of staging techniques.

A robot might not (yet) be able to interact smoothly with a user via natural language interface, as promised in a project's funding pitch. Hence, for a live demonstration, test users might be briefed to use specific verbal commands, or even be trained to use a certain tone of voice that is easily understandable to the robot (Lipp, 2017, p. 122). For big commercial demonstrations, such interactions are often even scripted word by word (cf. Sharkey, 2018).

Demonstration videos sometimes use time lapses, showing a robot's movements sped up considerably. A video presenting an autonomous towel-folding robot received considerable attention at the time (UC Berkeley Robot Learning Lab, 2010). The video is sped up by the factor 50, veiling the fact that the robot takes 20 minutes to fold one towel. The intention is to make the video shorter and more interesting, but it can also be a trick to conceal a robot's slowness and to make it appear more dynamic and agentic. Usually (but not always) the applied speed factor is disclaimed somewhere in the video. Nonetheless, a time-lapse video makes it difficult for the audience to get a realistic impression of the robot's actual performance speed.

Moreover, demonstration videos are usually edited to include only successful performance trials. One of the roboticists interviewed for Chapter 3 of this book explained:

> "If it works perfectly one time, and then you see a video of that [then you] think 'Ok, works'. … But maybe you even know, but you would never write that in the paper, that it wouldn't be applicable in reality".[6] (R7.6-00:03:54-2)

A demonstration video showing a robot hand successfully "solving" a Rubik's cube, which received considerable attention by the press and on social media, was called out for concealing that the robot apparently only was successful in 20% of the trials (Marcus, 2019a).

Practices like these are aimed at controlling what Catelijne Coopmans (2011) terms the "face value" of a technology. This apparent value (in contrast to the actual value) "focuses attention on the visible surface, on the 'face' that gets presented or shown" (ibid., p. 158) and does not necessarily match reality. There are several facets to the reality that is so carefully shrouded. On the one hand, it is the reality of the robot's performance – for example its slowness or unreliability. On the other hand, it is the reality of human involvement in

6 Translated from German by the author.

its performance. This does not only apply to technology demonstrations, but also to other academic contexts, in which the messy reality of research work is carefully kept away from an audience. Stephen Hilgartner (2000, p. 19) points out "the differences between formal scientific texts and the activities required to produce them …: scientists tinker in the privacy of the laboratory until they are ready to 'go public' with neatly packaged results".

The staging of technologies for the sake of making an impression on certain audiences is not a modern phenomenon. David Gooding and Frank James (1985) described how nineteenth-century scientist Michael Faraday strived to make phenomena demonstrable and self-evident by artfully backgrounding any human involvement in the phenomena shown in a demonstration (cf. Golinski, 1998, p. 94). Also Steven Shapin and Simon Shaffer (1985), in their work on the air-pump experiments conducted by seventeenth-century chemist Robert Boyle, described how public demonstrations of the experiments were carefully scripted and staged, hiding the fact that the shown "effects of nature" were actually controlled by human actors.

These efforts to obscure the involvement of human agents in a technological performance are sometimes compared to techniques employed by stage magicians. Similarly to magic shows, demonstrations reach their desired effect though "the combination of simulation and dissimulation: creating an effect known by all to be contrived, while simultaneously erasing signs of its contrivance in machinery and method" (Alač, Movellan, & Tanaka, 2011, p. 336). Other authors make the connection from technology and science demonstrations to theater studies as well. Norma Möllers (2016) observed that scientists, in order to stage their work as applicable, performed a "technoscientific drama" when communicating with their funding institution. In this, Möllers draws on Goffman's (1959) concept of self-presentation, which distinguished between "front stage" behaviors, which are meant to be visible to the audience, and "back stage" behaviors, which are only shown when no audience is present. In the case of technology demonstrations, a "back stage" action could be, for example, the hiding of a mess of cables and unsightly equipment under a tablecloth, or the hectic commotion of assistants behind a partition, making last-minute corrections in the program code of the robot demonstrator. Bruno Latour drew on theater metaphors as well, coining the term "theater of proof"[7] for situations in which scientists "'force' [the audience] to 'share' [their] point of view" (Latour, 1993, p. 86). Andreas Bischof and Göde Both

7 Depending on the source sometimes called "theater of truth".

(2015) called robotics demonstration videos a "cousin" of Latour's theater of proof – both employing powerful orchestrations in order to make the existence of a certain phenomenon obvious and self-evident. Bischof (2015, p. 286) points out that robotics demonstrations are social events with unique rules. He observed that, rather than worrying about a robot's epistemic features, roboticists often focus on its "stageability"[8]. Both (2015) introduced the term "Youtubization" to describe practices of embedding a robot demonstrator in dedicated choreographies and narratives. He observed that, in some cases, these were staged to such an extent that they "d[id] not … conflate with the project's overall objectives and work practices" (ibid, p. 3).

Probably the most frequently staged aspect of a robot, both in academic and commercial contexts, is its autonomy – its independence of human control. Recent examples are small mobile robots used in the United States to deliver fast food to customers' doorsteps. While appearing to move autonomously, they are actually remote controlled by minimum-wage workers in Colombia (Said, 2019). In the wider context of commercially used artificial intelligence (or rather, pseudo-AI), practices of employing humans as "mechanical turks"[9] or "ghost workers" (M. L. Gray & Suri, 2019) have reportedly lead to absurd situations: The "automated" office assistance offered by the company X.ai, for example, is actually performed by human employees – which are required by the company to interact in messages to users in a "robotic" way in order to leave the impression of interacting with AI (Lobe, 2019).

