PADERBORN UNIVERSITY

INTERDISCIPLINARY CONFERENCE

DATA SOCIETY

OPPORTUNITY – INNOVATION – RESPONSIBILITY

Paderborn University /

Heinz Nixdorf MuseumsForum

Paderborn
20–22
September
2022

50 YEARS UPB

Unless otherwise stated in individual cases, the event will be held in German.

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Organisers

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We would also like to thank Ina Heinrich and Hannah Brauckhoff from the Department of "Press, Communications and Marketing" and the entire UPB 50-Team, as well as all researchers and scientists and everyone else who helped organise and run the conference.

With special thanks also to the Heinz Nixdorf MuseumsForum (HNF) and its staff.

Data Society
Opportunity – Innovation – Responsibility
20–22 September 2022

Tuesday, 20 September 2022
(Lecture Hall L1)

Digital transformation and work

Time	Programme event
9:15 a.m.–9:30 a.m.	**Welcome** **Professor Birgitt Riegraf, President Paderborn University**
9:30 a.m.–11 a.m.	**Keynote: "People at the heart of the digital society"** **Professor Susanne Boll (University of Oldenburg, OFFIS - Institute for Information Technology)**
11 a.m.–11:30 a.m.	**Coffee break (Foyer Building L)**
11:30 a.m.–1 p.m.	**Human digital twins and the future world of work** **Professor Gregor Engels, Daniel Roesmann, Talea Hellweg (all Paderborn University), Sarah Pilz (Bielefeld University)**
1 p.m.–2 p.m.	**Lunch break in the Mensa Academica (self-pay)**
2 p.m.–3:30 p.m	**Gender perspectives on the digitalisation of work** **Professor Bettina Kohlrausch (Paderborn University and Institute of Economic and Social Research (WSI), Dusseldorf), Dr Julia Gruhlich (Paderborn University), Dr Lena Weber (GESIS – Leibniz Institute for the Social Sciences)**
3:30 p.m.–4 p.m.	**Coffee break (Foyer Building L)**
4 p.m.–5:30 p.m.	**The impact of artificial intelligence on jobs now and in the future** **Professor Ronald Bachmann (RWI – Leibniz Institute for Economic Research, Essen), Professor Oliver Müller (Paderborn University)**
5:30 p.m.–6 p.m.	**Light snack (Foyer Building L)**
6 p.m.–7:30 p.m.	**Evening talk: "Computer-generated music"** **Dr Axel Berndt (Center of Music and Film Informatics, University of Music Detmold)**

AI, big data and machine learning

Time	Programme event
9 a.m.–10:30 a.m.	**Meta AI: Developing AI systems with AI** **Professor Eyke Hüllermeier (Ludwig Maximilian University of Munich), Tobias Gaukstern (Weidmüller), Professor Axel Ngonga (Paderborn University), and Professor Andreas Both (DATEV)**
10:30 a.m.–11 a.m.	**Coffee break (Foyer Building L)**
11 a.m.–12 p.m.	**Explainability and understanding in interaction with AI – an interdisciplinary task** **Professor Britta Wrede (Bielefeld University), Professor Katharina Rohlfing, Michael Lenke (Paderborn University), Jaroslaw Kornowicz (Paderborn University), and Michael Rapp (Ludwig Maximilian University of Munich)**
12 p.m.–1:45 p.m.	**Lunch break in the Mensa Academica (self-pay) and transfer to the Heinz Nixdorf MuseumsForum**
The following sessions take place at HNF*	
1:45 p.m.–2:45 p.m.	**Quantum technologies for information processing** **Professor Klaus Jöns (Paderborn University)** Talk in English: **Professor Sevag Gharibian (Paderborn University)** 🇬🇧
2:45 p.m.–3:45 p.m.	**Data science in engineering – theory and industrial applications** **Professor Ansgar Trächtler, Junior Professor Sebastian Peitz, Dr Julia Timmermann (all Paderborn University), and Steven Koppert (Fraunhofer Institute for Mechatronic Systems Design IEM)**
3:45 p.m.–4:15 p.m.	**Coffee break (HNF Foyer)**
4:15 p.m.–5:15 p.m.	**Keynote: "The future of supercomputing: Saving power for greater computing power"** **Professor Dieter Kranzlmüller (Leibniz Supercomputing Centre (LRZ) of the Bavarian Academy of Sciences and Humanities)**

*The event at the Heinz NixdorfMuseumsForum will be held in compliance with the 2G rule. For more information, please visit the HNF homepage: www.hnf.de

