SCHAUFLER LAB
TU DRESDEN

Data↔Worlds

Socio-technical and Cultural Syntheses of New Realities

The concept for 2nd funding period of the Schaufler Lab@TU Dresden, 2024–2027
Dresden in November 2023

Guiding theme Data↔Worlds

At the Schaufler Lab@TU Dresden, scientists and artists engage in the interactions between the fields of technology, art, science, and entrepreneurship. In the second funding phase, this thematic emphasis is intended to be maintained as a distinctive feature. Therefore, the focus remains on the transformation of society and culture, in which technology plays a key role.

The new funding period will concentrate on *Data↔Worlds*. By this term, we understand sociotechnical and cultural mediations of reality based on data, which significantly shape social life. *Data↔Worlds* aims to research society and culture as a synthetic reality. This includes the historical view of past situations of radical change and the analysis of contemporary societies after the so-called digitalization, which has led to new realities that significantly depend on the availability of data. Data themselves exert an influence on the world they describe, bringing about their own dynamics and problems. Therefore, an adequate understanding of the interaction between data and our reality is urgently needed, especially about currently pressing social challenges and questions revolving around nature and the environment, the economy, law and politics, as well as art, culture, and education.

Data and worlds

The term world refers to where people find themselves. A world arises from the material conditions of human coexistence. This includes physical, geological, and biological as well as technical aspects. Worlds, in turn, also encompass the spheres of our perception and interpretation. What is ultimately recognized and perceived as a world results from the interplay of a multitude of different factors.

The term data refers to aspects of reality being selected, collected, and presented or generated in a constructed connection according to measurement regulations.

Today, the technical transformation of worlds into data is mostly being processed in automated form and using machine-readable digital signals. Vice versa, existing worlds are changed, and new worlds are created on the base of data generated in this way. The “datafied society” has already become a reality and has thus initiated a decisive cultural transformation. At the same time, the connection between data and worlds historically precedes the upheavals of today – analog data are likewise of constitutive meaning for worlds (e.g. Cartography at the beginning of the modern era).

The relationship between data and worlds can be fundamentally illuminated from three aspects: First, data should make worlds tangible and understandable. Second, however, they also constitute a reality of their own. Independent worlds can be created through data if they are available in sufficient quality and quantity and are mediated by appropriate technologies. Third, these worlds ultimately alter the reality from which they originated. This interactive relationship, which we refer to as *Data↔Worlds*, delineates the synthesis of new sociotechnical and cultural realities that warrant exploration.

The omnipresence of data shapes and mixes with the immediate perception of things. This places new demands on activities at work and in everyday life. Common distinctions between real and virtual or online and offline reality are becoming questionable. The resulting change is perceived as an opportunity by some parts of society, others evaluate it as a threat – not least in political terms. Either way, it demands our attention in various respects.

(1) *World data* – data convey reality

Every attempt to collect data and to represent worlds is a process of assigning signs. World phenomena are classified in their data-based capture. This is quite complex and requires a multitude of assumptions about which classifications adequately capture the respective phenomenon. A currently highly debated example is whether gender categories should be recorded as binary or diverse. Moreover, meanings are partly predetermined by the inherent logic of each sign system. The current digitalization perpetuates certain aspects of "analog" datafication of the past – e.g., the opening up of the (colonial) world by the forming European sciences from the 18th century, or the recording, categorization, and classification of the population in the social statistics of the 19th century. Therefore, contemporary developments can be described and perceived more precisely against the backdrop of the history of modernity. Controversies pertain not only to the selection, validity, and objectivity of data, but also to questions of the distribution of power in their collection, administration, and use.

Guiding questions:

- What knowledge enters data collection? How does the translation of the perceived "world" into "data" change knowledge and knowledge of the world?
- What influence does the emergence of mathematical approaches such as statistical methods and modelling, as well as the respective state-of-the-art technology exert on the formation and evaluation of data?
- Which actors have the power to define data, and how do these power relations shift in the course of social change?
- What past "datafications" continue into the present, which ruptures are detectable?
- In what form are data visualized, and what goals and strategies inform their presentation?

(2) *Data worlds* – data as a reality of its own

When individuals or groups are confronted with the consequences of data collection or data processing, they often experience contradictions between data, the decisions based on them, and the perceived reality of their world. Consequently, contexts from data are experienced as worlds of their own, which seem to follow their own laws. The reality processed in the form of data never aligns with the original, subjectively perceived world.

This is frequently problematic, as in discriminatory "decisions" by artificial intelligence against socially disadvantaged population groups. Similarly, criticism of immersive game worlds or social networks often relies on the distinction between data world and lifeworld. However, discrepancies can also be used deliberately, as in the digital humanities, where relationships between data are supposed to open up new scientific questions. Music, literature, and the visual arts have also always attempted to make a data-generated context appear as a world (e.g. the score of a musical composition). Their appeal is based precisely on the independence and difference of the creatively created worlds from the familiar (this applies to a classical symphony as well as to advanced versions of augmented reality).

