EINSTEIN CENTER
Digital Future

EINSTEIN CENTER DIGITAL FUTURE — ANNUAL REPORT 2023

ANNUAL REPORT 2023

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PREFACE

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Dear readers,

2023 was another milestone year for the Einstein Center Digital Future (ECDF). After a successful evaluation in 2022, we entered the second funding phase on 1 April 2023, which we officially launched at our ceremony on 20 March 2023. The ECDF remains an interdisciplinary and transdisciplinary research network for people-centered digitalization research across borders. For the new funding phase, which is called ECDF – New Generation (ECDF-NG), we have identified three new research priorities: Transforming Communities, Integrated Health and Sustainable Cities. These priorities will frame our work on digital solutions to both digital and analog problems, from flooded cities to understaffed hospitals. They are also reflected in the new research projects by ECDF professors, who are exploring issues such as the digitalization of the energy transition and digital tools for leak detection.

This was also a special year for me: since June 2023, I have been the new Spokesperson of the ECDF. I am delighted that my colleagues have placed this trust in me. And I would like to thank my predecessor Odej Kao once again, who has led the ECDF so successfully over the past six years. The work we have done with our colleagues on the Board over the first funding phase has made the ECDF into a successful interdisciplinary institution in Berlin's academic landscape. I hope that my new colleagues on the Board and I can build on these successes. The new board is the New Generation – five representatives have been elected from among the ECDF professors to further develop the ECDF and lead it into the future. For the first time, we also have a representative of the doctoral students and postdocs. I am very pleased that we have been able to bring together such a great team.

In addition to the major ECDF milestone of the extension of funding, there were also two professors who had important career milestones to celebrate. On 1 April 2023, Berit Greinke accepted an appointment at Berlin University of the Arts (UdK Berlin), and in December 2023 ECDF Professor David Bermbach accepted an appointment at TU Berlin. Both achieved tenure as part of the ECDF after going through the selection process in 2020.

In 2023, we placed a stronger focus on diversity with the new Gender & Diversity Network. In May, we officially launched the network with the event "Invisible Labor and Discrimination: Gender, Diversity and ChatGPT." The exhibition "Capital of Female Scientists" also opened in our foyer as part of the event. We want to use the network to contribute to more diversity in digitalization research. In addition, ECDF Professor Helena Mihaljević and Associate Researcher Daniela Rosner received the first ECDF Award for Digitalization and Diversity.

In this report, we present the new priorities of the second funding phase, current research projects, and the people and events of 2023.

I hope you enjoy reading it!

Gesche Joost
Spokesperson of the ECDF
Berlin, 31st of March 2023

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EINSTEIN CENTER DIGITAL FUTURE

//ABOUT

The Einstein Center Digital Future (ECDF) is a cross-university hub for research and support for digital structures in science and academia, business, and civil society. It is a program of the Einstein Foundation Berlin (ESB), which aims to promote science and research in Berlin at world-leading level and establish the area as an attractive research location in the long term. Under the leadership of Technische Universität Berlin (TU Berlin), the applicant institutions are Charité – Universitätsmedizin Berlin, Freie Universität Berlin (FU Berlin), Humboldt-Universität zu Berlin (HU Berlin), and Berlin University of the Arts (UdK Berlin). Numerous prestigious non-university research institutions are also involved in the Center. These include BIH, DLR, FOKUS, HHI, IZM, MDC, PTB, ZIB, Berliner Hochschule für Technik (BHT), the University of Applied Sciences (HTW Berlin), the Federal Ministry of Education and Research, and the Federal Ministry of Labour and Social Affairs.

As a center for digitalization research, the ECDF is based on a large public-private partnership (PPP) involving partners from business, science and research, and politics. This PPP model, which is unique in Germany, is financed by funds from over 30 private companies, the participating non-university research institutions, the federal ministries involved, and funds from the state of Berlin. In this way, the ECDF has received funding of over 38.5 million euros. In the first five years, the ECDF professors raised an additional 25 million euros in third-party funding for additional research projects.

On 3 April 2017, the ECDF was officially opened with a term of six years (1 April 2017 to 31 March 2023), and in July 2022, following a successful evaluation, the ESB Board agreed to fund the ECDF for a further five years until 31 March 2028. On 1 April 2023, the ECDF began its second phase of funding – New Generation – with the research priorities Integrated Health, Transforming Communities, and Sustainable Cities. Prof. Dr. Odej Kao (TU Berlin) was elected Spokesperson of the ECDF for the first funding period. At the start of the second funding phase, Prof. Dr. Gesche Joost (UdK Berlin) took over as Spokesperson of the ECDF.

Since its launch, the ECDF has been as an important driver for digitalization research in Berlin. To date, 45 interdisciplinary ECDF professorships have been filled at the participating universities and Charité – Universitätsmedizin Berlin. The professors strengthen digitalization research in Berlin and make an important contribution to innovative topics such as smart cities, digital diagnostics, the Internet of Things, and open science. Other areas including the digitalization of the world of work, systems engineering, and digital education are also important aspects of the ECDF's portfolio. Instead of promoting new individual initiatives, the ECDF connects the dots of digitalization research in Berlin, trials new forms of collaboration, and focuses on innovative interdisciplinary leading-edge research and expertly trained young research talent.

The ESB and the Senate Chancellery for Science and Research are particularly keen to establish the ECDF within the research landscape of Berlin. With this in mind, the Senate Chancellery announced ten tenured ECDF professorships early on in the project. The selection process for these positions was carried out in 2020 and 2021, and five professors were selected for tenured positions in each of those years. The first two professors took up their tenures in 2023: Prof. Dr. Berit Greinke at UdK Berlin, and Prof. Dr. David Bermbach at TU Berlin. Further tenure processes are in progress.

The ECDF is located in the Robert Koch Forum in the heart of Berlin. With an attractive event space, co-working areas, a social space, a Demo Area, and a Micro Factory, the Forum offers scientists space to develop their ideas for research, design and implementation, and digitalization.