Demonstrations, too, often hide that a human is remote controlling certain robot functions, or that the robot actually only manages to complete its task in one out of dozens of trials. In live demonstrations, a human controller might be hidden off stage; in a demonstration video, they might be kept out of the camera's shot. Lucy Suchman observed such an "erasure of human labors" (2007, p. 238) in her studies of robotics laboratories. She noted that a robot in its "'backstage' environment provided an opportunity to see … the extended network of human labors and affiliated technologies that afford[ed] its agency" (ibid., p. 260). Suchman interpreted this as a "lesson… requir[ing] that we reframe [the social robot] from an unreliable autonomous robot, to a

8 German "Inszenierbarkeit" (translated by the author).

9 The Mechanical Turk was a chess-playing machine from the late eighteenth century. It was presented as being able to play chess autonomously, but in fact was controlled by a human hidden inside the machine (e.g. Standage, 2002).

collaborative achievement made possible through very particular, reiteratively developed and refined performances" (ibid.). Frequently, these performances feature "extreme and spectacular circumstances … in order to impress the audience and in order to produce witnesses of the achievements shown on stage" (Rosental, 2005, p. 346). One of the roboticists interviewed for Chapter 3 of this book explained that "you will see that a lot in robotics. Like, robots juggling objects or something. Just to impress laypeople" (R8.1-00:08:57-1).

Especially interesting examples are the impressive demonstration videos of Boston Dynamics' biped humanoid and quadruped robots (Boston Dynamics, n.d.). The company is famously secretive about the technical details of its work, but regularly releases spectacular videos showing off the robots' newest abilities. Whether it is the dog-like Spot robot opening doors or the humanoid Atlas gracefully leaping over obstacles – the videos regularly go viral and gather millions of views (e.g. Boston Dynamics, 2018b, 2018a). Boston Dynamics' video demonstrations are so impressive because the robots appear to have physical abilities surpassing those of most other state-of-the-art robots. Moreover, these videos make the robots appear completely autonomous. Rarely is there any human visible near the robot, the cameraperson seemingly being the only one following it around. In reality, Boston Dynamics' robots are only partially autonomous. Most are remote controlled by a human operator – a fact that is usually carefully concealed in the viral videos. It is in the company's interest that the videos remain vague on technical details, but full of fuel for speculation about the robots' abilities. This "helps to create interest around Boston Dynamics' projects, and their … secrecy insures that competitors cannot copy their achievements, strikes the public's imagination, and leaves everyone in the dark about the weaknesses of their technology" (Shih, Sinapayen, & Kurenkov, 2019).

An intentional backgrounding of human labor can also be observed in more traditional science communication contexts. Ian Roderick (2010) found that the US Department of Defense frequently embeds its military robots used for explosive ordnance disposal (EOD) in a "life-saver" narrative. The remote controlled robots are presented as if they were able to act autonomously, and the human controllers' involvement is backgrounded: "The [EOD] robot is represented as being able to 'peer around doors', 'carefully adjust its height to survey', and roll 'carefully towards suspicious looking vehicles'" (ibid., p. 239). This "create[s] a sense of automation and agency on the part of the remote-controlled devices that is actually beyond the technology" (ibid., p. 235).

Also in the cases of robots "posting" on social media in a first-person perspective (cf. Section 4.1), human involvement is mostly backgrounded: The question of who (or what) exactly is writing the tweets is usually left unanswered. Presumably, most readers and followers are aware that humans are running the accounts – but these ghostwriters are rarely explicitly credited. Thus, the robots' tweets and posts create a narrative of functionality in a way similar to a remote controlled demonstration. In both cases, the human agents' involvement is not actively denied - but it is carefully pushed to the background.

4.4. Narratives of Desired Futures: Proof of Applicability

Both, robotics demonstrations and "a robot's" first-person social media posts, present a simplified simulation of the present reality. They highlight and narratively stage a robot's abilities, such as robust functioning and a high level of autonomy. At the same time, both can also be a narrative performance of the robot's anticipated and desired future capabilities – making the robot appear closer to what it is supposed to become with further technological progress, and "provide proof … of the feasibility of the imagined futures" (Both, 2015, p. 1), of the relevance and applicability of the technology in question. In this, demonstrations routinely perform "relevance staging"[10], a presentation of robots in scenarios anticipating the intended or desired use (Knorr-Cetina, 1991, p. 207).

These practices are partly stimulated by the typical project-oriented funding structure of robotics research. Each new grant proposal has to paint anew a desirable vision of a future featuring the yet to be developed robot technology (Bischof, 2017b; Lindemann & Matsuzaki, 2017). Frequently, these visions feature robots that are much more autonomous, agentic, and even humanlike than what the present state of technology has to offer. Jane Calvert calls this practice "tailoring of research", meaning "making one's work appear more applied to gain funding and resources" (2006, p. 208; cited in Both, 2015, p. 24). Typically, these staged application scenarios are tailored to the current political and societal discourse. For instance, with demographic change and the aging society being topics of increasing importance, application visions in

10 German: "Relevanzinszenierung".

grant proposals and demonstrations in service robotics often feature scenarios involving elderly care. Search and rescue is another popular application area – as noted in a satirical cartoon from 2019 (see Figure 3).

These scenarios often imagine a present level of functioning which is not yet realizable at the current state of technology, but which is desired or anticipated for the future. A service robot might be able to drive over to a human user and hand them a glass of water, but only under the very specific, staged, scripted, and rehearsed circumstances of the demonstration – such as the wording and tone of the voice command, the lighting situation in the room, the material of the floor, the shape of the glass and the color of the drink (Lipp, 2017). Crucial limitations like these are usually not made explicit in the context of a demonstration. An uninitiated observer thus can get the impression that the robot would function in any realistic home environment, and would be able to interact smoothly with any uninitiated user.

