Reimagining the Cyborg: How Queer-feminist STS can Contribute to Prostheses Research

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Abstract: Queer-feminist science and technology studies (STS) critically inquire science and technology and their promises enable new possibilities and challenging their manifestations, which are often seen as reproducing and increasing inequalities on local and global levels (Cipolla et al. 2017). The transdisciplinary technology development project PROTEA (2022-2025) has received funding to integrate a gender dimension into the human-centred technology design of 3D-printed prostheses with integrated sensor technology (Thaler et al. 2024). The gender research is adding an intersectional perspective to the participatory technology design itself, and raising gender awareness and knowledge within the research team. This paper demonstrates how a queer-feminist STS lens can intervene with the aim of challenging existing norms and standards in human-centred design through using the cyborg narrative (Haraway 1991, 2016) to analyse data. The queer-feminist lens challenges potential defaults by the research funders, and led to new research questions beyond prostheses improvement.

Keywords: Intersectionality, Queer-Feminist STS, Prostheses, Sensor Technology, Human-Centred Technology Design

1. Introduction

For decades, Europe promoted gender-inclusive research projects and emphasized the importance of gender equality and gender perspectives in research. The transdisciplinary technology project PROTEA (2022-2025)[1] is one of those projects where research funding agencies introduce gender as a research dimension to technology experts who might not have dealt with gender in their work yet. The lead partner of PROTEA contacted me after a presentation at the funding agency, where I talked about a previous gender-sensitive technology research project (Thaler 2022). The integration of gender began at the very beginning of proposal writing, and I included theories from feminist STS (Haraway 1991, 2016, Oudshoorn et al. 2004, Wajcman 2004) and the concept of intersectionality (Crenshaw 1989, Hancock 2007).

From the research funder's perspective, gender research has two main tasks. Firstly, increasing the gender awareness of researchers, as well as industry partners. This gender awareness comprises background knowledge about the rationale of gender equity and diversity sensitivity, and includes a motivation to professionalise the gender knowledge of the involved persons. This means that potentially biased everyday gender knowledge must be reflected and complemented or substituted by a practically relevant knowledge of a certain gender expertise (Wetterer 2009). Secondly, gender theories and methods inform the technology design process itself. In PROTEA, a human-centred technology design approach was chosen, because with a focus on users and further stakeholders (orthopaedic technicians, etc.), gender and intersectionality are easier to integrate into the technology development (Oudshoorn et al. 2004).

In a previous publication, the research team explained mainly this second task, focusing on the knowledge co-creation aspects of the gender-sensitive human-centred technology design approach (Thaler et al. 2024). Based on empirical findings, literature, ethical and societal aspects of different user groups, the consortium agreed in a decision workshop on a specific use case. This use case focuses on a specific mobility class of amputated people and their needs, which were translated into personas followed by technological requirements and concepts. These first technical concepts and 3D-printed prostheses parts were tested for their suitability, pressure sensors placed on the curved surface, data issues discussed and the whole prototype continuously evaluated and adapted through regular exchanges with the whole consortium, advisors and users (see Thaler et al. 2024).

This paper at hand asks how a queer-feminist STS perspective (Cipolla et al. 2017) can be used to reflect human-centred technology research. Donna Haraway's cyborg metaphor (1991, 2016) has often been used and criticized in feminist STS, especially in relation to health technologies (Reeve 2012, Lupton 2013, Kalender 2023). I argue

[1] PROTEA is funded by the Austrian FFG and the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology as part of the FEMtech Research Projects Programme 2021 (https://forschung.fh-kaernten.at/protea/).

that, albeit seemingly dated, it still is a generative lens to examine and further develop the social construction of human-centred design. Haraway (2016) posits:

> *„Modern medicine is also full of cyborgs, of couplings between organism and machine, each conceived as coded devices, in an intimacy and with a power that were not generated in the history of sexuality. " (p. 6)*

In the following, relevant deductions from these cyborg narratives and discourses are used to analyse PROTEA's interview-data with a queer-feminist lens. A queer-feminist perspective is challenging norms and standards beyond gender and sexualities, it puts power relations in the centre and asks uncomfortable questions.