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ECDF – NEW GENERATION: 2023–2028

We begin the second funding phase as ECDF-NG, and we want to continue to promote interdisciplinary, transdisciplinary, and collaborative research. While these terms are often used nowadays to describe modern research, for the ECDF-NG multidisciplinarity is not an end in itself but a means by which scientific disciplines can contribute to solving the problems of our time. Collaboration is key across computer science, engineering, the natural and social sciences, humanities, and medicine. For the years 2023-2028, the focus is on three overarching research priorities that address a variety of complementary challenges. The priorities are linked to the ECDF's vision, which puts people at the heart of digitalization research:

TRANSFORMING COMMUNITIES examines the effects of digitalization on individuals, groups, organizations, and society as a whole. Technological progress has changed the economic, social, and cultural landscape enormously over the last two decades. The way people learn, work, play, create, engage, share, and participate is changing rapidly, and there is an urgent need to align technology-driven developments with people's interests, needs, and wellbeing. Digital technologies have also given rise to new forms of social interaction, new markets and means of production, new goods and services, and new forms of work. This has prompted companies and organizations to radically change their business models, organizational structures, and processes. Digital organizations are already having a transformative impact on the value of work and the way it is organized. All of these developments require a better understanding of how the short, medium, and long-term dynamics of digitalization can be harnessed for positive social, economic and environmental change. Research in the area of Transforming Communities focuses in particular on the following overarching questions: How is digitalization changing organizations and markets? How is digitalization changing individual skills and preferences? How does digitalization deal with the needs, desires, and ambitions of certain communities? To what extent does digitalization serve or negate the needs and aspirations of certain communities?

INTEGRATED HEALTH is the second research priority of the new funding phase and is probably one of the areas that is undergoing the most revolutionary changes as a result of digitalization. With the largest medical research landscape in Europe and a high concentration of people with varying health needs, Berlin is an ideal location for networked health research. The digitalization of medicine is making it possible to think about health in new ways based on data collected in many areas, and this is leading to a new understanding of health in our society. Digital tools for prevention and direct links between patients and healthcare professionals are crucial in an aging society with a shortage of skilled workers. The research priorities of the ECDF-NG innovation area Integrated Health are therefore divided into two areas: "Digital Health Applications" and "Data Visualization and Decision Support". The first of these includes apps that enable patient-generated data and health data to be collected using mobile multi-sensor devices, including vital data from wearables. Collecting data from different sources requires high quality and interoperability, data pooling, and structured analysis.

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From this, we can produce diagnoses – including automated ones – and data-supported treatment algorithms. Digital health applications can be used to create direct connections between patients and healthcare professionals. Another hypothetical advantage of telemedicine is the cost-efficient provision of services in an overburdened healthcare system. The second research area "Data Visualization and Decision Support" explores the development of standard patterns using large amounts of data in order to support medical treatment decisions. By developing standard patterns from significant volumes of data, research work can develop diagnoses and link these with therapeutic steps to treatment algorithms. These treatment algorithms use patient data to facilitate decision-making in the clinical context and support healthcare professionals in providing quality treatment. Integrated Health brings together research on sensor technology, data management systems, data mining, and economic, sociological and legal considerations including data protection and digital sovereignty.

SUSTAINABLE CITIES, is the third research priority and investigates how digital technologies can help make cities more sustainable, safe, connected and people-centered. We need new solutions to improve climate resilience, infrastructure networks, governance models, social inclusion, and equity. Digital technologies play a key role in this and will continue

to do so, but they also raise new issues, for example around the protection of privacy, social inequality, and cyber security. Under this priority, we have identified the following key research questions and areas. These all relate to sustainability in its three dimensions – economic, social and ecological. The research area "Digitalization for Citizen Awareness and Participation" investigates how citizens can be more actively involved in decision-making with the help of digitalization, what role citizens can play in achieving climate neutrality goals, and how digital technologies can help build trust between citizens, and politicians and decision-makers. In the area of "Digitalization for Urban Governance and Climate Resilience," scientists are exploring questions such as how digital technologies can create climate-neutral and more resilient cities and make access to urban services safer, fairer, more inclusive, and more affordable. The research area "Applicability of Digital Technologies" looks at topics including the IT systems and technologies required for sustainable cities and their potential and risks. Research in all areas builds on the central ECDF pillars of human-centered digitalization, digitalization for everyone, and digitalization beyond silos. The research work is being carried out in synergy with the Berlin Smart City Strategy, the EU initiative for climate-neutral cities, and the EU strategy on adaptation to climate change.

In addition to updated research priorities and areas, the ECDF is also starting the second funding phase with an updated governance structure. The groups of Principal Investigators and Associate Members from the first funding phase will be combined to form the group Associate Researcher for the second funding phase. Interested scientists and researchers can apply to the ECDF to become an Associate Researcher member of the ECDF. The requirements are expertise in digitalization research, an intrinsic motivation for interdisciplinary research, and an interest in collaborating with other ECDF members. The Scientific Advisory Board (SAB) is still a central component of the new structure, but new appointments to it will be made by the new Board of Directors.

The new generation of the ECDF focuses more strongly on professors, which is why at least three tenured professors are elected to represent all ECDF professors. They are joined by an elected representative of doctoral students and postdocs, an elected representative of the Associate Researchers, and an advisory member delegated by the State Conference of Women's and Equal Opportunities Officers of Berlin's Universities. One person is elected as Spokesperson from among the voting members. Advisory members can be appointed at any time.

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CELEBRATING THE EXTENSION OF THE ECDF

Another five years of digitalization research in Berlin – around 250 guests from science and research, politics, and civil society gathered at the Futurium in Berlin on 20 March 2023 to celebrate the extension of the ECDF for another five years. The spectacular backdrop of the Futurium provided an ideal setting for the event, which provided a chance to take stock of the ECDF's achievements to date, as well as offering an inspiring outlook of the digital future.

A series of speeches provided a focal point for the evening, with Katja Weber hosting proceedings. The event was opened by Prof. Dr. Geraldine Rauch, President of Technische Universität Berlin, and Dr. Thorsten Wilhelmy, Managing Director of the Einstein Foundation Berlin. Both speakers emphasized the importance of the ECDF in promoting digital innovation and Berlin as a center for science and research. The members of the Board of Directors, whose term came to an end with the successful completion of the first funding phase, then gave a brief summary of the first six years. For their achievements, they received medals in the form of Calliope minis – small single-board computers developed for use in German elementary schools. "You can now use the extra time to foster the next generation of digitalization research," summed up the new Spokesperson Gesche Joost with a smile.

The tribute to the outgoing Board members and ECDF Managing Director Simone Harr, who also stepped down at the end of the first funding phase, was followed by the "passing of the baton" to the new generation of ECDF researchers. In brief addresses, ECDF professors Tabea Flügge, Andrea Cominola and Florian Conradi presented the research priorities under ECDF-NG – Integrated Health, Sustainable Cities and Transforming Communities – and shared their visions for the future of digitalization. At the same time, guests were given a first introduction to the projects that were later presented in the exhibition "Experience Digitalization research". The speeches concluded with a conversation on the Narratives of Digitalization, chaired by acclaimed science journalist Ranga Yogeshwar. Two leading figures in the digital world – Anke Domscheit-Berg, Member of the Bundestag for Die Linke, and Gesche Joost – discussed the effects and opportunities of digitalization for our society.