Guiding questions:

- How are data worlds constructed, which social norms and cultural values underlie them, and on which infrastructures are they based?
- How exactly do different forms of virtuality relate to (material) reality?
- In which way is individual and social experience being shaped in a datafied world?
- What about the feasibility and acceptance of ‚immersion' in digital data worlds in work, media, and consumption spheres?
- How do users influence the further development of these technologies?

(3) *Data↔Worlds* – reality is changed by data

Data as well as models and simulations that are constructed with them affect our understanding of ourselves and the world – and thus on existing societal realities. Datafication gives or at least suggests previously unknown power to shape the material world, by either transforming or entering syntheses with it. In the process, machine agents (such as AI) are increasingly experienced as having the power to shape the world. Furthermore, the massive datafication exerts pressure to act, plan, and design, which creates further demand for data and thus leads to a spiral (cf. Section 1). Whether in the context of business, industry, art, politics, or in the everyday world – action is increasingly data-based and at the same time data-producing. Not least, this has an ecological dimension. After all, the production, processing, transmission, and storage of data generates immense environmental costs – under conditions of global interconnectedness with consequences for the entire planet.

Guiding questions:

- What are the sociopolitical and economic consequences of data for the worlds of which they become a part?
- What are the material implications, such as raw material requirements, energy balances, and legacies?

— Which new opportunities (in terms of experiments or imaginings) do recent, large-scale, and resource-intensive developments of data-based technologies such as digital twinning or geoengineering provide?
— What are the risks, limitations, and ethical challenges associated with these novel large-scale datafication projects?

Possible PhD projects within the Schaufler Kolleg@TU Dresden

The guiding theme offers space for the investigation of the emergence of *Data↔Worlds* and the handling of them from a humanities and social science angle as well as from a cultural and educational science perspective. We are thus seeking a broad range of disciplines, ranging from media studies, linguistics, literature, art history, communications, political science and law, philosophy and ethics, sociology and socioeconomics, history, and didactics. Ph.D. projects should engage with the question of how data produce and mediate worlds and what effects and consequences they have on newly created, synthetic realities. We are interested in scholars examining a range of topics including the history and impact of statistical and stochastic techniques on society and technology, how knowledge, truth, and science are impacted by digital platforms and , how artistic and aesthetic practices shape and are shaped by big data and AI, and how data driven worlds are reshaping concepts of the human, language, politics, and environment. Questions of immersion in and the design of *Data↔Worlds* arise from perspectives including literary, artistic, and communication studies, as well as from historical, ethical, and sociological viewpoints. Analyses of the effects on the world of work are just as conceivable as studies on the monitoring and management of climate problems up to far-reaching interventions in geological processes (terraforming) – for example from a political, legal, or planning sciences perspective.

For historians, there is room for a variety of studies on the continuities, as well as ruptures from analog to digital data worlds. Possible examples are the history of statistics as a data apparatus for administration since the 19th century, the (colonial) history of surveying and mapping the world, or the history of media technologies, especially with regard to the dioramas popular in the 19th century, which may well be considered the analog twin of today's virtual reality applications.

Virtual worlds and data-based utopias of transhumanism have been discussed in science fiction since the 1970s; fictions of geoengineering can be traced back to Jules Verne, even to the beginnings of this literary genre in the 19th century; data worlds thus form a central subject of literary and cultural studies research.

Educational processes have also been profoundly changed by datafication for centuries, for example through objectification, ranking, and processes of (self-)control. An educational perspective on the relationship between data and worlds is therefore not only relevant through e-learning and e-assessment or since the establishment of tele-education in the course of the COVID-19 pandemic. For this purpose, the University School Dresden is the ideal partner, which will gladly engage in a second phase of the Lab.

To relate the dissertation projects to each other, each project should focus on two different research perspectives on the relationship between data and worlds. We are very interested in recruiting scholars who work intersectionality, and who are invested in working collaboratively across disciplines and practices (including the arts).

Contact by discipline for further information:

Faculty of Arts, Humanities and Social Science:

- Jun.-Prof. Dr. Miriam Akkermann, Junior Professorship in Empirical Musicology
- Prof. Dr. Gisela Hürlimann, Chair of History of Technology and Economy
- Prof. Dr. Tamara Jugov, Chair of Practical Philosophy
- Prof. Dr. Marianne Kneuer, Chair of Political Systems and Comparative Politics
- Jun.-Prof. Dr. Anna Sophie Kümpel, Junior Professorship in Media and Communication
- Prof. Dr. Birte Platow, Chair of Religious Education Studies
- Prof. Dr. Kerstin Schankweiler, Chair of Visual Culture in the Global Context
- Prof. Dr. Dominik Schrage, Chair of Sociological Theories and Cultural Sociology

Faculty of Linguistics, Literature and Cultural Studies:

- Prof. Dr. Orit Halpern, Chair of Digital Cultures
- Jun.-Prof. Dr. Moritz Ingwersen, Chair of North American Literature with a Focus on Future Studies
- Prof. Dr. Carsten Junker, Chair of American Studies with a Focus on Diversity Studies
- Prof. Dr. Simon Meier-Vieracker, Chair of Applied Linguistics

Faculty of Education:

- Prof. Dr. Anke Langner, Chair of Education/Inclusive Education

Linking to STEM subjects

The generation of data and the handling of them have never been the sole defining topics of computer science. Even before computerization, they were a focal point of all mathematical, engineering, and natural science subjects, and in two respects: First, methods and techniques of data processing are central objects of research, and second, they are indispensable tools of scientific work.

The partnership with the Center for Scalable Data Analytics and Artificial Intelligence (ScaDS.AI), which was already fruitful in the first phase of the Lab, will be continued. ScaDS.AI is part of the Center for Interdisciplinary Digital Sciences (CIDS), which TU Dresden has built up in recent years and which is to become an incubator for further collaborations of Schaufler Lab@TU Dresden (see below).

Partnerships also exist with various other actors from the Faculty of Computer Science, and more are being prepared. This concerns especially the Institute of Artificial Intelligence. Partners from the STEM subjects were already involved in the preparation of this draft topic, and are engaged, for example, in the design of immersive media, computer vision and technical design.

5 STEM mentors are obligatory for all doctorates – as was the case in the first funding phase.

Artistic research in Schaufler Residency@TU Dresden

Artists have been explicitly concerned with data collections since the early modern period. With the generation and processing of digital data from the mid-20th century onwards, these data were naturally adopted in artistic practices and productions. The handling and use of these digitally generated data can reflect very different accesses, intentions, and phenomena. Mass data and "big data" experienced a particular boom in the late 20th century and finally led to a "digital turn" in the arts.

The often transdisciplinary artistic works of all genres range from approaches to "surveying the world" by highlighting specific issues (migration, gender, race, transcultural aesthetics, etc.) to planning and design possibilities in the sense of technically sophisticated visualizations and immersive approaches.

The basis for the artistic projects in the Schaufler Residency@TU Dresden, which are processual and open in terms of content, are the complex relationships between data and world phenomena. On the one hand, the artistic questions that accompany this process can be directly dedicated to the aesthetic and formal dimensions of data and data worlds. On the other hand, the implications of the generated *Data↔Worlds* are investigated. These are thus of particular relevance to the Schaufler Residency. Bringing together urgent challenges of the present and visions of extreme future scenarios, new and innovative artistic projects are to be developed along the central theme.

For the Schaufler Residency@TU Dresden, partners from science and research will be recruited, among others from the national competence center ScaDS.AI, the TUD Cluster of Excellence *Physics of Life* (PoL), the Chair of Visual Culture Studies in a Global Context, as well as institutes and professorships from medicine and genetics, but also from the Leibniz Institute of Ecological Urban and Regional Development (IÖR) Dresden. In addition, close cooperation with the interdisciplinary Center for Synergy of Systems (SynoSys), an integral part of CIDS, is sought. SynoSys focuses on research into the ongoing digitalization of all areas of life and their dependence on digital systems.

The teaching and research collections of the Office for Academic Heritage, Scientific and Art Collections (Kustodie) with their heterogeneous object cultures are available as images of the world and science for artistic research projects. These research data in the form of unique university collections are also a unique feature of the Schaufler Residency@TU Dresden.

International collaborations

New impulses and greater international visibility can also be achieved with the future integration of important international cooperation partners of the TU Dresden, such as the EUTOPIA network and the transCampus with King's College London. The Office for Academic Heritage plans to present the Schaufler Residency at the International Collection Conference (ICOM, Universeum) to be held in Dresden at the end of 2024. The following questions offer a high connectivity for the projects of the Schaufler Residency@TU Dresden as well as for the Schaufler Kolleg@TU Dresden: How can digital technical systems and non-digital psychological, biological, social, linguistic, and cultural systems work together, and what are the implications and limitations of each of these systems?

Strategy for Communication and Transfer

The strategy for informing and involving non-university partners and urban society, which was already formulated in the first application, will be continued and expanded in the second funding phase. Due to the pandemic, many of the planned formats, especially for the Schaufler Kolleg@TU Dresden, could not be implemented. It is important to make the artistic projects and the Ph.D. students' research results accessible to a broad public and to initiate an active exchange with non-scientific partners, such as educational institutions in and outside of schools, cultural centers, urban associations, NGOs, and (data) activists. In addition to classical conferences and workshops and the exhibitions in the Gallery of the Office for Academic Heritage, new, especially non-university forms of mediation are to be developed and tested. A closer cooperation with the public relations and didactic departments of the TU Dresden as well as with the museum education department of the SCHAUWERK Sindelfingen is desirable.