2. Methodology

The methodological approach of this paper is a thematic analysis (Braun & Clarke 2006) of existing interview data[2] with new research questions based on cyborg theories (Reeve 2012, Lupton 2013, Kalender 2023), which serve as a discursive framework to reflect on the transdisciplinary research project in a queer-feminist way.

The interview data stem from two crucial time points in the technology development cycle, a first online group interview with six prostheses users in winter 2022 (four female, two male) before the technology development started; a second group interview with four prostheses users and additional single interviews with three prostheses users between spring and autumn 2024 (two female, five male) in the phase of prototype testing of PROTEA. All prostheses users have one (or in one case two) lower leg amputations.

In a final step, results from this thematic analysis of user interview patterns were discussed in an interview with the project leader of PROTEA in winter 2024 to validate how a queer-feminist perspective can add epistemological richness to a participatory technology design project (in short 'validation interview').

The research questions for interview data analysis were:

1. Are economic and other real-world struggles mentioned by prosthesis users? If yes, how are those issues integrated into the ongoing technology research project?
2. Are bodily experiences and health problems discussed by prosthesis users? If yes, how were they regarded in the project?
3. Are amputated persons broaching the issues of reluctance to wear prostheses or social pressure to wear prosthesis? If yes, how are these discourses considered by the project team?
4. Are prosthesis users talking about resisting strategies towards technologies, are they specifically refusing to have sensors integrated in their prosthesis or are they worrying about the security of and access to their sensor data? If yes, how is the project team dealing with this potential user resistance?

3. Results

The group and single interviews with 13 prostheses users are analysed through the lens of the cyborg metaphor and its queer-feminist critique. This new epistemological dimension contributes to gender-sensitive technology research. Below I offer the research questions and present the answers we derived from the data. Additionally, a validation interview with the project manager of PROTEA offers insights on a meta-level of how the project funding influences the scope of the research and limits insights.

3.1 Research Question 1: Are Economic and Other Real-world Struggles Mentioned by Prosthesis Users? If yes, how are Those Issues Integrated in the Ongoing Technology Research Project?

One critique of feminist scholars on the cyborg narrative is aimed on the risk of erasing real-world problems from amputated people for instance concerning economic struggles:

[2] All group and single interviews were conducted with an informed consent procedure, audio recordings, and written summaries. Interview questions comprised personal health histories of the amputation and experiences with prostheses. In the first group interview an additional focus lied on challenges in wearing prostheses and wishes for improving the technology. In the second group interview first prototypes of 3D-printed soft and hard sockets were shown and plans of integrating pressure sensors explained and discussed with the prosthesis users (see Thaler et al. 2024).

> *„The ease with which cyborg politics offers a new language and possibilities for marginalised groups risks erasing the actual struggles that many disabled people face for economic survival, especially in the majority world." (Reeve 2012, S.96)*

In each interview with prostheses users, their story of how their lower legs got amputated was shared. Thus, real-world problems and health struggles were of central interest for the project team. In the first group interview in 2023 the reasons for amputations varied a lot from trauma related amputations (accidents, war injuries, etc.) to complications after infections. Following this interview, a use case decision workshop led to the project's focus of the technology development and users. Thus, the second group and single interviews in 2024 were all conducted with prostheses users, whose lower legs all got amputated due to arterial occlusive diseases, which cause 75-80% of all lower extremities' amputations in the global north (Greitemann et al. 2016).

Another theme that emerged in several interviews was what type of prostheses is covered by which social and health insurance. This economic issue was explained further in interviews, for instance that retired, older persons receive only the 'most necessary' prostheses, and additional prostheses for sports or with more technological features are not covered by the basic insurance. As the majority of lower leg amputees are older, retired persons, suffering from Diabetes Mellitus (ca. 70% of all amputated lower extremities are caused by Diabetes Mellitus leading to arterial occlusive diseases, Greitemann et al. 2016) and often also multi-morbid, PROTEA focused on this group of prosthesis users. With this user group, the project wanted to make the most impact with a 3D-printed prostheses with integrated pressure sensors to detect potential lesions and wounds before they lead to further complications and amputations.