5:15 p.m.–6 p.m.	**Panel discussion: "The future of supercomputing: Where will the future take us?"** **Panelists: Professor Dieter Kranzlmüller (Leibniz Supercomputing Centre (LRZ) of the Bavarian Academy of Sciences and Humanities),** **Professor Christian Plessl,** **Professor Christine Silberhorn,** **Professor Kirsten Thommes (all Paderborn University)** **Moderation: Julia Ures**
6 p.m.–6:15 p.m.	**Opening of the poster session and reception**
The buffet will be open from 6:30 p.m.–8 p.m.	
6:15 p.m.–7:45 p.m.	**Poster session** **Award ceremony starts at 7:30 p.m.**
6:15 p.m.–8:30 p.m.	**Opportunity to visit the museum**
9 p.m.	**End**

Ethical issues of digitalisation

Time	Programme event
8:30 a.m.–9 a.m.	Arrival and welcome coffee
9 a.m.–10:30 a.m.	**Keynote: "Digital ethics"** Professor Sarah Spiekermann-Hoff (Vienna University of Economics and Business)
10:30 a.m.–11 a.m.	Coffee break (Foyer Building L)
11 a.m.–12:30 p.m.	**Who does our data belong to? Data ownership and platform capitalism** Professor Dennis Kundisch (Paderborn University), Birte de Gruisbourne (Paderborn University), Dr Sebastian Sevignani (University of Jena)
12:30 p.m.–1:30 p.m.	Lunch break in the Mensa Academica (self-pay)
1:30 p.m.–3 p.m.	**Show me your data and I'll tell you who you are. Discriminatory data (analyses)** Felix Maschewski (Berlin University), Junior Professor Henning Wachsmuth, and Junior Professor Suzana Alpsancar (both Paderborn University)
3 p.m.–3:30 p.m.	Coffee break (Foyer Building L)
3:30 p.m.–5 p.m.	**Autonomy** Professor Tobias Matzner, Professor Kirsten Thommes (both Paderborn University), and Professor Gabriele Gramelsberger (RWTH Aachen University)
From 5 p.m.	Close and departure

Status 30.08.2022 – subject to change

Tuesday,
20 September 2022

Digital transformation and work

KEYNOTE
People at the heart of the digital society

Professor Susanne Boll

University of Oldenburg OFFIS – Institute for Information Technology

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Today, it is almost impossible to imagine life without digital technologies. And it is precisely because technologies and applications are penetrating all aspects of our lives that attention is increasingly turning to issues surrounding the shaping of our digital society, both in public discussion and in research. Digitalisation, automation and AI are facilitating major advances in many areas of our lives: automated driving, digital healthcare, intelligent production. In everyday life, too, digital technologies are set to facilitate and change many things.

How can we put the well-being, participation and empowerment of people at the heart of technological development? How can the impacts of technological development in complex socio-technical systems be taken into consideration as the technology is being developed? This talk will show how technological innovation in complex socio-technical systems can be developed with and for users. Examples from research and development will highlight the important role of human-technology interaction in jointly shaping the digital society in a responsible manner.

Bio

Susanne Boll is Professor of Media Informatics and Multimedia Systems at the University of Oldenburg and a member of the board of the OFFIS – Institute for Information Technology. Her research interests lie in the field of human-computer interaction (HCI). She designs novel interaction technologies that promote respectful and beneficial interaction between humans and technology in an increasingly automated world. Her research passion is the development of novel, innovative technologies with user needs and social acceptance in mind. Her scientific research projects deal with highly relevant challenges in digital healthcare, interactive systems in Industry 4.0 and automated driving. In the new "society" research area, she investigates how technological development can be shaped with society in the sense of an open, participatory and democratic society.

Professor Boll is a fellow of the German Informatics Society (GI), a distinguished member of the Association for Computing Machinery (ACM) and an elected member of the German Academy of Science and Engineering (acatec).

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Chair:
Professor Birgitt Riegraf (Paderborn University)

Human digital twins and the future world of work

In the future, it is not only machine "digital twins" that are set to shape the world of work, but also human "digital twins", defined as data models of employees. This session presents key findings on the significance of digital twins in the new world of work, based on findings by the Bielefeld/Paderborn transdisciplinary research centre "Arbeit 4.0" (Work 4.0).

Dimensions of the digital twin
Professor Gregor Engels (Paderborn University)

Digital twins exist for products, machines – and people. This talk will give an overview of the various different concepts and draw a critical conclusion, and thereby serve as an introduction to the session topics.

Integration of human factors in production systems of the future
Daniel Roesmann (Paderborn University)

Production workers have varying degrees and forms of experience and specific skills. This talk will describe a procedure for human-centred assembly planning and control through the integration of learning and forgetting curves.

Competence twins and the impact of digitalisation
Talea Hellweg (Paderborn University)

You can map what employees do using task profiles in a competence twin. This talk will demonstrate how employees with particularly unusual profiles are more likely to be adversely affected by digitalisation.