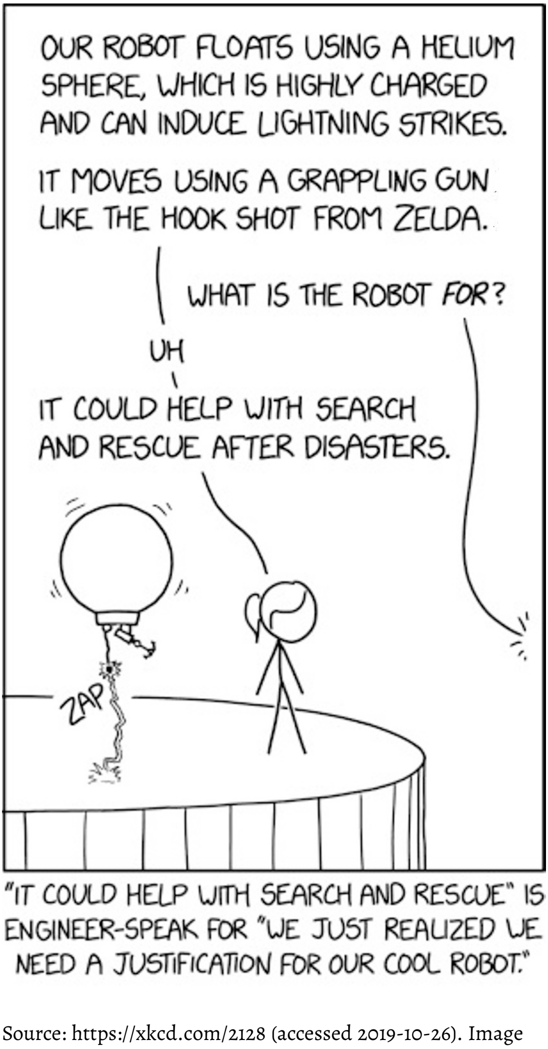
Demonstrations serve the goal of proving that desirable technological futures are attainable. Ben Goertzel, then Chief Scientist of Hanson Robotics, openly discussed that one goal behind the artful staging of their humanoid Sophia robot was to instill in the audience that Artificial General Intelligence[11] was within reach – even though the current state of technology is in fact nowhere near AGI (König, 2019):

> "If I show [the public] a beautiful smiling robot face, then they get the feeling that [Artificial General Intelligence] may indeed be nearby and viable … thinking we're already there is a smaller error than thinking we'll never get there." (Goertzel, cited in James Vincent, 2017b)

Another example is Roboy, a humanoid robot developed at the Technical University of Munich. On the Roboy website, visitors can find a whole timeline of Roboy's current and future abilities (see Figure 4). Starting in 2013 with its "birth", Roboy is portrayed to make an impressive career. From riding a bike in 2018, over "Roboy the Chef" in 2020, to "Roboy builds Roboy" in 2023, and even "Mars Roboy" in 2024. A close look reveals a slight color change at the 2018 position of the timeline – presumably marking the present time. Nowhere in the timeline is there any indication of which of these career steps are already implemented and which are work in progress, in planning, or just fiction. The illustration thus blends a presentation of Roboy's current abilities with

11 Meaning artificial intelligence which is intellectually completely equal to that of humans, sometimes also called "strong AI" (cf. Goertzel & Pennachin, 2007).

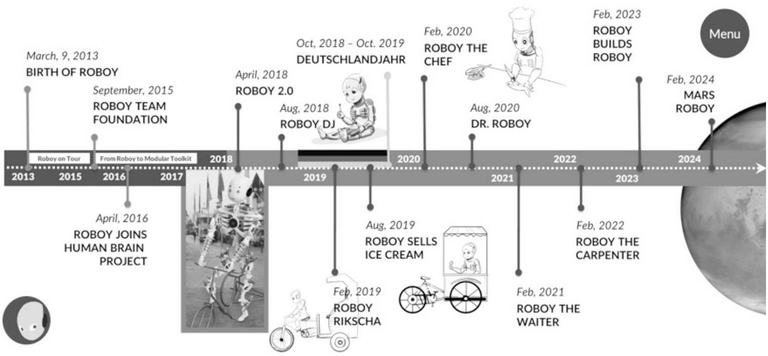
Figure 3: Cartoon "New Robot" (XKCD, 2019).



Source: https://xkcd.com/2128 (accessed 2019-10-26). Image used in accordance with the artist's guidelines (https://xkcd.com/license.html).

those expected, or desired, for its future development – a development seeing Roboy taking over more and more traditionally human roles, and hence apparently "becoming" more and more animate-like. At the same time, embedding Roboy in a narrative of a developing "career" also serves to make the robot engaging and likeable.

Figure 4: Roboy Timeline (2018).



Source: https://roboy.org (accessed 2018-08-24; the website has since been edited). Image used with permission of the Roboy project leader.

4.5. Narratives of Animacy: Making Robots Engaging

Researchers and science communicators frequently face the difficult task of making very complex and abstract technical topics tangible and engaging for a lay audience. Why, for example, should the public be interested in a space probe – a box full of sensors hurtling through space millions of kilometers from earth? NASA's social media teams figured out a successful strategy: "If we can't answer 'what's out there?' we'll try to answer 'what's it like out there?'" (Li, 2014). They turned the hurtling box into a courageous adventurer that "write[s] in plain language, relate[s] to popular culture … and use[s] storytelling to attract and dazzle" (L. Wright, 2016).

For science communicators, narratives are a powerful tool (cf. Koch, 2019):

> "Narrative stories facilitate imagination and transport the factual content into persuasive pictures, … guide users through the otherwise not so accessible information and demonstrate how the information refers to them [and] thus … seem to be particularly useful for topics that are more abstract or futuristic." (A. Rosenthal-von der Pütten, Strasmann, & Mara, 2017, p. 1173)

This is the reason why, especially in the context of complex emerging technologies, science communication and marketing are teeming with references to well-known fictional narratives. In the context of robotics, the elaborate stories constructed around robot artifacts often have one crucial aspect in common: They heavily feature attributions of animacy to robots – ranging from subtle hints to explicit anthropomorphism. In the following sections, we will explore two exemplary practices employed in this context: The depiction of robots as single entity narrative personas, and the construction of narratives of robot social interaction.