In the validation interview with the project manager of PROTEA, she agreed that educational background and economic questions are always important in her health technology projects. However, she emphasized the intersectional perspective of not adding factors but looking specifically on the cross-section of factors like gender, age and health status, who might lead to multi-discriminations were a new approach to her.

About the fact that in interviews with users and stakeholders the economic and health political context of prostheses use was discussed and several problems highlighted, but not further worked on in the project PROTEA, the project managers stated:

> *"I don't know how to deal with it. These are not unknown problems on the part of the stakeholders ... it affects many areas. The prosthesis is one area, but it often also affects the surgeries, any replacement products, ... it affects a lot of topics ... health policy in general. ... We would probably have to talk to the Austrian Association for Prosthetics to see if they are active at this political level. ... We could also really discuss this again with our Advisory Board, because they do a lot of networking." (Validation interview[3])*

The thematic interview analysis could show that economic and real-world struggles are an important issue, mentioned by prosthesis users, and was also acknowledged by the research team, especially in their technology development focus. The validation interview however pointed out that the empirical findings could be fed back to the advisory board of PROTEA to follow up with the health policy issues beyond technology research.

3.2 Research Question 2: Are Bodily Experiences and Health Problems Discussed by Prosthesis Users?

The second research question regards leaving out the bodily experience of amputated persons wearing a prosthesis. Critical voices from disability studies highlight real life experiences of bodies with technological enhancements a reality, which Haraway's cyborg is supposedly missing *(Reeve 2012., S. 96).*

As discussed before in answering research question 1, all interviewees spoke very openly about their bodies and their pain, and so they also discussed their bodily issues with their prostheses. Some amputees talked about preferring to use a wheelchair at home, wear crutches or hobble with their healthy leg. One woman told us that putting on her prostheses quickly and not perfectly is the best way to react to her child's or her needs at night:

> *"I've put on weight due to stress and have to use the prosthesis at night to go to the toilet and put it on briefly. It's not ideal, but it's an option." (Group interview 1, female)*

[3] All quotes from user and the validation interviews have been translated from German to English with DeepL (https://www.deepl.com/de/translator).

Ute Kalender points out that the cyborg metaphor can lead to unrealistic expectations towards wearing prostheses and neglecting negative experiences:

> *"... negative experiences of an 'ordinary cyborg' ... disappear behind Haraway's cyborg metaphor, which rather couples prostheses with pleasure, fun and irony, and thus sits on an idealized and depoliticized understanding of disability" (Kalender 2023, p.1[4]).*

The interview participants from PROTEA specifically broached the issue of bodily problems, like pressure and friction points, as this was one of the research questions at the beginning of the technology development. What are the usual problems of prostheses users, and how would they change technology if they could?

Almost all interviewees reported pressure points and lesions especially after wearing the prosthesis over a longer period of time, and during summer, when sweat and swollen limbs increase problems:

> *"I like to take my prosthesis off in the afternoon, especially in summer when I sweat a lot, as I then quickly develop friction and pressure points. Then I use crutches. After sport, I can only wear the prosthesis for a short time (max. 30 minutes)." (Group interview 1, male)*

> *"I'm already looking forward to taking the prosthesis off in the afternoon. The prosthesis often feels like a lump on the leg, especially when the leg is chafed." (Group interview 1, female)*

These results were translated into specific user requirements concerning the material and design of the inner socket of the 3D-printed prosthesis and the integration of pressure sensors to measure pressure before amputees feel the pain and experience lesions. Ideas of integrating additionally sensors measuring temperature, blood flow or oxygen saturation had to be left out in this project because of time restraints and a limited budget.

3.3 Research Question 3: Are Amputated Persons Broaching the Issues of Reluctance to Wear Prostheses or Social Pressure to Wear Prosthesis?