The global human digital twin
Sarah Pilz (Bielefeld University)

Knowing people's genetic make-up and their complete biography could help you make good predictions about whether they are likely to stay healthy or remain loyal to their current employer. This talk will shed light on how private companies are already collecting and using much of this information.

Session organiser and chair:
Professor Martin Schneider (Paderborn University)

Gender perspectives on the digitalisation of work

In the social sciences, the changes being brought about by new forms of digitalised networking, automation and storage in the world of work are the subject of much debate. However, there has to date been a lack of dedicated research that analyses and evaluates these changes from gender-theoretically informed perspectives. Against this background, this session will feature talks by various members of Paderborn University who have addressed this research gap and who will present new findings and the latest research on the topic. The session will be based on a broad understanding of "work" – in addition to changes in the workplace, changes in care work and housework as a result of digitalisation will also be discussed.

Working from home and childcare during the COVID-19 pandemic
Professor Bettina Kohlrausch (Paderborn University and Institute of Economic and Social Research (WSI), Dusseldorf)

The digital housewife – smart homes from a gender perspective
Dr Julia Gruhlich (Paderborn University)

Platform-mediated care work and intersectional inequalities
Dr Lena Weber (Leibniz Institute for the Social Sciences (GESIS), team lead Centre of Excellence Women and Science (CEWS))

Session organiser:
Dr Julia Gruhlich (Paderborn University), Dr Lena Weber (GESIS, team lead CEWS)
Session chair:
Dr-Ing. Kay-Peter Hoyer (Paderborn University)

The impact of artificial intelligence on jobs now and in the future

Since at least as far back as the Industrial Revolution, people have worried that machines are going to replace their jobs. This is an issue that seems to garner (varying degrees of) public attention in cycles. As a result of increasing digitalisation, this worry has recently come back into focus. In this session, two empirical papers will be presented that provide evidence on the current situation (first paper) and an assessment of the situation for the near future (second paper).

How is technological progress impacting labour market transitions in Europe?
Professor Ronald Bachmann (RWI – Leibniz Institute for Economic Research, Essen)

Technological change has given rise to significant fears of substantial job losses. These fears are fuelled by the fact that certain technologies like artificial intelligence are able to handle tasks previously carried out by humans. This talk will therefore look at the extent to which technological progress and its impacts on the labour market can be measured and what impacts can actually be observed, drawing on a study examining the labour market transitions – from employment to unemployment, for example – of individual workers in 31 European countries for the period 2014-2019. The study shows that these transitions are, on the one hand, connected to the extent to which workers are exposed to artificial intelligence, but that the relevant tasks performed within a specific job and the employee's qualification level also play a decisive role.

What jobs might AI be able to do in the future?
Professor Oliver Müller (Paderborn University)

Artificial intelligence (AI) has the potential to reshape our world of work. In recent years, AI systems have surpassed humans in numerous tasks that require human-like cognitive abilities. However, we are still a long way from artificial general intelligence (AGI): Machines cannot handle the full range of tasks that humans can. This raises the question of which tasks, and therefore which jobs are likely to be the most affected by the increasing prevalence of AI. In this talk, we will report on the development and application of a machine learning-based
measurement tool that can predict how likely it is that AI will be able to carry out certain work tasks in the near future. Our empirical estimates suggest that over half of the operational jobs advertised on online job boards will be carried out by AI within the next 10 years.

Session organiser and chair:
Professor Hendrik Schmitz (Paderborn University)

Tues., 20.09.22 | **6 p.m.–7:30 p.m.** | **Lecture Hall L1**

EVENING TALK

Computer-generated music

**Dr Axel Berndt
Center of Music and Film Informatics,
University of Music Detmold**

The idea that computers can generate music is one which divides opinion. Is music not a deeply emotional means of expression, of which only creative human beings are capable? Yet, there is hardly any creative field as mathematically affine as music. Musicology, music theory and music informatics have always sought to identify and systematically explain the creative processes and style-forming patterns – the foundations of music generation. This talk will give an insight into this exciting field of computational creativity, starting with the earliest known "composition algorithm" in the Middle Ages, right up to the machine learning-based methods of today, including several sound samples.