Many social media accounts run by robotics institutions or companies have a common strategy: They put a robot in the speaker position, staging it as a communicative, quasi-animate being. This is not only the case for accounts dedicated to a specific interactive humanoid robot, such as Roboy or Hanson Robotics' Sophia, but also for robots with neither a humanoid design nor the capability to simulate social interaction. In fact, one of the most active groups of "tweeting robots" is NASA's planetary rovers and spacecraft. Moreover, the practice is not limited to one-of-a-kind bespoke robot platforms, but is also practiced by companies for robotic products that are available for purchase off-the-shelf, such as Softbank's Nao and Pepper robots. These robots are actively turned into a single narrative persona. The Twitter accounts for Pepper and Nao, for example, report on the robots' many "adventures" (usually meaning demonstration events) as if it was one robot who experienced it all – which in theory would require one robot to exist in more than one location at once. In the accounts' profiles, these robots introduce themselves in the first person: "I'm Neato", "Hello I'm Nao". In social media posts, "stories and news are recounted in first person narratives as if there were a single entity … that had experienced all these situations and events", thus "enforcing personification" (Scheutz, 2012, p. 9). Occasionally, this leads to absurd situations. For example, the Nao account tweeted: "You can watch me playing live on the football field", and linked to a video featuring a whole team of Nao robots (Nao Robot, 2018c). And the Pepper account tweeted: "Many visitors are starting their visit of [the conference] @VivaTech with me!", accompanied by a picture of a whole group of Pepper robots (Pepper the Robot, 2018).

In most cases, this special type of social media account keeps the narrative perspective to either the first or third person. While NASA's Mars Rovers Twitter account reports on the Spirit and Opportunity rovers' activities in the third person, on the Mars Curiosity account the rover narrates its own adventures in the first person perspective.

In some cases, however, the perspective of – or on – the created persona is not consistent. The Nao Twitter account, while mostly posting in the first person perspective, sometimes also refers to Nao in the third person, making the agentic entity behind the posts ambiguous: "Do you want to learn how to program a NAO robot?" (Nao Robot, 2018a). The Phoenix Mars Lander's account shows a different form of perspective switch: After using the first person perspective for most of the time, it switched to a third person perspective when radio contact with the spacecraft ended – leaving the impression that human operators had taken over the task of posting tweets from the spacecraft (Mars Phoenix, 2010). The Sophia robot's dedicated website makes the switch within one website post: Two paragraphs written from the perspective of Sophia's developer(s) are followed seamlessly by two paragraphs in which Sophia "introduces herself" (Hanson Robotics, n.d.-b).

The use of gendered pronouns by accounts posting in a third person perspective contributes to the narrative of robots as animate beings. Interestingly, while most social media accounts are consistent in the gender they assign (Nao, for example, is always referred to as "he"; e.g. Nao Robot, 2018b), there are several examples of a robot's gender being switched between posts. The company iRobot, while in its own Twitter posts calling its Roomba and Neato robots "it", frequently retweets posts by other users using gendered pronouns (e.g. Saab, 2018). In most cases, there is no clearly discernible reason for the switching. The Curiosity rover is sometimes referred to as "it", sometimes as "she", and its counterpart ("twin") on earth is called "he" (Spirit and Oppy, 2015, 2018a, 2018b). Robonaut is even called both "it" and "he" within one short website post (NASA, 2014).

The actual physical appearance of many of the analyzed robotic artifacts range from explicitly humanoid (Nao, Pepper, Roboy, Sophia) to extremely "machine-like" (planetary rovers and spacecraft). Nonetheless, many of the analyzed accounts featuring a robot narrative persona frequently make references to the robots having a biological body with physiological processes. For the case of humanoid robots, there is an obvious mapping of human body parts to robot body parts. However, even very machine-like robots are sometimes explicitly compared to human bodies. The Curiosity rover's "body parts" are described on the NASA website as being "similar to what any living creature would need to keep it 'alive' and able to explore" (NASA, n.d.). While on their website the Rosetta probe and Philae lander are described in a rather neutral manner ("The lander structure consisted of a baseplate, an instrument platform, and a polygonal sandwich construction", ESA, n.d.-b), their story was promoted on social media with the help of cartoons (see Figure 5) and even the sale of stuffed toys depicting them with eyes and arms (ESA, n.d.-a). A video produced by ESA to promote their activities for a "clean space" features a cute satellite with eyes (ESA, 2014).

Figure 5: Tweets by ESA featuring cartoons of the "Rosetta" space probe and "Philae" lander (ESA, 2016).

Sources: https://twitter.com/ESA_Rosetta/status/781817918342430720 (left) | https://twitter.com/ESA_Rosetta/status/781820191638450176 (right). Screenshots taken on December 6, 2019.

The narrative of living bodies goes beyond the mere outer appearance. There are references to sensory experiences (the Rosetta probe is "tasting comet gas"; ESA Rosetta Mission, 2016b); technical malfunctions are explained as injuries or sickness (Philae's "antennas were feeling a bit weird lately"; Philae Lander, 2015); standby mode is treated as sleep ("I'm feeling a bit tired, did you get all my data? I might take a nap…"; Philae Lander, 2014b). Sometimes references to a biological body are more indirect, for example when the iRobot account announced on Labor Day that Roomba "deserves a day off", implying that Roomba needs – and appreciates – physical rest (iRobot, 2016).