The critical point raised in research question 3 is aiming at the social pressure of wearing prosthesis to 'fix bodies':

> *„Cyborg theory celebrates technological innovations, and perpetuate the narrative of broken bodies, which supposedly need fixing." (Reeve 2012, S. 102)*

Reeve (2012) discusses the gendered implication of prosthetics when she discusses the social pressure for women especially to wear a prosthesis as to not be marked different. Concerning feeling comfortable or not with visible prostheses the thirteen interviewees reacted differently, regardless their gender or age. Some prefer skin-coloured prostheses and ask for more adapters to be able to wear different shoes, others deliberately opt for metallic versions, highlighting a visible cyborg effect. One younger woman explained that she feels uncomfortable to leave her house without a prosthesis. One older male talked about his trauma concerning visible "naked iron rods" – as he called them – and emphasized that he cannot stand them:

> *"Mentally, I can't stand not encased prostheses!" (Group interview 2, male)*

As in the project PROTEA the outer socket is 3D-printed with a resin, a material which can be coloured, users' wishes can be considered in the future. As the scope of the project is the development of a technology, it could be critically seen as technological fix or technoableism. Ute Kalender (2023) explains that a technoableist understanding rather uses resources to create technologies to help amputated persons overcoming challenges than changing the very environment that disables specific bodies. *Ashley Shew (2022) has coined the term technoableism and critizes how disabled people and their voices are steamrolled, whereas nondisabled helpers are focusing on technologies instead of listening to disabled persons and their suggestions on how to fix the systemic problems. Shew (2022) and Kalender (2023) both criticize research that sees disabled people only as recipients and focuses on technological fixes, where other solutions might be relevant for disabled persons.*

In PROTEA disabled people are not seen as mere recipients, one of the advisors and co-author of the joined publication (Thaler et al. 2024) is a prosthesis user, and the thirteen interviewees were all participants in the

[4] All quotes from Ute Kalender's German article were translated to English with DeepL (https://www.deepl.com/de/translator).

knowledge co-creation process, which means they are actively involved in the research throughout the three years.

And while PROTEA is a technology research project, it is not enforcing an unwanted technology. Most prostheses users talked about the degrees of freedom their prosthesis gives them, which is directly connected to the prostheses:

> *"I am happy that I can walk!" (Group interview 2, male)*
>
> *"I have a personal trainer, I go walking, I just can't cycle. I can do everything; it just takes a bit longer. Window cleaning and things like that are a bit tricky, but it is possible." (Group interview 1, female)*

The project manager talked about the technology focus of research projects, which receive funding explicitly for developing a technology and that there might be non-technical solutions for some amputees, but the focus of PROTEA are prostheses users and not amputees, who prefer other solutions. She stated:

> *"There are a few people for whom a prosthesis is ... they don't want it at all ..., but our funding relates to this further development of prostheses, which is why we look at people who have a problem with it (their prostheses, author's note)." (Validation interview)*

However, it has never been the goal of PROTEA to develop prostheses for amputees who do not want to wear prostheses. Amputees who do not use prostheses were never seen as 'needed to be fixed', but rather as non-users, and the focus of PROTEA was to improve prostheses for those who already use or would like to use them. The project manager added, this might by an interesting angle for a next project, to not limit the target group in the beginning to prostheses users per se, but really look at all amputees and see what non-users might need.

3.4 Research Question 4: Are Prosthesis Users Talking About Resisting Strategies Towards Technologies?

The fourth research question is based on the fact that since Haraway wrote about the cyborg in 1991 technologies have become pervasive and embodied, and resisting these technologies, especially if they are connected to the notion of a 'healthy, good citizen' is seen negatively:

> *„The concept of cyberspace has become irrelevant for most users of ubiquitous digital technology in a world in which we carry, wear or insert our devices on or in our bodies. Personal computers no longer squat heavily on desks, as they did when Haraway was first writing about cyborgs.*
>
> *They are now an integral part of our embodied habitus, frequently accompanying us wherever we go, and even monitoring our sleep patterns throughout the night." (Lupton 2013, S. 9).*