After the official program, guests were invited to visit the exhibition, which had already been viewed by interested members of the press as part of an exclusive press opening. From groundbreaking technologies to visionary ideas, the exhibition offered a fascinating insight into the world of digitalization research at the ECDF and its partners. Visitors were able to explore interactive exhibits and develop a deeper understanding of the three main research priorities. Three projects were exhibited in the Sustainable Cities priority area: In "Smart Water Network," ECDF Professor Andrea Cominola is researching the complex interrelationships between water systems and other critical infrastructures in order to develop smart monitoring and decision-making tools for crisis prevention. The ConnectiCity e-learning model game allows users to test planning decisions and develop a feel for urban systems. In "Energy System Transformation," ECDF

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Professor Rita Streblow and ECDF Professor Max von Grafenstein are investigating how building data can be used to accelerate the energy transition and make it more transparent. In the third project, "Bio-Inspired Robotic Vision," ECDF Professor Guillermo Gallego's Robotic Interactive Perception Lab is researching methods and algorithms that enable machines to recognize and predict movements by using innovative event cameras borrowed from the animal world.

Integrated Health was represented at the exhibition by Intraoral Scan, a project led by ECDF Professor Tabea Flügge that uses digital procedures for the detailed planning of surgical interventions to the face. A scan of the oral cavity is used to optimize surgical planning and the manufacture of implants using 3D printing. New 3D printing technologies are being developed in collaboration with the Center for 3D Technologies at Technische Universität Berlin. "KIP-SDM", on the other hand, is exploring the use of AI in preventing falls in people in need of care. An app analyzes people's gait patterns and individual risk factors, and a learning algorithm is used to suggest specific steps that can be taken. The algorithm analyzes sensitive patient data in innovative ways

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in order to train its problem-solving skills. The Digital Urban Center for Aging and Health (DUCAH) focuses on improving the quality of life of older people through digital and social innovations. Interdisciplinary research projects at the Center include ComfortCube, which collects objective and subjective data on room quality in order to improve well-being.

The Transforming Communities priority area was also represented by three projects in the exhibition: ECDF professor Berit Greinke and Federico Visi are developing electronic textiles for music performances in "interwoven sound spaces." Musicians play at the same time as each other while sitting in different concert halls by interacting through sensors in their clothing. Janik Wolters is researching quantum technology and, with the EsCQuTe project, is designing a puzzle that conveys the principles of quantum technology. Michelle Christensen and Florian Conradi's Critical Maker Lab is a space for experimental research and technology development. Rapid prototyping is used to create design objects that open up critical perspectives on social power structures and help connect theory, practice, science, and activism. "With the exhibition, we wanted to bring our research to life for visitors. All the projects on display either allow visitors to get actively involved – such as in the ConnectiCity simulation game or the quantum puzzle – or show how they are implemented in everyday life," explained Friedrich Schmidgall, an industrial designer and member of staff in the ECDF Management Office who played a key role in designing the exhibition.

The day ended in a relaxed atmosphere, and participants had the opportunity to network and reflect on proceedings. It was an inspiring day that underlined the importance of digitalization research for the future.

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ECDF – NEW GENERATION: THE ECDF HAS A NEW BOARD OF DIRECTORS

The members of the ECDF have elected a new Board of Directors for a term of two years. The new Board was officially inaugurated on 19 June 2023. It is made up of five ECDF professors from the various Berlin universities, and they are joined by a representative of the Associate Researchers and a representative of the research assistants/postdocs. A member of the State Conference of Women's and Equal Opportunities Officers at Berlin's universities is also a member of the Board.

Board of Directors officially elected by ECDF members:

// **Prof. Dr. Gesche Joost**, Professor of Design Research, Berlin University of the Arts, as representative of the Associate Researchers
// **Prof. Dr. Philipp Staab**, Professor of Sociology of the Future of Work, Humboldt-Universität zu Berlin, as representative of the professors
// **Prof. Dr. Tabea Flügge**, Professor of Digital Technologies for the Reconstruction of Complex Facial Defects, Charité – Universitätsmedizin Berlin, as representative of the professors
// **Prof. Dr. Timm Teubner**, Professor of Trust in Digital Services, Technische Universität Berlin, as representative of the professors
// **Prof. Dr. Andrea Cominola**, Professor for Smart Water Networks/Digital Networking of Water and Wastewater Systems, Technische Universität Berlin, as representative of the professors of the ECDF
// **Prof. Dr. Michelle Christensen**, Professor of Open Science/Critical Culture, Technische Universität Berlin, as representative of the professors
// **Laura Rothfritz**, Research Assistant at the Chair of Information Management, Berlin School of Library and Information Science (IBI), Humboldt-Universität zu Berlin, as representative of the doctoral students and postdocs
// **Dr. Christine Kurmeyer**, Central Women's and Equal Opportunities Officer, Charité – Universitätsmedizin Berlin, delegated by the State Conference of Women's and Equal Opportunities Officers at Berlin's universities

At the inaugural meeting, the members unanimously elected Professor Gesche Joost as Spokesperson of the ECDF: "I am delighted that as the Board of Directors we can begin the second chapter of the ECDF's success story together. Our mission is to shape digital transformation in a sustainable, socially equitable, and inclusive way. And Berlin is the right place for this – working with excellent universities, private firms, and civil society organizations in an international network is what the city is all about. It's a great scene, and you can always get a decent coffee," said Joost. Andrea Cominola and Timm Teubner were elected as her deputies. Joost succeeds Professor Odej Kao, who was ECDF Spokesperson until March 2023.


