Content

Looking Through the Mirror: The PhD Program KoMMa.G[1]

Bettina Wahrig and Corinna Bath

1. Introduction

Can you look through a mirror? Of course not. But yet… Plain mirrors usually have a reflective *and* a transparent component. A transparent surface, like water or glass, will reflect some of the light rays falling on it, depending on the angle of incidence and the perspective of the onlooker. By using the reflecting surface of this volume, which was the last joint project of the members of the PhD program "Gendered Configurations of Humans and Machines" ("Konfigurationen von Mensch, Maschine und Geschlecht, KoMMa.G," 2017–2020) we are looking back at three years of intensive and often joyful collaboration and striving to catch a glimpse of the future. Hence our paradoxical title "Looking through the mirror," i.e., casting a glance both backwards and ahead, taking account of the recent past and guessing what may become of that endeavor in the future. The conference itself was organized by the PhD researchers in KoMMa.G, and this volume is also a fruit of their initiative.

Over the past three years of working in the PhD program KoMMa.G, funded by the Ministry of Science and Culture in Lower Saxony, our PhD researchers and the Principal Investigators (PI) have held conversations at the intersections of a broad range of disciplines. The initial fifteen principal investigators and PhD projects represented disciplines cutting across the fields of technology and engineering, natural sciences, social sciences, science and technology studies (STS), film and media studies, and history of science. We also garnered associated investigators from literary studies, history, and informatics, to name just the most important ones. The overall aim of this project was to understand gender relations and implicit gendering within the disciplinary fields of science and engineering. In this context, our questions

---

1 This short preface is the written and overhauled version of our welcome address to the final conference of the Doctoral Program "Gendered Configurations of Humans and Machines" ("Konfigurationen von Mensch, Maschine und Geschlecht, KoMMa.G," 2017–2020) held in October 2019 in Braunschweig.

were: How do different forms of gender knowledge arise within these fields? In what way do they play out at the sites where knowledge and technologies are produced? How do technologies configure gender as a structural-symbolic category of inequality and, vice versa, how does gender configure knowledge and technologies? Our PhD researchers, previously educated in science, engineering, or the social sciences and humanities, acquired knowledge about other disciplines and about the way Gender and Queer Studies provide frames of understanding and analyzing them. They did so by actively participating in workshops, seminars and discussions, and through invited guest lectures, many of which they organized themselves. They also developed and organized the conference documented in this volume. Consequently, PhD researchers from our program are its principal editors.

Within the limited time of three years' funding, and in addition to working on their own projects, the PhD researchers and the Principal Investigators have taught each other what their disciplines of origin are about. The PhD researchers have nudged their mentors and inspired one another to cast a fresh look at their fields of research. They reframed their habitual disciplinary perspectives by gazing through the looking glass of unfamiliar research methods and approaches that they had not yet considered.

The PhD researchers' short accounts of their completed and ongoing work included in this volume testify to the difficulties of developing an inter- and transdisciplinary perspective, inspired by questions arising from different strands of Gender Studies, but centered on a given research topic in their disciplines of origin. The task of combining innovative research & development (R&D) with current approaches in gender studies, or, vice versa, of undertaking a journey into the world of R&D, equipped with a gender toolbox taken from the arts and media or social studies, has been challenging. It is an endeavor, an issue of daily struggles, of getting lost, of misunderstanding each other, and of eventually making sense of that incomprehension. This might even lead us to a short, and paradoxical, definition of *inter-disciplinarity* and *transdisciplinarity*: Interdisciplinary and transdisciplinary work are the process of NOT understanding each other, which then makes us start to spell out WHY these moments of misunderstanding continue to happen, with the effect of either transforming well-trodden paths or clinging to the traditional epistemologies we have been taught. With this definition – or, to phrase it more modestly – with this formula for what happens at the intersections between disciplines, we have already taken the step from *reflecting on* science, technology, and gender to *reflecting on the way we perform this reflection*. But on what does this reflection on reflection depend? We intended – and still intend – to tap into inter- and transdisciplinary reflection as a resource to understand better how we, as researchers and as humans, change and are changed in a series of co-configurations in technology-driven processes (see among others Barad 2007; Barla 2019; Suchman 2007; 2012).

The necessity of such a transdisciplinary reflection process in a globalized, technology-driven world, which is thoroughly structured by inequality and by dangerously anti- or a-social power relationships, is highlighted by the central research object of our PhD program, namely the growingly complex human-machine configurations, as we formulated in our project outline: "Machines, which can be understood as object-centered technologies, open up new possibilities for mobility and communication, they relieve us of tedious tasks, and allow us to share information or overcome physical limitations and geographical borders. At the same time, technical products influence the way we think, act, and feel, i.e., our forms of subjectification. Machines are thus not only configured by humans, but they represent an essential part of the (re)configuration of the human […]. The same applies more generally to technical artifacts in research and development."[2]

Gender Studies in STS, Queer Studies and approaches to intersectionality have helped us to contextualize scientific and technological developments within the larger picture of social interaction, to understand research practices and disciplinary cultures, to conceptualize their economical, juridical, and political frameworks (Cipolla et al. 2017; Escobar 2018; Harding 2015; Suchman 2008; Thakor/Molldrem 2017; Verran 2002; Wajcman 2010). Science and technology are social enterprises; they constitute webs of signification and power relationships, to which we all belong. Like the challenges of the climate crisis, the ongoing pandemic is a striking example of how urgently we need approaches encompassing and entangling cultural, historical, and techno-scientific insights, in addition to a new understanding of what it means to be human, in order to solve the current existential global problems (see among other Bath et al. 2017; Haraway 2016; Puig de la Bellacasa 2017; Stengers 2015; Tsing 2017).