All thirteen interviewees are prostheses users, and have generally a positive attitude towards prostheses as such. However, concerning additional sensor technology and a potential app illustrating the sensor data, the interviewees were divided. Most are curious and open (this can be a bias within the interview sample, as the interviewers asked for prostheses users who might be interested to participate in a research project dealing with 3 D-printer and sensor technology), however some interviewees also expressed concerns, for instance comparing additional electronics in cars, which changed driving in the last years tremendously:

> *"Please not like the Audi – no electronics please!" (Group interview 2, male)*
>
> *"Feedback for me on my cell phone would be good and I'll take it to the orthopaedic technician" (Group interview 2, male)*

The seven interviewees in the second part of the project (one group interview and three single interviews) were first shown prototypes and sensors and asked more questions concerning the placement of pressure sensors and the access to the sensor data. Here all interviewees voiced their trust in their personal orthopaedic technician, even the more techno-sceptical wanted that the orthopaedic technician should receive their sensor data, and would find it helpful to receive an immediate appointment connected to such a sensor warning to optimise the prostheses.

However, although all these interviewees stemmed from the defined use case group (amputation due to peripheral arterial occlusive disease) – and it is known that often occurring polyneuropathy leads to reduced sense of pain in the extremities – some of the interviewees stated they would not need sensors, they would recognize problems early enough. This was not only contradicted by interviewed experts (orthopaedic technicians and physicians), who discussed the problem of missing pressure points in an early stage especially

by Diabetus Mellitus patients. Also, one of the interviewed women stated that – although she declared to not need sensors – she actually already overlooked a lesion stemming from a pressure point:

> *"I wasn't paying attention!" (Single interview, female).*

In the validation interview, considering the technology, it was mentioned how important it is to use different media to approach potential users, to not exclude anyone. For instance, interviews might be done online, but always have to be offered also in a face-to-face format. In PROTEA the decided use case (aiming at people with amputation due to chronic illnesses and limited mobility) also narrowed the focus on the technology development, especially the sensor technology (due to financial issues, and because users reported they would not need much technological feedback). The project manager discussed lower level of innovation, which is connected to the focus on users from a lower mobility level. However, the sensor technology and a potential application for rehabilitation offers possibilities, which was not the aim of PROTEA, but could be researched further:

> *"I believe that prosthetics with sensor technology and the results from it, the data, could be brought very close to the person so that they can perhaps learn more easily and better themselves in the rehabilitation process ... but there are still many levels to it, but we are a long way from that. That would have been another topic for me." (Validation interview).*

Technologies have changed a lot since Haraway first wrote about the cyborg (1991), but although wearable technologies like fitness watches are very common, and many people use health monitoring and tracking apps in their mobile phones, the prostheses user group of PROTEA is heterogenous in that regard. Some interviewees stated they would not need or want specific sensor technology. The validation interview showed that the technology development in the project focused more on 3D-printing and basic sensor integration, to support the use case. In future projects other innovative technologies could be developed for interested user groups in rehabilitation.

4. Discussion

The PROTEA project had to gender related goals. First to increase gender awareness and knowledge within the team. Second to integrate gender theories and methods into the human-centred technology design. The gender-sensitive human-centred prostheses design has been the topic of a previous publication written by the team of PROTEA (Thaler et al. 2024).

In this paper, I discussed how the gender knowledge used by the team influenced the research process and its outcome. I used the queer-feminist perspective of the cyborg metaphor (Haraway 1991, 2016), and its critique (Reeve 2012, Lupton 2013, Kalender 2023) to analyse the research beyond the scope of integrating gender into the technology development.

Interviews with thirteen prostheses users were analysed with a queer-feminist STS understanding (Cipolla et al. 2017) using the cyborg metaphor (Haraway 1991, 2016) – translated into four research questions – to broaden the scope of gender-sensitive technology research. Additionally, a validation interview with the project manager of PROTEA offered reflections on how decisions had been made and which influences might have limited the scope of the research.