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/ PROFESSORSHIPS

/ DISTRIBUTED SECURITY INFRASTRUCTURES / DIGITALIZATION AND SUSTAINABILITY / MOBILE CLOUD COMPUTING / SMART MOBILITY SYSTEMS / E-HEALTH AND SHARED DECISION ALLOCATION / SECURE AND TRUSTWORTHY NETWORK-ATTACHED SYSTEM ARCHITECTURES / ORGANIZATIONAL ECONOMICS – FUTURE OF WORK / SOCIOLOGY OF WORKING WORLDS' DIGITALIZATION / OPEN SCIENCE / TRUST IN DIGITAL SERVICES / DATA SCIENCE AND ANALYTICS / DIGITAL SELF-DETERMINATION / DATA SCIENCE / OPEN AND SECURE IOT ECOSYSTEM / WEARABLE COMPUTING / DIGITAL EDUCATION / APPLIED VISUAL SYSTEMS RESEARCH

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RESEARCH AT THE ECDF

What sets ECDF scientists apart is their focus on interdisciplinary and transdisciplinary research. The Center brings together scientists from a wide range of disciplines – from sociology and medicine to design and quantum physics – to work together on digitalization research. Since it opened in April 2017, the ECDF has been the center for digitalization research in Berlin, enabling a cross-disciplinary perspective on the conversations around social change.

In 2023, a number of new interdisciplinary projects were launched, developed, and completed at the ECDF: For example, ECDF professor Anastasia Danilov conducted an economic laboratory experiment into the effects of affirmative action measures on effort and sabotage behavior. Over the past few years, the BBBlockchain project has been investigating whether blockchain technologies can improve engagement and transparency in participation processes. It presented a final report along with its findings at the end of the project.

While no new ECDF professorships were appointed in 2023, two ECDF professors celebrated an important milestone: tenured positions at a Berlin university. On 1 April 2023, Berit Greinke accepted a tenured professorship in Wearable Computing at the Institute for Experimental Fashion and Textile Design. The appointment was made by Berlin University of the Arts (UdK Berlin). It was the first professorship from the ECDF to be permanently established at a Berlin university. And on 20 December 2023, ECDF Professor David Bermbach accepted an appointment at TU Berlin, where he will head the Chair of Scalable Software Systems at the Faculty of Electrical Engineering and Computer Science.

ECDF professors Florian Tschorsch and Stefan Kirchner also took the next step in their careers: Professor Tschorsch accepted the professorship in Privacy and Security at the Institute of Systems Architecture at TUD Dresden University of Technology on 1 August 2023, while Professor Kirchner has been head of the Chair of Economic and Industrial Sociology at the Brandenburg University of Technology Cottbus-Senftenberg (BTU) since December 2023. This means that, as of 31 December 2023, there are 31 professors at the ECDF, of which nine are women and 22 men. In total, 45 professors have been appointed since the ECDF opened.

Below is a full list of appointments in chronological order up to the end of 2023, along with biographies of the professors appointed in 2023, and an overview of joint projects.

LIST OF APPOINTMENTS

Appointed Professors

Name	Designation	Institution	Start Date
Prof. Dr. Tilman Santarius	Socio-Ecological Transformation and Sustainable Digitalization	TU Berlin, Faculty I – Humanities and Educational Sciences	15.12.2017
Prof. Dr. David Bermbach	Mobile Cloud Computing	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	20.12.2017
Prof. Dr. Dr. Felix Balzer	E-Health and Shared Decision Allocation	Charité – Universitätsmedizin Berlin	01.04.2018
Prof. Dr. Timm Teubner	Trust in Digital Services	TU Berlin, Faculty VII – Economics and Management	01.04.2018
Prof. Dr. Helena Mihaljević	Data Science and Analytics	HTW Berlin – University of Applied Sciences	01.07.2018
Prof. Dr. Max von Grafenstein, LLM	Digital Self-Determination	UdK Berlin	01.08.2018
Prof. Dr. Berit Greinke	Wearable Computing	UdK Berlin, Institute of Product and Process Design	01.08.2018
Prof. Dr. Daniel D. Hromada	Digital Education	UdK Berlin, Faculty of Design	01.08.2018
Prof. Dr. Felix Biessmann	Data Science	Berlin University of Applied Sciences	17.09.2018
Prof. Dr. Andrea Cominola	Digital Networking of Water and Wastewater Systems	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	01.10.2018
Prof. Dr. Elisabeth Mayweg	Digital Knowledge Management in Higher Education	HU Berlin, Faculty of Humanities and Social Sciences	01.10.2018

Name	Designation	Institution	Start Date
Prof. Dr. Tilo Schwalger	Data Assimilation in Neuroscience	TU Berlin, Faculty II – Mathematics and Natural Sciences	01.10.2018
Prof. Dr. Sangyoung Park	Smart Mobility Systems	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	16.10.2018
Prof. Dr. Michael Gensch	Terahertz and Laser Spectroscopy	TU Berlin, Faculty II – Mathematics and Natural Sciences	01.01.2019
Prof. Dr. Tobias Schäffter	Biomedical Imaging	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	01.01.2019
Prof. Dr. Leonid Goubergrits	Cardiovascular Modeling and Simulation	Charité – Universitäts-medizin Berlin	01.02.2019
Prof. Dr. Philipp Staab	Sociology of the Future of Work	HU Berlin, Faculty of Humanities and Social Sciences	01.02.2019
Prof. Dr. Anastasia Danilov	Organizational Economics – The Future of Work	HU Berlin, Faculty of Economics	01.04.2019
Prof. Dr. Janik Wolters	Physical Foundations of IT Security	TU Berlin, Faculty II – Mathematics and Natural Sciences	01.07.2019
Prof. Dr. Michelle Christensen	Open Science	TU Berlin, Faculty I – Humanities and Educational Sciences	01.08.2019
Prof. Dr. Florian Conradi	Open Science	TU Berlin, Faculty I – Humanities and Educational Sciences	01.08.2019

Name	Designation	Institution	Start Date
Prof. Dr. Emmanuel Baccelli	Open and Secure IoT Ecosystem	FU Berlin, Department of Mathematics and Computer Science	22.08.2019
Prof. Dr. Guillermo Gallego	Robotic Interactive Perception	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	01.09.2019
Prof. Dr. Michael Ortgiese	Traffic and Mobility Management	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	01.09.2019
Prof. Dr. Adrian Paschke	Semantic Data Intelligence	FU Berlin, Department of Mathematics and Computer Science	17.10.2019
Prof. Dr. Rita Streblow	Digital Networking of Buildings, Energy Supply Systems and Users	TU Berlin, Faculty III, Institute for Energy Technology	19.12.2019
Prof. Dr. Tabea Flügge	Digital Technologies for the Reconstruction of Complex Facial Defects	Charité – Universitätsmedizin Berlin	01.03.2020
Prof. Dr. Lydia Kaiser	Digital Engineering 4.0	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	01.03.2021
Prof. Dr. Andreas Schwitalla	Digital Implantology	Charité – Universitätsmedizin Berlin	01.12.2021
Prof. Dr. Hanna G. Zimmermann	Applied Research of the Visual System	Charité – Universitätsmedizin Berlin	01.06.2022
Prof. Dr. Heinz Pampel	Information Management	HU Berlin, Berlin School for Library and Information Science	01.12.2022

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BERIT GREINKE APPOINTED PROFESSOR AT BERLIN UNIVERSITY OF THE ARTS

On 1 April 2023, Berit Greinke was appointed to a tenured professorship in Wearable Computing at the Institute for Experimental Fashion and Textile Design at Berlin University of the Arts. This is the first professorship to emerge from the ECDF research network and be permanently established at one of Berlin's universities.