Chair:
Ulrich Lettermann (Paderborn University)

Wednesday,
21 September 2022

AI, big data and machine learning
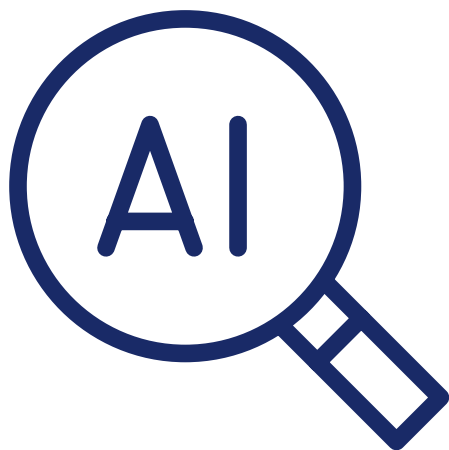
Meta AI: Developing AI systems with AI

In recent years, artificial intelligence (AI) has grown from a primarily academic discipline into a field of research with extremely high potential for application – in certain areas, such as image and language processing, AI systems have now reached product maturity. Accordingly, there is a high level of interest in industry for AI systems and a high demand for AI experts capable of developing such systems. However, as it is currently proving difficult to meet this demand for expertise, the question arises as to whether the design of the AI for a specific application could be simplified or even automated, or in other words, whether the required AI expertise could also be algorithmized. This ultimately leads to the idea of leveraging AI systems to develop AI systems. In this session, this concept of "meta AI" will be discussed for two specific applications, namely machine learning and conversational AI.

Automated machine learning: Theory and practice

Professor Eyke Hüllermeier (Ludwig Maximilian University of Munich), Tobias Gaukstern (Weidmüller)

This talk will focus on a current area of research within the field of artificial intelligence, namely automated machine learning (AutoML). This research area explores how and the extent to which the creation of an algorithmic solution to a practical machine learning (ML) problem can be automated. The core aim here is to develop methods for selecting and configuring ML methods and to combine these to create a comprehensive solution tailored to a given learning problem. The talk will begin with an introduction and an overview of the state of the art. The second half of the talk will describe how the AutoML approach simplifies the industrial application of ML and enables engineers to create ML solutions without the need for any expertise in data science.

Training conversational AI: Theory and practice

Professor Axel Ngonga (Paderborn University), Professor Andreas Both (DATEV, Leipzig University of Applied Sciences)

Voice assistants, chatbots and question answering systems (QAS) are popular forms of conversational AI systems that are already being used in a large number of households. The aim of this talk is to highlight methods for configuring and training conversational AI from a theoretical and practical perspective. The first half of the talk will introduce the latest research findings. The focus will be on building blocks of conversational AI, with the emphasis on building blocks for QAS. Methods for combining these building blocks to create usable solutions will also be presented. In the second half of the talk, the everyday use of a conversational AI system will be presented.

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Session organiser and chair:
Professor Friedhelm Meyer auf der Heide (Heinz Nixdorf Institute, Paderborn University)

Explainability and understanding in interaction with AI – an interdisciplinary task

The need for intelligent artificial systems to present their output in such a way that it is understandable to laypersons has so far primarily been addressed in informatics research into *explainable artificial intelligence* (XAI), with the aim of achieving explainability and understanding through transparency. An alternative approach to this is that of co-construction, whereby those seeking explanations are not seen as passive partners, but instead actively help shape the explanation process together with the explainer, with both parties striving for explainability and a form of understanding. Investigating the mechanisms of this co-construction is an interdisciplinary task on which researchers in the Collaborative Research Centre/Transregio (TRR) 318 "Constructing Explainability" are working. Their work will enable foundations to be laid for new paradigms of explanations in human-machine interaction and empower people to make confident, informed decisions when interacting with intelligent systems.

Introduction: Co-constructing explainability
Professor Katharina Rohlfing (Paderborn University)

The co-construction of explanations will be presented in a brief introduction.

Moderated poster presentations
Attention guidance in human-robot explanation processes: Professor Britta Wrede (Bielefeld University), Professor Katharina Rohlfing (Paderborn University)

In human-robot explanation processes, attention can be guided by, for example, linguistic negations. The project investigates the effects of these and other interventions, as well as methods to monitor attentional parameters in humans.

Explainable technologies workshops: Michael Lenke (Paderborn University)

In co-construction workshops, different target groups will have the chance to use AI. This hands-on approach is intended to help introduce previously underrepresented social groups to the use of AI.

Interactive training of explainable decision models: Jaroslaw Kornowicz (Paderborn University) and Michael Rapp (Ludwig Maximilian University of Munich)

The aim of the project is to develop an AI methodology to devise a family of decision models, the complexity of which can be flexibly adapted to the relevant situation. The models will be co-constructed in an interactive training process by combining expert knowledge and data-driven learning methods.

Session organiser and chair:
Dr Angela Grimminger (Paderborn University)

Quantum technologies for information processing

Quantum technologies form the basis for the next revolution in our information society. Innovations in this fast-growing field of research combine approaches from physics, computer science, mathematics and engineering to process large volumes of data in the quantum regime, thereby exceeding the capabilities of classical supercomputers, but also threatening current encryption protocols. Quantum technologies therefore bring new challenges and opportunities that will have a significant impact on this and future generations. In this session, the basics of quantum data processing will be presented from various perspectives.