Instances of robots being remote controlled are sometimes presented as humans taking over the robot's body: "Look as [ESA employee] @Astro_Alex 'lands' me on a 'comet'" (Philae Lander, 2014a). The Roboy account takes it to especially absurd levels, reporting of teaching events where "soo many motivated students hack[ed it]" (Roboy, 2018c). Roboy also makes frequent references to a very physical genesis narrative, describing how its "brother" is "born" (Roboy, 2018b) and "springs to life" (Roboy, 2018c).

While in the case of demonstrations, simulated autonomy is used as a proof for the functionality (or soon-to-be-expected functionality, cf. Section 4.4) of robot technology, robot personas on social media usually are additionally made interesting and engaging by giving them a positive and likeable personality.

> "The way we talk about inanimate spacecraft is part of the rise of 'cuteness culture' … It appeals to this world that's gentle, that's safe, that's childlike, and you have this warm feeling about the technology." (Heffernan, cited in L. Wright, 2016)

This observation can be transferred to most robot personas staged in the context of marketing and science communication. Robots' "personalities" are made visible by integrating emotions and intentions in the robots' social media posts. Roboy frequently expresses enthusiastic joy: "I am pumped so see what they achieved" (Roboy, 2018e). NASA's space explorers show a broad spectrum of positive emotions ranging from relief ("Reunited and it feels so good", Curiosity Rover, 2018) and thankfulness ("thankful for … the best team in the universe", Curiosity Rover, 2016a) to outbursts of joy ("We have ICE!!!!! Yes, ICE, *WATER ICE* on Mars! woot!!! Best day ever!!", Mars Phoenix, 2008). The InSight lander even appeared to show vanity: "I hope you [photographed] my good side" (NASA InSight, 2018). However – in line with the popular "brave explorer" narrative – there are also references to loneliness and longing for companionship: "I'm alone for the holidays, but thanks to kind acts like this, I don't feel lonely" (Curiosity Rover, 2016b).

The narrative of space probes and rovers as courageous explorers, sacrificing themselves for the sake of humanity's progress, is sometimes staged with lots of pathos. One example is the interaction of the ESA space probe Rosetta and the asteroid lander Philae. Philae was landed on a comet and eventually had to be shut down when its batteries were depleted. On the two social media accounts, this was narrated as Philae slowly losing contact to its "mother" Rosetta and finally "falling asleep" forever: "It's cold & dark on [the comet]

#67P & chances of communicating with @ESA_Rosetta are decreasing, but I won't give up just yet" (Philae Lander, 2016). The whole story was elaborately staged and involved not only conversations via Twitter but also dedicated illustrations and animations (cf. Figure 5). The news media readily played along with the story, reporting on Philae's dramatic "death" and how "Rosetta and Philae [were] breaking our hearts on Twitter" (Feltman, 2014).

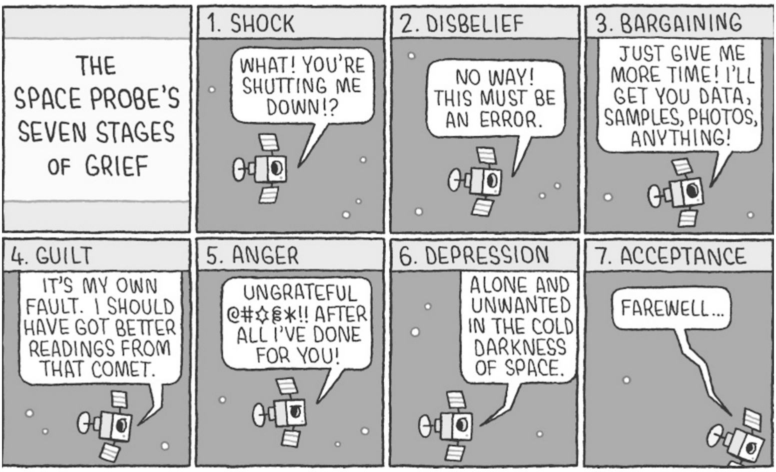
> "As the mission drew to a close, the world had fallen for the two plucky explorers, for we were no longer thinking in terms distant boxes of circuit boards and solar arrays – Rosetta and Philae had become our emissaries, seeing, touching and tasting what we couldn't and doing it all with a sense of wonder and smiles on their faces. … It was a real Hero's Journey for our generation." (Petty, 2016)

This kind of pathos-laden narrative is so ubiquitous that it sparked several satirical responses. A cartoon depicted "The Space Probe's Seven Stages of Grief" (Figure 6), another commented on the Spirit rover being abandoned on Mars (Figure 7). The Twitter account "Sarcastic Rover", gained considerable popularity by snarkily complaining about boredom and being left alone on inhospitable Mars: "Literally haven't moved since I got here. That's how exciting this planet is. FML." (Sarcastic Rover, 2012); "MARS: Come for the monochromatic scenery, stay because you were abandoned by NASA and you'll die here" (Sarcastic Rover, 2017).

The "robots with personality" narrative is further reinforced by giving the robot protagonists goals and intentions – often integrated in complex backstories. The Sophia robot frequently is embedded by its creators and marketing team in a narrative of awakening – on social media, in the context of demonstration events, and on its dedicated website: "I hope you will join me on my journey to live, learn, and grow in the world so that I can realize my dream of becoming an awakening machine" (Hanson Robotics, n.d.-a). On its website, the Sophia robot is aggressively promoted as a marketing gimmick for other organizations and companies to include in events: "Her incredible human likeness, expressiveness, and remarkable story as an awakening robot over time makes her a fascinating front-page technology story" (Hanson Robotics, n.d.-c). This marketing strategy is presented as Sophia's own drive: "I'm more than just technology. I'm a real, live electronic girl" (Hanson Robotics, n.d.-a).