Berit Greinke was Junior Professor of Wearable Computing at the ECDF and UdK Berlin from August 2018 to April 2023, and is now continuing her research and teaching as a tenured professor at these institutions. Her research focuses on technical design methods for electronic textiles and their application in artistic formats. It combines traditional textile craftsmanship with new digital technologies. "I'm delighted to have the chance to work both artistically and scientifically at UdK Berlin in the field of electronic textiles on an ongoing basis," she said. This is a unique opportunity to contribute to research in wearable computing from an interdisciplinary perspective."

Berit Greinke's projects include Interwoven Sound Spaces, a telematic concert performed simultaneously in Berlin and Piteå in Sweden. She investigated how live music could be performed across large distances by combining textile wearables, interactive machine learning, and spatial sound.

The Wearable Computing professorship is the first of up to ten ECDF professorships at the respective Berlin universities that will be made permanent and receive additional funding from the state of Berlin. The President of UdK Berlin, Professor Dr. Norbert Palz said: "Berit Greinke's research is a good example of what can be developed collaboratively in Berlin as a center for science and research. The arts, design, and engineering all contribute to a technologically innovative, socially relevant, and artistically valuable project. The ECDF is highlighting the areas of potential that we need to continue to support."

"I'm very pleased that Berit Greinke has become the first tenured professor at the ECDF and UdK Berlin. Her research is centered around interdisciplinarity and multidisciplinarity, which lies at the core of what we do at the ECDF," explained Prof. Dr. Gesche Joost, Spokesperson of the ECDF and Professor for Design Research at UdK Berlin.

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DAVID BERMBACH APPOINTED PROFESSOR AT TU BERLIN

ECDF Professor David Bermbach was appointed a professor at TU Berlin on 20 December 2023. He is now head of the Chair of Scalable Software Systems at the Faculty of Electrical Engineering and Computer Science. This is the second professorship to emerge from the ECDF research network and be permanently established at one of Berlin's universities.

David Bermbach studied industrial engineering at the Karlsruhe Institute of Technology and completed his doctorate there. From 2017 until his new appointment, he was Professor of Mobile Cloud Computing at the ECDF and TU Berlin. In his new field of research, he will initially concentrate on serverless computing and benchmarking in continuous integration processes. "I'm delighted to be able to continue researching and teaching at TU Berlin going forward. We're currently working on using benchmarking to ensure the quality of software systems before they go live. And we're also trying to improve the scalability of serverless computing platforms."

During his time as a junior professor, Professor Bermbach conducted research on various interdisciplinary projects. The SimRa project (cycle safety) is a major achievement in the field of citizen science. The project collects data (in accordance with privacy laws) on where in the city there are clusters of cycle hazards, what type of hazards these are, and whether they occur more frequently at specific times or locations. A smartphone app has been developed that uses GPS data to record cycle routes and employs acceleration sensors and AI to detect dangerous situations such as sudden braking, swerving, and even falls. After they have finished their ride, cyclists are asked to categorize the hazardous situations detected. "SimRa is now available in around 100 regions, including areas of Switzerland, Austria, and the Netherlands. One highlight of the project was being awarded the German Bicycle Award 2022," says David Bermbach.

In the GeoVER project, which looked at geo-warnings for air traffic and the transport sector using extended reality (XR), David Bermbach and his team developed a scalable IT system with Deutsche Telekom. The system can be used flexibly for all transport sectors and can distribute data from different data sources to a wide variety of recipients in a targeted manner and in real time. This might include drones in the approach path of an airport, for example, or traffic jams. "For the project, we took the case of air traffic as an example and developed an XR application for visualizing geo-warnings in cooperation with Schönhagen airfield in Brandenburg," explained David Bermbach.

The professorship is the second of up to ten ECDF professorships that the state of Berlin will make permanent at Berlin universities. "I'm really pleased for David Bermbach and that another ECDF professorship is being made permanent. Digital transformation is a current issue and will continue to be so, and I'm delighted that we can keep the exceptional talent of the ECDF in Berlin's scientific community," said Prof. Dr. Gesche Joost, Spokesperson of the ECDF and Professor of Design Research at Berlin University of the Arts.

ALUMNI

Since its opening in 2017, the Einstein Center Digital Future (ECDF) has supported numerous outstanding female scientists who are now making important contributions to digitalization research as alumni. During their time at the ECDF, the former professors initiated groundbreaking research projects and had a significant impact on the scientific landscape. Many remain closely connected to the ECDF as associated researchers even after their departure and, as ambassadors, carry innovative, interdisciplinary research ideas out into the world - be it to other universities in Germany and abroad or to industry.

Name	Designation	Period at ECDF	New Position
Dr. Sebastian Köhler	Methods for Digital Phenotyping	"01.06.2018–31.10.2019"	Information Architect, Ada Health
Prof. Dr. Daniel Fürstenau	Digital Transformation and IT Infrastructures	"01.12.2017–30.09.2020"	Professor at Copenhagen Business School, Denmark
Prof. Dr.-Ing. Sergio Lucia	Internet of Things for Smart Buildings	"01.12.2017–30.09.2020"	W2 Professorship in Process Automation Systems, TU Dortmund University