Lights on! Quantum technologies
Professor Klaus Jöns (Paderborn University)

Quantum mechanics was developed in the early twentieth century and has led to quantitative predictions with astounding precision. Today's technology is based on our understanding of quantum effects and advances in semiconductors, transistors, lasers, organic chemistry, nuclear magnetic resonance (NMR) and more. Now, a second quantum mechanical revolution has begun, with the aim of harnessing the non-intuitive laws of quantum mechanics to boost performance in the fields of computation, simulation, communication, sensing and metrology. These technical solutions are collectively referred to as 'quantum technologies'. Several approaches to realising such technologies are currently being pursued simultaneously. In my talk, I will compare different technology platforms, highlight their advantages and disadvantages and focus on the use of light as a quantum resource. I will give a brief overview of what can be achieved with light and what we still need to develop in order to produce fully functional integrated photonic quantum circuits, as well as an overall picture of the market and research landscape.

Quantum computing – a gentle introduction 🇬🇧
Professor Sevag Gharibian (Paderborn University)

In the mid 1980s, renowned physicist Richard Feynman put forward the idea of building quantum computers as a tool for studying physical quantum systems in nature. Fast-forward almost 40 years, and the field of quantum computing has exploded into a globally networked initiative to build the first large-scale "universal" quantum computers. This talk is intended to provide a gentle, general introduction to quantum computing – what exactly is quantum computing, and why is it interesting? And what breakthrough applications beyond simulating physical systems has the research community discovered since Feynman's original vision? No background in computer science, mathematics or physics is required for this talk.

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Session organiser:
Professor Jan Sperling (Chair), Professor Dr Klaus Jöns,
Professor Thomas Zentgraf (alle Universität Paderborn)

Data science in engineering
Theory and industrial applications

The use of machine learning methods in engineering opens up a wealth of possibilities. AI-based methods are used in various applications such as autonomous driving, as well as in other industrial contexts such as robotics and logistics. Often, the established physics-based methods are simply replaced by data-driven methods, rather than the two being combined. However, the use of hybrid methods that result when these two methods are combined also raises questions: How can the high demands on quality and reliability in industrial applications be met, in particular in safety-relevant components? How can self-learning mechatronic systems develop autonomously and still be reliable?

This talk will shed light on current developments in the field of machine learning for the development of controls and regulations for technical systems, with a particular focus on reliability. We will explain why AI cannot generally speaking replace physical modelling of technical systems, and how synergetic combination is possible. We will also highlight the relevant potential in an industrial context, and thereby also the practical relevance of the research work carried out.

Junior Professor Sebastian Peitz Data Science for Engineering (Paderborn University)

The Department of Data Science for Engineering explores the development of data-based methods and machine learning in an engineering context. More specifically, it aims to identify how data can be used in complex systems to analyse, predict, optimise and control these systems. Unlike in many other areas of application, reliability and safety are of vital importance in technical systems, as malfunctions and system failure can often have fatal consequences.

Dr Julia Timmermann (junior research group DART – Data Driven Methods in Control Engineering, Paderborn University)

The goal of the junior research group "DART - Data Driven Methods in Control Engineering" is to develop novel hybrid methods for control engineering problems, by means of combining established physics-based methods with modern data-driven methods to maximise performance for control design. This part of the talk will describe how the advantages of both worlds can be synergistically combined.

Steven Koppert (Fraunhofer Institute for Mechatronic Systems Design IEM)

Fraunhofer IEM puts intelligent systems to the test and advises companies on their path to Industry 4.0. In the context of real industrial applications, the same problems occur time and again: too little and too poor data, lack of traceability of the AI, no way to manually customise the AI. In this part of the talk, we will show how hybrid methods from research can solve these problems and demonstrate their potential for success with the help of an example.

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Session organiser and chair:
Professor Ansgar Trächtler (Paderborn University)

KEYNOTE

The future of supercomputing: Saving power for greater computing power

Professor Dieter Kranzlmüller

Leibniz Supercomputing Centre (LRZ) of the Bavarian Academy of Sciences and Humanities

Ludwig Maximilian University of Munich

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IT creates knowledge: Today, supercomputers are drivers of scientific progress in a multitude of disciplines – from astrophysics and life sciences to environmental science and the humanities. Their computing power provides the basis for simulation and modelling, artificial intelligence (AI) methods, data analytics and big data. Supercomputers themselves are the result of innovations in computer science, physics and engineering. This is the only way in which computing power has been able to increase so exponentially over the past decades. As we head towards the exascale era, there are two main challenges that we need to overcome together: the end of Moore's Law and the need to reduce power consumption. The next generation of supercomputers will require new approaches to accelerate computing and, most importantly, a combination of these approaches. AI and quantum computing are just two examples here. New technologies for cooling are the second main issue. This talk will give an outlook on the future of supercomputing and what this means for users of these systems.