2. How to Conceptualize an Interdisciplinary PhD Program

When, together with the other PIs, we started to write up the proposal for the doctoral program back in 2015, we were confronted with the challenge of how to organize a joint exploration of research fields and methods. At first, each of us developed outlines of case studies for possible PhD projects. For example, we sketched out projects touching on gender aspects in the ergonomics of human-computer interaction, gender in the planning processes of steel construction or, the task of developing a revision of actor-network theories with the aid of the critical tools developed by gender studies.

---

2   See: https://www.tu-braunschweig.de/kommag, last accessed August 11, 2020.

Thus, in order to create a living and productive atmosphere of interdisciplinarity, we needed a space for mutual translations and collaborations. KoMMa.G turned out to be such a space. How did we conceptualize this space? We initially aimed at a tandem or double supervision for PhD projects, so that each project would have one supervisor with a science or engineering background and one with a gender studies background. These tandems, we thought, would be able to inform each other both on the thematic side and the methodological side. For example, how are gender relations and lab automation entangled? The tandem project for this research in pharmacy was to be located in the history of science: Can prosthetics re-constitute the cis-male body? In both projects in this tandem, artifacts and humans were intermixed and entangled. But how do lab automation and the development of prosthetics in the wider sense resonate? How do human-artifact relations change human-human relations and vice versa? In the course of the program, the first project (on lab automation) has been realized, the second one (on prosthetics) thoroughly modified.

In hindsight, we can name some more pairs of projects that mirror each other somehow. Still, in the period of refining the program, we soon realized that this approach was too schematic because we were encompassing such a large number of different disciplines. We were still confident that resonances between the PhD projects would arise over time, and we had already detected quite a number of them. But on further elaboration, they turned out to be elusive, and, more importantly, the thematic interactions were not simple resonances, but rather patterns of resonances and interferences, like the patterns one may see on a liquid surface observed from different angles and over an extended period. Moreover, we had to adapt the formal requirements of the curriculum and the supervision of doctoral students to the regulations of three different universities. A schematic dual mentoring would have brought too many structural inequalities into the group.

Therefore, we decided to propose another model of mutual interdisciplinary instruction: We defined four research areas and allocated between three and five PhD projects to each, making sure that experts both for gender studies and for science and engineering were present in every group of potential supervisors. The four research areas were *Abstractions and Modeling*; *Creativity and Design*; *Materialization, Virtualization, Representation*; and *Networks and Emotions*. This concept of structuring the program and facilitating interdisciplinarity convinced the reviewers of our proposal. Thus, in 2016, we received the funding for the PhD program by the Ministry of Science and Education in Lower Saxony.

3. Working with PhD Researchers and Their Supervisors Across Disciplines

We started our program in January 2017 with eighteen PhD researchers. Fifteen of them received a three-year grant, and three were associated with the PhD program. They were, and continue to be, supervised by fourteen professors at eleven institutes or departments from three universities in and around Braunschweig: The TU Braunschweig, the Ostfalia University for Applied Sciences and the Braunschweig University of Arts.

As expected, the doctoral students brought a large number of new perspectives into the program. Many of them joined the research areas with projects of their own.[3] As a consequence, the dynamics emanating from the interdisciplinarity within the four groups differed enormously from what we had expected and among these research areas. Although the backbone of the accompanying curriculum was stable, these differences necessitated repeated adjustments of the program's details.

Looking back, we might say that the fruitful process of *not understanding* each other went on throughout the program, and we continuously got better at it. Understanding and being engaged in interdisciplinary processes is a complex skill that involves capacities of interpersonal and trans-methodological communication, but also of finding one's place in an array of existing disciplinary fields. From the beginning, we encouraged the PhD researchers and the Principal Investigators to look for individual paths of qualification in a well-defined discipline, while also gathering experience in interdisciplinary work. We placed a relatively strong emphasis on disciplinary frameworks in view of the fact that, after receiving their doctoral degree, PhD researchers will have to gain access to established professional and disciplinary fields, even though, in the third millennium, professional work is undergoing enormous changes. This also applies to research and development. The balance between intradisciplinary and inter-/transdisciplinary work remained difficult for almost every one of us. In nearly all the projects, research tandems, and clusters, it was continuously negotiated and re-negotiated.

In spite of all of us having to handle this demanding task, we look back on one element of our curriculum as particularly successful, namely the workshops. These were our discursive and experimental spaces for the reflection of and training in inter- and transdisciplinary research. These workshops

---

3   One of the first experiences of interdisciplinarity we had when discussing in the group of PIs were differences in the recruiting processes of the PhD researchers: Graduate programs in the social sciences and the humanities usually recruit PhD researchers by asking them to come up with their own project proposal and announce decisive criteria for being selected for the program. In contrast, supervisors in sciences and engineering offer pre-defined PhD projects within the framework of their own working programs.