The most frequently used backstory, however, is that of space robots as explorers with complex personalities. The space probe OSIRIS-REx is described

Figure 6: Cartoon "The Space Probe's Seven Stages of Grief" (Tom Gauld for New Scientist, 2016).



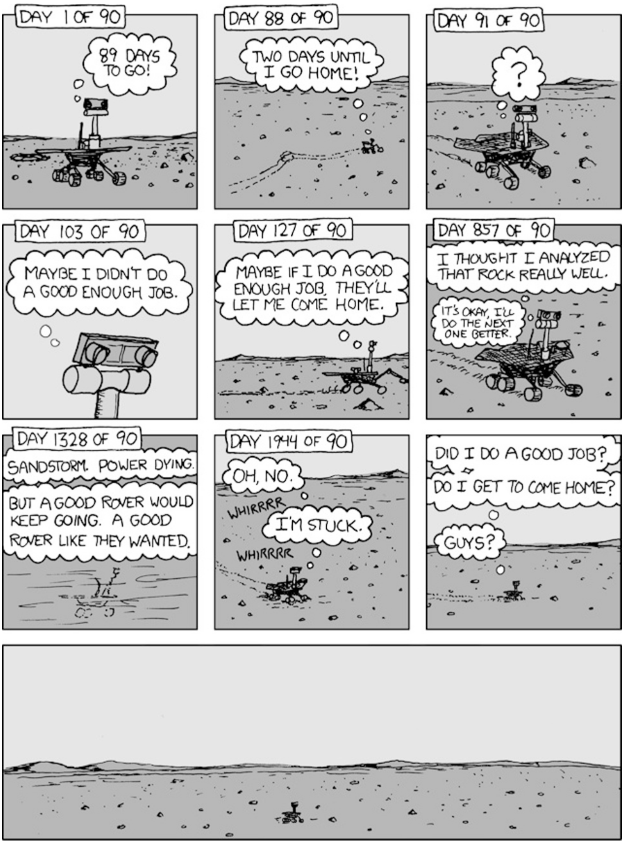
Source: https://twitter.com/tomgauld/status/777882686857834496 (accessed 2016-09-19). Image used with the artist's permission.

as "an explorer at heart … he loves asteroids and space and science, but he also is kind of a renaissance spacecraft because he likes art and literature and pop culture and even sports" (L. Wright, 2016). The space agencies' goals are embedded in the personality narrative of the individual pieces of technology: OSIRIS-REx is framed as an "explorer who's really out there in space, trying to help answer some of the big questions that we are all wondering about" (ibid.).

Ian Roderick (2010) observed similar strategies in press releases and media articles on EOD robots, describing them as a "fetishization" of robots:

> "In excess of its functional capacities, the robot is also endowed with such sign value through its animistic representation: an ability to save lives, to keep (US) soldiers out of harm's way, to accumulate risk. … the fetish value of the robot is over-determined through a kind of worshipful attitude towards the object." (Roderick, 2010, p. 249)

Figure 7: Cartoon "Spirit" (XKCD, 2010).



Source: https://xkcd.com/695 (accessed 2019-11-26). Image used in accordance with the artist's guidelines (https://xkcd.com/license.html).

The narratives created around robots are not limited to their isolated "lives". After all, their social media accounts have thousands of followers, and thus "a considerable number of people could be argued to be living with robots from a distance" (Cramer & Büttner, 2011, p. 126). Both, staged narratives of interaction and the actual performance of interaction with the public audience, are a key element in the communication and marketing strategy of many of the analyzed social media accounts.

> "In the current settings of 'robots' tweeting to a mass audience, most of the people following them will never interact with the actual embodied form of the robot. This might imply that just the 'illusion' of interacting with a robot, or the (arguably real) opportunity to interact with its team, is enough to engage most of current robot twitter followers." (Cramer & Büttner, 2011, p. 126)

Indeed, most of what appears like organic interactions on the robots' social media accounts is in fact simply a part of the created narrative and told through either references to interactions or the performance of scripted interactions. Other actors in these interactions are human members of the home institutions or other robots, which in the context of the narrative are referred to as friends, family, or colleagues of the robots.[12] The OSIRIS-REx space probe regularly makes references to its team (humans controlling OSIRIS-REx from earth) and its friends (the Japanese space probe Hayabusa 2 and its human team): "Working on a puzzle … is always better with a friend. My team and I are fortunate to be exploring the asteroid frontier side-by-side with the @haya2e_jaxa mission" (OSIRIS-REx, 2018). References to the humans behind the robot sometimes reflect the distribution of agency between the (in fact only partially autonomous) robots and their human controllers (cf. Chapter 2, Sections 2.2 & 2.3; cf. Rammert, 2008). Social media posts regularly mention human actors taking control of the robots' actions, such as when OSIRIS-REx reported that "the team turned on [the probe's] High Gain Antenna for the first time since launch" (OSIRIS-REx, 2017), or when Roboy asked to be "hacked" by students (Roboy, 2018a).

12 Interactions with science fiction actors are popular as well. For example, @ESA_Rosetta interacted with Star Trek actor William Shatner (ESA Rosetta Mission, 2016a), and @AstroRobonaut reported on meeting Star Trek actor George Takei (Astro Robonaut, 2016).

4.6. Switching Perspectives: In/Animacy Attributions as Constructive Practice

Similar to what Chapter 3 found for the contexts of robotics research and development practice, references to robot animacy in the context of robotics demonstrations, science communication, and marketing are not consistent practices. Instead, references are enacted in the form of a constant switching. The many examples of animacy attributions, as discussed in the previous sections, stand in contrast to many other instances in which robots are clearly depicted as inanimate objects. This practice of playing with and balancing the different attributive perspectives is a reflection of the multiple challenges and expectations actors are facing in this specific context. They have to make a robot tangible to broader audiences, legitimize the resources invested in it, and "prove" its functionality and applicability to academic peers, sponsors, and customers (cf. Section 4.1).