Bio

Dieter Kranzlmüller holds a PhD and post doctorate degree in Computer Science from Johannes Kepler University in Linz, Austria. After a number of years working in the IT industry, he made the move back into research, with positions at Johannes Kepler University Linz, the University of Reading, Dresden University of Technology, the École Normale Supérieure Lyon and subsequently as deputy project director at the European Organisation for Nuclear Research (CERN) in Geneva. In 2008, he was appointed Chair of Communication Systems and Systems Programming at Ludwig Maximilian University of Munich (LMU) and a member of the Board of Directors of the Leibniz Supercomputing Centre (LRZ), also in Munich. Kranzlmüller took on the role of Chair of the LRZ Board of Directors in 2017 and currently leads a team of more than 250 employees. Since 2019, Kranzlmüller and his colleagues have been expanding the LRZ's quantum computing activities, which are now bundled in the LRZ Quantum Integration Centre (QIC). In collaboration with partners, Kranzlmüller is pursuing the goal of driving the development of this future technology as a research computing centre, establishing services for researchers and advising and training users.

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Chair:
Professor Artur Zrenner (Paderborn University)

PANEL DISCUSSION

The future of computing: Where will the future take us?

Microelectronics, a subfield of electronics, emerged some 50 years ago. It is this key technology that has formed the basis for the digital transformation of our society. As a result of unprecedented development, computers and digital networking via the Internet have today become indispensable in all areas of our modern society. Particularly promising new areas of application such as artificial intelligence, machine learning and the analysis of large volumes of data are now also set to take off. However, the ever-growing diversity of application areas and ever-greater demands on hardware and software are increasingly pushing established computer architectures to the limits of their capabilities, and to the limits of ecologically acceptable energy use. Now that the exponential growth of integration density in computer chips in line with Moore's law is coming to an end, this panel discussion will look at where we go from here.

In expert circles, different approaches are currently being discussed, some of which bring completely new concepts and technologies into play. For example, specialised chips could be used to efficiently process CPU-intensive sub-tasks. Novel technologies such as neuromorphic computing or quantum computing have the potential to solve certain classes of problem extremely efficiently, or to make them solvable in the first place. More generally, the question also arises as to in which cases calculations actually need to deliver exact statements, as well as the question of the role of the incorporation of human knowledge on the efficiency of the knowledge gained.

Panelists

Professor Dieter Kranzlmüller (Leibniz Supercomputing Centre (LRZ) of the Bavarian Academy of Sciences and Humanities, Ludwig Maximilian University of Munich)

Professor Christian Plessl (Paderborn Center for Parallel Computing, Paderborn University)

Professor Christine Silberhorn (Integrated Quantum Optics, Faculty of Science, Paderborn University)

Professor Kirsten Thommes (Organizational Behavior, Faculty of Business Administration and Economics, Paderborn University)

Moderation:
Julia Ures

POSTER SESSION

Conducting research together in our anniversary year:
Celebrating the research of the future

This year, Paderborn University is celebrating its 50th anniversary. But what do the next 50 years look like? What future issues are researchers at Paderborn University already conducting research into today?

This poster session, featuring posters by Paderborn University PhD students, post-docs and junior professors, some of which in co-operation with external research partners, will be on the theme of "Data society" in the broadest sense of the term, covering, for example

- the technical, socio-technical and scientific foundations of digitalisation,
- the social changes currently taking place as a result of processes of digitalisation and/or
- how economic, working and living conditions and cultural practices are changing.

The best three posters of the call for posters "We celebrate the research of the future" will be awarded with a prize at the evening's award ceremony
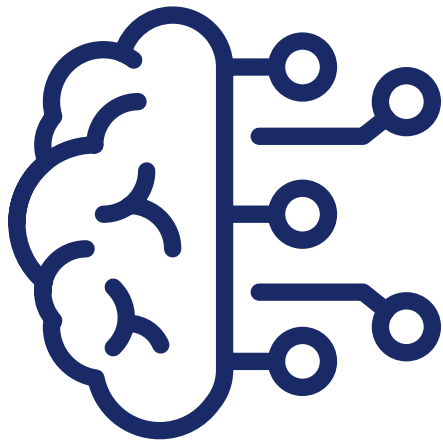
5:15 p.m. Opening
Moderation: Julia Ures

7:30 p.m. Award ceremony
Presenting the awards: Professor Johannes Blömer, Vice-President for Research and Early-Career Researchers, Paderborn University

Thursday,
22 September 2022

Ethical issues of digitalisation

KEYNOTE
Digital ethics

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**Professor
Sarah Spiekermann-Hoff**

**Vienna University of
Economics and Business**

Apps that send unsolicited information; cars controlled by Google computers; corporate IT that no longer allows employees to get involved – more and more people are asking: What is digitalisation doing to me, my life and our companies? In her keynote address, Sarah Spiekermann, author of the book "Digital Ethics", will postulate that we need to question more critically the values created by technology – and not just in terms of money or efficiency, but, above all, in terms of human values such as satisfaction, community and knowledge. This will be the only way in which we will be able to progress, rather regress with the digital transformation.