One critique of feminist scholars of the cyborg narrative aims at the risk of erasing real-world problems of amputees (Reeve 2012). In PROTEA however, real-world and health struggles were of central interest for the project and led to the decision for the specific use case of prostheses users, whose lower legs got amputated due to arterial occlusive diseases, to make the most impact with 3D-printed prostheses with integrated pressure sensors to detect friction points before they lead to further complications and amputations.

In the validation interview economic and health policy issues of prostheses use were discussed but not seen as the main focus of PROTEA. A queer-feminist analysis of this topic led to the verbalised intention of discussing the broader context of prostheses use and challenges – for the specific PROTEA users – with the advisory board of the project and using their network to transfer the knowledge further.

A second criticism from disability studies was that the cyborg discourse neglects the negative bodily experiences of prostheses users and idealises the prostheses' use (Reeve 2012, Kalender 2023). This topic was at the core of PROTEA: the improvement of prostheses for users. Thus, all interviewees talked openly about their bodies and their pain, like pressure and friction points, some amputees spoke also about preferring a wheelchair or crutches

at home. These interview results directly led to prostheses requirements including the integration of pressure sensors.

Thirdly, queer feminists criticise the paradoxical issue of social pressure of wearing prostheses to fix 'broken bodies' on the one hand, while on the other hand, visible prosthetic limbs are marking amputees out as different (Reeve 2012). While the social pressure has not been broached in the interviews with prostheses users, the visibility and optics of prostheses were discussed often, regardless of gender or age of the interviewees.

Superficially, the project can be critically interpreted as technoableist, because technologies should help amputees overcome struggles rather than improving the environment (Kalender 2023), but the project manager explained that the research funding explicitly aimed at developing technology. Additionally, a potential new angle for a next project was discussed, by not limiting the target group from the beginning, but focusing on all amputees and their needs beyond the prostheses.

The fourth research question broached the issue of users' resistance towards technologies (Lupton 2013). Because of the scope of the technology development project most interviewees shared a general positive attitude towards prostheses, however the additional sensor technology and resulting app divided the users, and some interviewees expressed concerns. Most interestingly also the seven interviewees who lost their lower legs due to a peripheral arterial occlusive disease and experience polyneuropathy, which leads to reduced sense of pain in the extremities, were not all convinced of the usefulness of pressure sensors in their prostheses. Despite this feedback, the PROTEA project developed their 3D-printed prostheses with the sensor technology, because experts (orthopaedic technicians, physicians) agreed on the usefulness of the technology. It will be seen in future whether prostheses users opt out of the sensor technology or show other resistance strategies or if they will be convinced to use the technology.

5. Conclusion

The developed 3D-printed prosthesis prototype with integrated pressure sensors is the result of user and stakeholder needs and expectations. Interviews with amputees led to a specific group of users, which the 3D-printed prostheses including pressure sensors was designed for (Thaler et al. 2024).

The benefit of analysing existing interview data with queer-feminist critique stemming from cyborg theories and discourses (Reeve 2012, Lupton 2013, Kalender 2023), was especially visible in the validation interview with the project manager, where she reflected on the transdisciplinary technology research project and its limitations. The queer-feminist interpretation of data led to a challenging of existing power relations, a questioning of potential defaults by the research funders, and an attempt to get to the bottom of how the scope of a technology research project came to be and what insights were left out and why. A queer-feminist perspective is challenging norms and standards beyond gender and sexualities, it puts power relations in the centre and asks uncomfortable questions. For PROTEA, it will be seen if this queer-feminist intervention will have an impact, the project ends in summer 2025, and follow-up projects are potentially feasible, there are a lot of research questions not answered and innovation beyond prostheses improvement thinkable, for instance technology and non-technical solutions aiming at preventing amputation. It comes down to science and health policies and resulting research funding programmes and how much degrees of freedom they leave for research. With this paper I aimed to show that queer-feminist perspectives can be very valuable for science and technology research and will hopefully be integrated more explicitly in research funding in the future.