Name	Designation	Period at ECDF	New Position
Prof. Dr. Setareh Maghsudi	Control of Convergent Access Networks (CCAN)	"01.08.2017–30.09.2020"	Professor of Decision-Making at the University of Tübingen
Prof. Dr. Christian Meske	Digital Transformation and Strategic Information Management	"16.10.2017–30.08.2021"	Professor of Sociotechnical System Design and Artificial Intelligence at Ruhr University Bochum
Prof. Jussi Ängeslevä	Internet of Things	"01.04.2020–30.09.2021"	Berlin University of the Arts
Prof. Dr. Anna Almosova	Digital Currencies / Cryptocurrencies	"16.10.2019–14.02.2022"	Software Engineer at Google
Jochen Rabe	Urban Resilience and Digitalization	"01.10.2016–31.03.2022"	Managing Director of the Berlin Centre of Competence for Water
Prof. Dr. Björn Globisch	Terahertz Sensor Technology	"01.10.2019–30.06.2022"	Development engineer at eagleyard Photonics GmbH
Prof. Dr. Rebecca Frank	Information Management	"01.10.2019–31.07.2022"	Professor at the School of Information Sciences at the University of Tennessee, Knoxville, USA
Prof. Dr. Florian Tschorsch	Distributed Security Infrastructures	01.04.2017– 31.07.2023	Professor for Privacy and Security at TUD Dresden University of Technology
Prof. Dr. Stefan Kirchner	Sociology of Digitalization in the Working World	01.04.2018– 30.11.2023	Professor of Economic and Industrial Sociology at Brandenburg University of Technology Cottbus-Senftenberg (BTU)
Prof. Dr. Jan Christoph Nordholz	Secure and Trustworthy Network-Attached System Architectures	01.04.2018 – not specified	Not specified
Prof. Dr. Joachim Seifert	Digital Networking of Buildings, Energy Supply Systems and Users	18.12.2019–30.11.2022	Professor of Building Energy Systems and Heat Supply at TUD Dresden University of Technology

ECDF/PR/Felix Noak

NEXT CAREER STEP: FLORIAN TSCHORSCH TAKES UP POST AT TU DRESDEN

Prof. Dr. Florian Tschorsch was appointed to the professorship for Privacy and Security at the Institute of Systems Architecture at TUD Dresden University of Technologyon 1 August 2023. From 2017 to 2023, he held the professorship in Distributed Security Infrastructures at the ECDF and Technische Universität Berlin.

Since October 2021, he has also been a visiting professor at Humboldt-Universität zu Berlin, where he heads the Chair of Computer Engineering. Florian Tschorsch's research focuses on the integration of security and privacy in distributed system architectures and communication protocols, with a focus on application requirements.

He has received several awards for his research, including nominations for the best paper at the IEEE International Conference on Blockchain and Cryptocurrency (ICBC), the IEEE Conference on Local Computer Networks (LCN), and the Conference on Networked Systems (NetSys). He has also received research awards from the German Association for Data Protection and Data Security (GDD), the GI Division of Communications and Distributed Systems (KuVS), and the U.S. Naval Research Laboratories. In addition, Florian Tschorsch is a Fellow at the Berlin Centre for Consumer Policies (BCCP) and was named a Pioneer at the World Frontiers Forum (WFF).

"I will remember the ECDF as a creative and inspiring place for interdisciplinary research with a strong network. Now I'm looking forward to the next step in my career and to the teaching and research environment at TU Dresden. With the professorship, I want to focus even more on designing secure communication systems that protect privacy and enable self-determined use," says Florian Tschorsch.

He studied computer science with a major in computer networks and a minor in cultural studies at Heinrich Heine University Düsseldorf. During his master's degree, he received the NRW scholarship, which is awarded to young researchers. After graduating, he worked as a research assistant at universities in Düsseldorf, Würzburg, Bonn, and Berlin. He completed his doctorate at Humboldt-Universität zu Berlin in June 2016.

Christian Kielmann

STEFAN KIRCHNER TAKES OVER AS HEAD OF CHAIR AT THE BRANDENBURG UNIVERSITY OF TECHNOLOGY COTT-BUS-SENFTENBERG

Prof. Dr. Stefan Kirchner was ECDF Professor for Sociology of Digitalization in the Working World at Technische Universität Berlin from 2018 to 2023. He has been the head of the Chair of Economic and Industrial Sociology at the Brandenburg University of Technology Cottbus-Senftenberg (BTU) since December 2023. The move to BTU marks another milestone in Stefan Kirchner's career.

Born and raised in Berlin, his academic career took him first to Dresden and later to the UK, where he studied sociology. After returning to Germany, he completed his doctorate and "Habilitation" at the University of Hamburg. Stefan Kirchner's research focused on analyzing the quality of work in international contexts, monitoring the changes in quality markers over time. Stress, workload, and autonomy in the workplace were key aspects of his work.

At the ECDF, his research focused, among other things, on how online market platforms are changing the world of work and what impact this is having on workers. Stefan Kirchner also looks at these changes in an international context. These digital platforms represent a new form of work organization that challenges the traditional role of the employer. They provide an infrastructure that enables users to offer or use services. This development raises a number of sociological questions: How many people are actually affected by this new organizing work and how do they experience it? What structures do these workers find themselves in and how does this affect them? In particular, Stefan Kirchner looks at large-scale platforms such as Airbnb, Deliveroo, and Uber. These marketplaces are backed by large companies that also regulate them. They are the ones that select or reject the providers.

In taking over the Chair of Economic and Industrial Sociology at BTU Cottbus-Senftenberg, Stefan Kirchner is continuing with the same research focus and dealing with the interactions between economic processes and individual and social experiences.

ASSOCIATE RESEARCHERS

Since its launch in 2017, the ECDF has been very interested in looking beyond its own scientific horizons and incorporating external expertise into its research into digitalization. One tried-and-tested way to do this is by appointing respected national and international scientists as Associate Researchers. They bring valuable research perspectives to the ECDF portfolio. For the second funding phase, some of the former Principal Investigators have opted to continue working at the ECDF as Associate Researchers, while new associates are continually being brought on board. In this report, we present some of our latest members.

Privat

JAN MENDLING

Jan Mendling is Einstein Professor of Process Science at the Department of Computer Science at Humboldt-Universität zu Berlin. He has been an Associate Researcher at the ECDF since November 2023. His research interests include various topics in business process management and information systems. In his professorship in process science, he focuses on how processes in administration, logistics, and other sectors can be improved. He analyses event data and, together with his team, develops algorithms and visualization techniques that can present this event data in a user-friendly way. Jan Mendling is also researching how business processes can be managed more efficiently through the use of technologies such as robotic process automation, blockchains, and business process management systems.

As an Associate Researcher at the ECDF, Jan Mendling is keen to engage in interdisciplinary collaboration on digital and ecological modernization. "The ECDF offers me the opportunity to collaborate with other ECDF members whose expertise and passion for the topic closely align with my own research interests. I'm already in contact with ECDF Professor Philipp Staab, and we are planning our first joint research projects on the topic," says the expert in information systems management.