Bio

Sarah Spiekermann has been Chair of the Institute for Information Systems & Society at Vienna University of Economics and Business since 2009. She is a highly-regarded scientist, author, speaker and advisor on digital ethics. She has published several books in the field, including "Digital Ethics - A Value System for the 21st Century" (Droemer, 2019), "Ethical IT Innovation: A Value-based System Design Approach" (Taylor & Francis, 2015) and "Networks of Control" (Facultas, 2016). In 2016, Sarah founded the Privacy & Sustainable Computing Lab at Vienna University of Economics and Business (renamed "Sustainability Lab" in 2020). In the same year, she also became Vice-Chair for the Institute of Electrical and Electronics Engineer's (IEEE) 7000 standardisation project to build the world's first model process for ethical system design, which was released to the public in September 2021.

To date, she has published over 100 scientific articles on the social and ethical implications of computer systems and given more than 200 presentations and talks about her work worldwide. She has co-authored US/EU privacy regulations and supported works as an expert and advisor to companies and governmental institutions, including the EU Commission and the Organisation for Economic Co-operation and Development (OECD). Sarah also writes a blog on "The Ethical Machine" at Austria's leading daily newspaper Standard.at, as well as blogs for German business

newspaper Handelsblatt. She is on the scientific advisory board of the European Forum Alpbach (EFA) and a member of the Science and Ethics for Happiness and Well-being (SEH) Project, an initiative of the Pontifical Academy of Social Sciences, in partnership with the UN Sustainable Development Solutions Network (SDSN).

Before being awarded tenure in Vienna in 2009, Sarah was Assistant Professor at the Institute of Information Systems at Humboldt University Berlin (Germany), where she headed up the Berlin Research Centre for the Internet Economy (InterVal) (2003-2009), was Adjunct Visiting Research Professor with the Heinz College of Public Policy and Management at Carnegie Mellon University (Pittsburgh, USA) (2006-2009), founded and closed down the company Skillmap (visualising social networks) (2008-2011) and worked as a management consultant and marketing manager with A. T. Kearney and Openwave Systems. Sarah was born in 1973 and grew up near Dusseldorf in Germany. She is an honorary citizen of Austria.

Chair:
Dr Anda-Lisa Harmening (Universität Paderborn)

Who does our data belong to?
Data ownership and platform capitalism

Platform capitalism = surveillance capitalism?
Economic considerations for a digital economy
Professor Dennis Kundisch (Paderborn University)

Digital platforms are increasingly shaping the digital economy. The specific features of digital services, network effects and the mass collection and intelligent use of data facilitate the creation of business models that generally help the operators of successful digital platforms achieve monopoly-like market positions. In this talk, economic mechanisms in a digital economy will be illustrated on the basis of selected examples and their implications discussed.

Can data belong to anyone? A cultural theoretical perspective
Birte de Gruisbourne (Paderborn University)

"Large internet platforms are often criticised for collecting data and making money from it, even though this data actually belongs to us or is produced by us. But what does it actually mean when we talk about "our data", when data only becomes significant as a relation and mass? And do attempts to somehow squeeze data into ownership form perhaps reveal fundamental problems with modern ownership? I want to explore the contradictions between data and ownership from a cultural theoretical perspective, and to ask whether what we might by definition be dealing with is what Eva von Redecker terms "phantom ownership.""

Why platform capitalism doesn't need data ownership
... and why nothing would change even if there were such
a thing as data ownership
Dr Sebastian Sevignani (University of Jena)

"Data is the new oil" was once the slogan of the World Economic Forum (WEF). Today, the political economy of commercial platforms establishes a circle of surveillance, valorisation of data, accumulation of monetary power, investment in technical platform infrastructure and the exercise of communication and network power through the curation of the platforms operated. The result is (often) monopolisation and entire markets in private ownership. The question is how data gets into this circle, and what makes it suitable for processing. Unlike other capital goods, data cannot currently be owned and cannot simply be acquired. We therefore need to look at functional equivalents to data ownership that economically facilitate platform capitalist accumulation movements and that are also culturally suitable for legitimising these.