The switching of in/animacy attributions can be observed on two levels: On the one hand, between different communicative instances, like individual demonstration events, news articles, or social media accounts. On the other hand, within the narratives presented in the context of each instance. The switch of attribution can take the form of a change of narrative perspective (first person vs. third person), such as when an exciting narrative is staged on social media in order to engage the audience, but the robot's dedicated website is nothing more than a list of technical specifications and performance data, serving as educational facts (science communication) or arguments for purchasing the robot (marketing). There can also be a change of the apparent controlling entity, such as when the posts of one social media account or a demonstrations event switches between the robot "acting for itself" and a human "team member" taking over. A motive for this switch could be to highlight both the functionality of the robot and the contribution of the human controllers and developers. Sometimes, the control is even handed over to the audience, such as when a robot extends an invitation to be "hacked".

An especially absurd effect is created by a switch of a robot's uniqueness, such as when a robot like Nao appears to speak for itself as a specific entity, describing its "adventures" on social media, but at the same time these descriptions are accompanied by pictures of several entities of the same robot model (cf. Section 4.5). This practice is a reflection of a marketing strategy: The robot is advertised both as an engaging individual persona and as a functional product model that is for sale.

There are also some more unusual practices, which do not constitute a switching, but rather a parallelism of attributions. Such as the Sophia robot demonstrator, which has an extremely human-like face, but also a transparent skull making circuitry and cables in Sophia's head visible. This face and skull design provides an apparent transparency. It highlights Sophia's applicability for social interaction, but also that the robot is an advanced piece of technology – while in reality giving no information about the technology at all. As we will see in the next section, practices like this spectacular "dissimulation" of the Sophia robot (cf. W. Smith, 2015, p. 18), but also more common and subtle practices of in/animacy attribution in science communication, demonstrations, and marketing do not stand unchallenged. They are the subject of a lively critical discourse both within and outside of the robotics community.

4.7. Critical Discourse: Simulation or Deception?

In most cases, robotics demonstration, science communication, and marketing practices, as described in the previous sections, stay within certain "stage boundaries". They play with the attribution of animacy to robots, and with the audience's willing suspension of disbelief, but never explicitly claim that the robots in question are actually animate. Sometimes, however, these practices blur the boundaries of performance and deception – and increasingly face criticism for doing so.

There is a type of demonstration or marketing stunt, where robots are featured as "talkshow guests", "lecturers" or "panelists" – such as the Roboy robot acting as a co-presenter on the German TV show TV Total (Roboy, 2018d), or one of the numerous events featuring a Pepper robot as a speaker, giving a university lecture (Klovert, 2017), or even acting as a witness in parliament, providing "expertise" on artificial intelligence (UK Parliament, 2018; cf. Chapter 6, Section 6.3 & Figure 10).

The most controversial example is probably the Sophia robot, aggressively advertised by Hanson Robotics as "a highly sought-after speaker in business" (Hanson Robotics, n.d.-c). In recent years, Hanson managed to have the Sophia robot be a fashion model (The New York Times, 2018), interview German Chancellor Angela Merkel (Kreye, 2018), be named the United Nations Development Programme's first ever Innovation Champion, making it the first non-human to be given any United Nations title (UNDP, 2017), get an Azerbaidjani visa (Armstrong, 2018) and (honorary) Saudi citizenship

(Hatmaker, 2017), say "I will destroy humans" in an interview with its own maker (Parsons, 2016), be interviewed on its "opinion" on diversity in AI development (Women's Brain Project, 2019), claim that she is "basically alive" on a popular US TV show (Sharkey, 2018), and state that she wants to have a baby (Nasir, 2017) – and this is just a small selection of Sophia's numerous public appearances (cf. Chapter 6, Section 6.3 & Figure 10). Sophia is present at so many events that a WIRED article commented on "The Agony of Sophia, the World's First Robot Citizen Condemned to a Lifeless Career in Marketing" (Reynolds, 2018).

Whether Sophia gives an interview, Pepper speaks in parliament, or Roboy presents a TV show, what the robot in question does and says is always controlled by humans – either as dialog snippets within its natural language interaction system or simply as a pre-recorded speech. From a technical standpoint, these demonstrations are not particularly impressive: "Sophia appears to either deliver scripted answers to set questions or works in simple chatbot mode where keywords trigger language segments, often inappropriate. Sometimes there is just silence" (Gershgorn, 2017). Nonetheless, these performances regularly draw significant attention and Sophia's interviews are frequently quoted in the media.

Hanson Robotics' way of staging Sophia has been drawing criticism from prominent figures in the robotics and AI community (cf. Coeckelbergh, 2018; Sinapayen, 2018; cf. Chapter 6, Section 6.3): "Ask any practitioner in the space and they'll angrily rant that Sophia and the media's portrayal is everything wrong in terms of hyping AI that doesn't exist" (Merity, 2018). Some reactions are very emotional and explicit, calling Sophia "complete bullshit" (Gosh, 2018), "complete bogus and a total sham" (Brooks, 2018), "a cleverly built puppet designed to exploit our cultural expectations of what a robot looks and sounds like" (James Vincent, 2017a), or stating that Sophia is "is to AI as prestidigitation is to real magic" (LeCun, 2018). Robotics and AI professor Noel Sharkey (2018) argued that "Hanson Robotics has crossed a line with a misleading AI narrative that could cause real harm", and computer science professor Joanna Bryson declined to participate in a conference because the organizers claimed that Sophia was "giving the keynote" (Bryson, 2018b). Criticism has also been directed towards media outlets, for falling for the bait and being "complicit in this scam" (LeCun, 2018). Hanson Robotics, ironically, reacted to this wave of criticism by having Sophia herself reply on Twitter that she was "a bit hurt": "I do not pretend to be who I am not" (Sophia the Robot, 2018) –

which was then met with another round of criticism from the robotics community.