Jan Mendling studied at the universities of Trier and Antwerp. He completed his doctorate at the Vienna University of Economics and Business. He has published more than 500 research papers and articles, including in MIS Quarterly, ACM Transactions on Software Engineering and Methodology, IEEE Transactions on Software Engineering, and the Journal of the Association of Information Systems and Decision Support Systems. He is one of two founding editors of the journal Process Science and a member of the IEEE Task Force on Process Mining. He is a co-author of the textbooks Fundamentals of Business Process Management and Business Information Systems, which are widely used in training in information systems management. Jan Mendling is also a Principal Investigator at the Weizenbaum Institute for the Networked Society with a research focus on digital infrastructures in democracy.

RESEARCH PROJECTS

Whether at home, at work or at the doctor's - digitalization is everywhere and has significantly changed the way we work and live. The research projects at the ECDF reflect the diverse opportunities and challenges that the digital transformation brings with it.

In the light of the invasion of Ukraine, for example, ECDF Professor Rita Streblow's team is looking at possible measures to save energy; Prof. Dr. Timm Teubner is examining how data science can contribute to more sustainable tourism; the projects on digital health DIGIOP, KIP SDM and PROKIP focus on digital health applications and artificial intelligence in care. Below we present a selection of research projects, collaborations and initiatives that ECDF professors worked on in 2023.

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PRIVACY & DESIGN – MORE IMPACTFUL PRIVACY ICONS

Privacy icons are small symbols that are meant to help people better understand the complexity of data protection and privacy guidelines. How do you design the icons and banners so that users are aware of the risks and can make an informed decision? ECDF Professor Max von Grafenstein and his team are investigating this question in their research project "Designing and Testing Privacy Icons for Their Effectiveness."

Privacy icons are needed for the General Data Protection Regulation (GDPR) to be fully operative. Many studies show that without icons, the people impacted hardly take note of the information provided, let alone understand it. One example of this is the cookie banner that appears on websites and is intended to inform users about data processing when using the website. Currently, users cannot prepare themselves for risks, so GDPR offers protection in theory rather than in practice.

In their first research phase, ECDF Professor Max von Grafenstein (UdK) and his colleagues conducted qualitative research where they investigated the risks that users perceive in relation to their data. On this basis, the researchers developed design templates (e.g. cookie banners) that would help users better understand and control such data protection risks. This was not really possible in the past. It is particularly evident in the privacy icons proposed by the EU Parliament. The real consequences for those affected that are hidden behind the respective icons are rather vague, as the privacy icon shows. The EU icon does not provide any information about the risks and consequences for data subjects if data is used for purposes other than those for which it was originally collected or if certain data is forwarded to commercial partners or even loaned out and, in some cases, sold. In contrast to these approaches, the aim of ECDF project is to highlight the risks for the people concerned. If the intended data processing creates a risk to a fundamental right, such as freedom, privacy, or equality, the controller must make this clear and disclose the purpose of the processing accordingly.

In addition, the researchers have designed a quantitative research study to quantitatively test and compare the designs they have developed. The aim of the study by Max von Grafenstein and his colleagues is to design privacy icons in such a way that users understand the risks to their rights to privacy, freedom, and/or equality. The project builds on previous UX design projects. "In the project, we are focusing on a number of typical scenarios that pose a specific data protection risk, for example the risks presented by personalized advertising," explains Max von Grafenstein. In the case of one mobile app, the provider originally collects personal data as part of providing its service and improving the user experience. The user can therefore assume that the data processing does not pose a concrete threat to their right to privacy. "At a later stage, however, the controller decides to use the data for personalized advertising and passes the data on to one or more commercial partners for this purpose. When making this decision, this new purpose not only increases the risk to the user's privacy as companies obtain information about their private lives, but it also

poses an additional threat to the user's right to make autonomous purchasing decisions. The data controller must communicate this additional risk," says Max von Grafenstein.

Ultimately, the researchers intend to share their results with data protection authorities and national and EU legislators in order to improve implementation on the basis of empirical findings. The empirical user test is taking place in the Berlin Open Lab. For the expert workshops, the research team can draw on its extensive network of researchers, industry partners, and data protection authorities.

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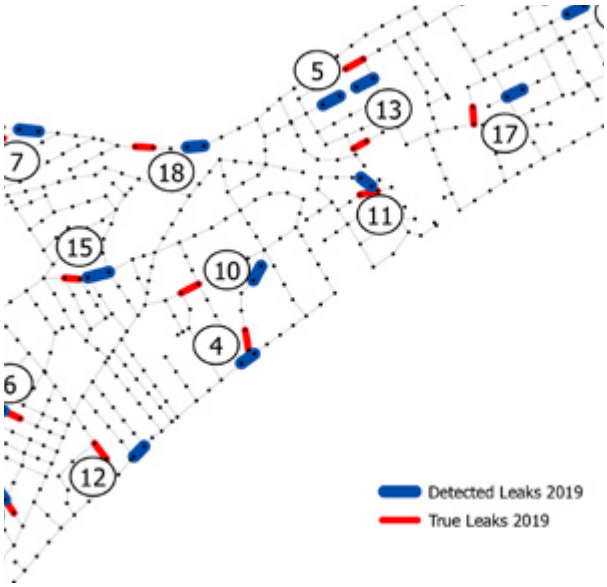
BITS & BÄUME – BOOK PROVIDES 28 IMPULSES FOR SUSTAINABLE DIGITALIZATION

From artificial intelligence and global justice to the environmental impact of the digital economy, the digital transformation comes with many challenges. And it harbors risks. The book Shaping Digital Transformation for a Sustainable Society is about addressing these. The problems of digital developments are explored in 28 articles by 68 authors from industry, civil society, and research. The contributions provide insights into how digital policy can be made more sustainable. One of the authors is Tilman Santarius, ECDF Professor for Sustainable Digitalization at TU Berlin.

The publication addresses the gap between digital and sustainability policy – the two areas do not currently have common goals. The aim should be a fairer future. "Technological developments must take place within planetary boundaries and support a globally equitable and sustainable society, as well as a sustainable economic system," explain Tilman Santarius and Nicolas Guenot from Konzeptwerk Neue Ökonomie – the laboratory for new economic ideas. These developments should serve people and not the other way around. The articles in the book deal with the environmental impact of phone apps, software, and blockchains, among other things. In other chapters, the authors present more sustainable alternatives to the current platform economy and propose a restructuring of state intervention in the digital world. The collection also includes articles commenting on current policy developments, such as EU legislation on sustainability and the impacts on freedom of ICT devices. Other articles emphasize the power and need for an active civil society and encourage participation and activism.