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References

Braun, Virginia & Clarke, Victoria (2006). Using thematic analysis in psychology. In: Qualitative research in psychology 3.2, 77-101.

Cipolla, Cyd; Gupta, Kristina; Rubin, David A. & Willey, Angela (Eds.). (2017). Queer feminist science studies: A reader. Seattle, London: University of Washington Press.

Crenshaw, Kimberlé (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. In: The University of Chicago Legal Forum (1), 139–168.

Greitemann, Bernhard; Brückner, Lutz; Schäfer, Michael & Baumgartner, René (2016). Amputation und Prothesenversorgung. Stuttgart, New York: Georg Thieme Verlag KG.

Hancock, Ange-Marie (2007). When multiplication doesn't equal quick addition: Examining intersectionality as a research paradigm. In: Perspectives on politics 5.1, 63-79.

Haraway, Donna J. (1991). A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century. In Simians, Cyborgs and Women: The Reinvention of Nature. New York: Routledge,149-181.

Haraway, Donna J. (2016). Manifestly Haraway, University of Minnesota Press. ProQuest Ebook Central, http://ebookcentral.proquest.com/lib/warw/detail.action?docID=4392065.

Kalender, Ute (2023). Cyborgs, Tryborgs, Techno-Ableismus. Perspektiven der feministischen Disability Studies auf künstlich-intelligente Gesundheitstechnologien. In: Open Gender Journal 7, https://doi.org/10.17169/ogj.2023.212.

Lupton, Deborah (2013). The digital cyborg assemblage: Haraway‘s cyborg theory and the new ditigal health technologies. (preprint) In: Collyer, F. (ed.). The Handbook of Social Theory for the Sociology of Health and Medicine. Houndmills: Palgrave Macmillan.

Oudshoorn, Nelly; Rommes, Els; Stienstra, Marcelle (2004): Configuring the User as Everybody: Gender and Design Cultures in Information and Communication Technologies. In: Science, Technology, & Human Values 29 (1), S. 30–63. DOI: 10.1177/0162243903259190.

Reeve, Donna (2012). Cyborgs, cripples and iCrip: Reflections on the contribution of Haraway to disability studies. In: Goodley, B. Hughes & L.j. Davis (eds.). Disability and Social Theory: New Developments and Directions. London: Palgrave Macmilian, 91-111.

Shew, Ashley (2022). How to get a story wrong: Technoableism, simulation, and cyborg resistance.In: Including Disability Journal1.1.

Thaler, Anita (2022). Saving lives with gender studies? Putting technofeminism into practice. In: Pereira, Elisabeth T.; Costa, Carlos & Breda, Zélia (eds.). Proceedings of the 4th International Conference on Gender Research, University of Aveiro, Portugal. Download: https://www.researchgate.net/publication/360334600_Saving_lives_with_gender_studies_Putting_technofeminism_into_practice [03.05.2022]

Thaler, Anita; Sascha Fink, Daniela Krainer, Peter Schubert, Rosmarie Heim, Julian Bosch, Thomas Rockenbauer, Michael Sauer, Matthias Sepin (2024). Co-creating a 3D Printed Prosthesis Design using an Intersectionality Lens. In: Günter Getzinger, Michaela Jahrbacher, Roman Lukas Prunč (eds.) Conference Proceedings of the 22nd STS Conference Graz 2024. Critical Issues in Science, Technology and Society Studies; 6-8 May 2024. p. 180-192. https://openlib.tugraz.at/download.php?id=676268fce66f0&location=browse

Wajcman, Judy (2004). Technofeminism. Cambridge: Polity.

Wetterer, Angelika (2009): Geschlechterwissen & soziale Praxis: Grundzüge einer wissenssoziologischen Typologie des Geschlechterwissens. In: Angelika Wetterer (Hg.). Geschlechterwissen und soziale Praxis. Theoretische Zugänge – empirische Erträge. Königstein/Taunus: Ulrike Helmer Verlag, 39-63.