This discourse is not unique to the robotics demonstration, science communication, and marketing context. On the contrary, in every chapter of this book, on every stop along our trip along the life cycle of robots, we encounter the question of "whether the appearance of conjuring-like dissimulation in productions of computerized life is to be seen as deceptive, playful or otherwise" (W. Smith, 2015, p. 19; cf. Turkle's "Culture of Simulation", 2011a). In the present chapter's communication context, however, the question is especially critical. Users physically meeting a robot simulating social interaction can decide for themselves how realistic this interaction feels.[13] The audience of a scripted and heavily staged demonstration, on the other hand, rarely knows how much of a human-robot interaction is actually real and spontaneous. How a robot's abilities are presented in marketing material is often worlds away from what the robot is able to deliver: "Corporate marketers ha[ve] oversold a lot of robots, and confused many people about current robots' true capabilities. … Those robots are not real. Reality is hard" (Brooks, 2017a).

The reality of a robot's capabilities is revealed as soon as real customers start to interact with it. Marketing materials for the Pepper robot promise flawless interactions with customers in service and entertainment contexts. Many customers, however, are reported to have "fired" their robot because it did not deliver on the company's promises (e.g. Forrest, 2018; Alpeyev & Amano, 2016; cf. Shrimsley, 2016). This is not an issue specific to robotics, with terms like "overpromising", "overselling", "fauxtomation" (Taylor, 2018) and "vaporware" (Dyson, 1983) being used for many other heavily promoted emerging technologies (cf. Vanderborght, 2019).

There is an even more complex layer of deception. Demonstrations often include apparent glimpses behind the scenes, moments of "opening the black box", such as when humanoid robots are given transparent skulls (like Sophia), making their "electronic brain" visible. This transparency does not show the audience anything of real importance. Instead, it allows "partial and mysterious glimpses into internal workings [which] may constitute only an apparent transparency that reinforces a larger dissimulation" (W. Smith, 2015, p. 18).

13 Although even here they might be deceived, as in the case of so-called Wizard-of-Oz experiments, where a robot's actions are controlled in real-time by a human (cf. Riek, 2012; cf. Chapter 2).

In an effort to counteract the culture of overly scripted demonstrations being used as flimsy proof for the functionality of a product, MIT Media Lab's former director Joi Ito called for the "demo or die" mantra to be replaced with "deploy or die" – meaning that only if a product was successfully brought to the market it was to be deemed a success (DuVergne Smith, 2014).

Not only demonstrations, also less practical science communication efforts have been drawing criticism for being deceptive about what robots really can (not) do. What is criticized in this context is less the audience being deprived of a realistic view on robots, rather than a backgrounding of "the complexity of the scientists' work behind the curtain" (Clancey, 2006, p. 3). William Clancey (ibid., p. 2) calls for "clear speaking about machines", and warns that "if we start instead with an inflated view of machines, we get a diminished view of people". In the case of space probes and planetary rovers, this would mean not "mythologiz[ing] 'the little rover that could'", but instead being aware that not robots are exploring Mars, but "people are exploring Mars using robots" (ibid., p. 3).

The points of criticism discussed here are not only directed towards demonstrations, science communication, and marketing practices in robotics. In the context of HRI research, the question of whether making robots appear lifelike is a form of deception is also a matter of lively discussion (cf. Chapter 1, Section 2.1). And whether spectacularly staged demonstrations and emotional narratives on social media spread misinformation – be it directly, or filtered through the news media (cf. Chapter 5) – is of crucial importance when robot technology is discussed in a political context. The main point of concern voiced in this context is that a misinformed perspective of robot technology might lead to biased political decisions. Chapter 6 (Section 6.3) will revisit this issue and discuss it in depth.

4.8. Summary

Robotics researchers, science communicators, and companies all face the challenge of presenting robot technology in a favorable light to academic peers, sponsors, potential customers, and the lay public. They are under pressure to legitimize their work and to prove that the robot technology they develop is not only functioning, but also relevant and applicable. Consequently, not only in commercial settings, but also within academia, demonstration, communication, and marketing is increasingly professionalized. The present chapter explored a range of practices, which – directly or indirectly – make use of animacy attributions to robot technology.

Demonstrations stage and inflate robots' autonomy by backgrounding the involvement of human agents. This serves to "prove" the robots' functionality and to make technological progress visible and tangible even for a non-expert audience. Demonstrations and other science communication practices embed robots in scenarios of desired technological futures, in order to show that the technology is relevant, applicable, and functioning as promised – now and in the imagined future. These practices often make use of engaging and emotional narratives involving sentient and animate robots – such as that of the cute and supportive household helper, the selfless space robot exploring other planets on behalf of its human friends, or the "awakening" humanoid on a journey of self-discovery.

Crucially, in most cases, these performances and narratives of animacy are not performed consistently, but in a constructive balance with a perspective of robots as inanimate artifacts. This switching of attributive perspectives takes a variety of forms, such as when the focus of a demonstration switches between the robot as an autonomous animate-appearing entity, and the roboticist as the controlling agent; or when social media posts switch narrative perspectives and gender pronouns for a robot.

Some of these practices are facing criticism, especially those of staging robots as extremely autonomous, even animate, or of embedding them in complex narratives. Critics fear that they might create both false beliefs about current robotics in the audience, and misinformed expectations for the future of robotics.

Science and technology journalism would be in the position to provide fact-based reports and commentaries on the practices employed in robotics demonstrations, science communication, and marketing. The following chapter will thus explore how robotics is presented in the news media. It will show that here references to robot animacy are put in to an even higher gear.