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Session organiser:
Dr Anda-Lisa Harmening, Professor Tobias Matzner (chair) and
Professor Volker Schöppner (all Paderborn University)

Show me your data and I'll tell you who you are. Discriminatory data (analyses)

Fitter, happier, more productive: The normality of self-measurement
Felix Maschewski (Humboldt University of Berlin)

Walking 10,000 steps a day, burning 450 calories during a workout, while reaching at least 60% of your maximum heart rate, regular visits to the gym and a low-carb diet – these standards all sound good, at least sporty, and are also favoured by insurance companies. Data analyses via smartwatches or fitness or health apps are becoming increasingly widespread in conjunction with platform-economy premium models or behaviour-based tariffs. However, the promises of a healthier life through digital technology often come with algorithmic biases and questionable ideas of what constitutes the norm, which provokes, and sometimes worsens individual vulnerabilities and social distortions. This talk will outline current trends in digital self-measurement and trace how the relationship between norm and normality, Self and Others is changing in the digital capitalist system.

Computational mitigation of social bias in language
Junior Professor Henning Wachsmuth (Paderborn University)

"Social bias" means the unfair treatment of certain social groups in terms of discrimination and prejudice, such as women or people of different origin. Language manifests this bias, which is why it is also found in textual datasets used to develop artificial intelligence techniques. This bears the risk of these techniques adopting this bias, and possibly even reinforcing it, and thereby consequently reproducing discrimination and prejudice. This talk will address this problem and draw on recent research as an example to show how the adoption of social bias in language by artificial intelligence can be prevented.

The mediality of algorithmic decision-making systems
Junior Professor Suzana Alpsancar (Paderborn University)

It is generally assumed that algorithmic decision-making systems (ADMs) will soon be widely used in a multitude of fields in society. This has sparked a lively debate on the ADMs currently being tested or already in use. This debate centres on the question of discriminatory effects, such as discrimination against black people in predicting the probability of recidivism in the penal system in Florida/USA (COMPAS) or in medical diagnostic procedures, the underrepresentation of black people on shortlists of applicants (Amazon) and the rejection of loans based on nationality, where people in that nationality group are deemed unworthy of credit (Svea Ekonomi). Faulty datasets or proxy variables, i.e., parameters within the algorithmic decision-making system, are usually talked about when it comes to the causes of discriminatory effects. Little, if any, consideration has so far been given to the mediality of ADMs, i.e., the form of their operative conditions and their procedural logic. This talk will make the argument for incorporating this "blind spot" in technology design.

Session organiser:
Dr Anda-Lisa Harmening (chair), Professor Tobias Matzner and Professor Volker Schöppner (all Paderborn University)

Autonomy

Digital technologies have an ambivalent relationship to autonomy. While they on the one hand offer us a wealth of new possibilities, on the other, they are often perceived as restricting autonomy – think surveillance and privacy. A second issue is the conflict between human and technical autonomy. Artificial intelligence, machine learning and related technologies are increasingly autonomous, and sometimes no longer even need humans to train them. Different notions of autonomy overlap here: ethical-political, psychological, technical, individual and infrastructural. The panel will examine all of these perspectives as it discusses these areas of conflict.

Notions of autonomy
Professor Tobias Matzner (Paderborn University)

Artificial intelligence jeopardises autonomy in two ways:
On the one hand, there is the notion of technological autonomy, whereby information technology systems are taking on increasingly complex tasks "autonomously", without the need for direct human control. It is, however, precisely this technological autonomy that invariably jeopardises ethical-political autonomy, i.e., the possibility to determine one's own life oneself and transparently. Drawing on the example of "autonomous" driving, this talk will show how human and technical notions of autonomy are mutually dependent, and sometimes wrongly linked.

Digitalisation and autonomy
Professor Kirsten Thommes (Paderborn University)

Dubbed "the autonomy paradox", the scientific literature discusses how many digitalisation processes in the workplace cause tension: In some cases, digitalisation increases perceived autonomy, while, at the same time, decreasing objective autonomy. This talk will discuss this paradox and develop a model of the relationship between digitalisation and autonomy with the help of practical examples.

Machine autonomy
Professor Gabriele Gramelsberger (RWTH Aachen University)

The development of AI, in particular in the field of machine learning (ML), is increasingly moving towards autonomy from human intervention. "Tabula rasa" learning is intended to enable ML algorithms to learn without the need for human intervention. Self-training and mutually-training networks currently regularly exceed human benchmarks. In addition to this, there is the issue of non-understandability of algorithmic decisions (explainable AI). This is resulting in the emergence of a new infrastructure of autonomy, but one that is moving significantly towards machine autonomy. The question this raises is what this will mean for humans.

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