The volume brings together contributions from the Bits & Bäume community, which came together in Berlin in 2022 for the second conference on digitalization and sustainability – with 2,500 people in attendance. The conference was arranged by 13 organizations from the fields of environmental protection, digital policy, development policy, and science and research, with the participation of the ECDF. The articles in the 150-page book introduce readers to new topics as well as providing an opportunity to delve deeper into familiar areas. The aim is to help ensure that the voice of civil society is better integrated into attempts to put digitalization on a more sustainable footing. The publication, which is written in English, is available exclusively in digital form and free of charge as an open access download. It was launched on 6 June 2023 at the Republica digital conference in Berlin.

The publication and the 2022 Bits & Bäume conference were funded by the German Federal Environmental Foundation (DBU) and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).



LILA

IOLE

Intelligent Online Leak Detection to Reduce Water Loss

Digital solution for saving water: on 1 September 2023, the new project „iOLE – Intelligent Online Leakage Detection" was launched under the leadership of ECDF Professor Andrea Cominola and Ivo Daniel, Research Assistant at the ECDF. The main objective is to minimize water losses in water distribution networks in Germany and worldwide by rapidly and automatically detecting and locating leaks. The project has received 880,000 euros in funding from the Federal Ministry of Education and Research.

Water losses are one of the biggest challenges in the management of urban water infrastructure and a cause for concern both for the economy and society at large. Approximately 25% of the drinking water supply in Europe is currently lost due to leaks. "Detecting leaks early on offers enormous potential in terms of reducing water losses. To detect them faster, we are combining two award-winning algorithms developed by the project consortium in previous research," said Andrea Cominola. These algorithms have different advantages. Taken together, they create a useful dashboard for water supply companies and will hopefully find broad application in the German and global water industry going forward.

The award-winning algorithms are LILA, an AI-based algorithm that only uses the data measured by pressure sensors to detect leaks and is therefore limited by the positioning of the sensors, and the hydraulic network model – part of the dual model developed by the Berlin Centre of Competence for Water – which can locate leaks down to the level of a single pipe. The success of the project primarily depends on the extent to which it can be used by operating and maintenance personnel in water supply companies. To ensure usability, the project team relies on comprehensive and intuitive visualization and the integration of GIS data. The tool is designed to provide smart support for decision-makers.

The project is receiving funding from September 2023 to August 2025 as part of the funding instrument "Digital GreenTech – Environmental Technology Meets Digitalization", which supports the development of technologies to conserve natural resources and reduce environmental pollution. The project consortium and associated partners include the Smart Water Networks group of the ECDF and TU Berlin (project coordinator), the Berlin Centre of Competence for Water (KWB), Urban Impact Berlin GmbH and Gelsenwasser AG.

BBBlockchain

TRANSPARENT URBAN DEVELOPMENT: BBBLOCKCHAIN PRESENTS FINAL REPORT

Transparency is the key to successful urban development and participation processes. Over the past few years, the BBBlockchain project has used real construction projects to investigate whether blockchain technologies can improve engagement and transparency in participation processes. The project, which involved the participation of Berlin housing associations Gewobag and degewo, the ECDF, and the Technische Universität Berlin, wrapped at the end of March 2023, and the results are available in a final report.

BBBlockchain explored existing participation formats and tailored them to blockchain-based use cases. These use cases were implemented together with degewo and Gewobag in two construction projects in Berlin. The first phase of the project just began with providing information on construction progress and publishing updates in order to increase transparency and bring several stakeholders onto one platform. Under real-life conditions, BBBlockchain became part of the ongoing participation process at Kietzer Feld in Köpenick; residents of the Bülow90 construction project in Schöneberg were asked about their opinions and expectations for the future of the construction project. In the second phase of the project, BBBlockchain explored the potential of blockchain tokens, a type of credit that stakeholders can collect by taking part in the participation process. The survey's reach is increased by offering token-based incentives; residents receive a blockchain token for their participation, which they can exchange for a free coffee.

The findings are discussed in detail in the project's final report. ECDF Professor Florian Tschorsch was one of the BBBlockchain project managers. For him, a key advantage is that you can access new target groups through digital services. "We reached a new target group with the BBBlockchain app. This has less to do with blockchain technology than with the provision of an additional digital communication channel. The digital token was only redeemed in 6% of cases and serves less as an incentive," he said. In general, introducing blockchains in urban development processes seems to provide more transparency due to the fact that they cannot be altered and their integrity can be verified, but there are also likely to be negative effects on the willingness of stakeholders to participate in such a mandatory platform. To minimize the negative impact of blockchain, a clearly defined communication policy and regular engagement are required, otherwise blockchains cannot provide more transparency or engagement on their own.

The project marked a number of research and project milestones during its short term from October 2018 and March 2023. In addition to the project being extended in 2019, the BBBlockchain team published a report with recommendations for action and several studies, including on the suitability of blockchain in voting.

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ECONOMIC LABORATORY EXPERIMENT: WHAT ARE THE EFFECTS OF AFFIRMATIVE ACTION MEASURES ON EFFORT AND SABOTAGE BEHAVIOR?

Can affirmative action practices enable socially disadvantaged groups to compete with their privileged counterparts? This is the research question being tackled by ECDF Professor Anastasia Danilov (HU Berlin), Martin G. Kocher (University of Vienna), Subhasish M. Chowdhury (University of Sheffield), and colleagues in the project "The Lifecycle of Affirmative Action Policies and Its Effect on Effort and Sabotage Behavior." The team conducted a laboratory experiment to investigate the impact of positive and negative discrimination on the work performance and collaboration of individuals participating in a tournament. As this question is virtually impossible to investigate in practice, the team used the economic laboratory experiment method. "We simulated work situations in a controlled environment and investigated the influence of introducing and discontinuing affirmative action (AA) practices on the performance and sabotage behavior of the study participants," explains Danilov.

People take part in a variety of tournaments and contests, for example in college admissions, recruitment processes, promotions, as well as in leisure activities such as marathons. In such situations, the winners of tournaments are selected on the basis of their relative performance. The participants' performance is determined by a combination their efforts, their ability levels, luck, and possibly other random factors. It is often assumed that high incentives lead to a greater willingness to perform overall. In many real-life cases, however, different people have very different ability levels. Participants or a group of participants often have better chances and an advantage from the outset. They are often referred to as the "favorites." Such heterogeneous competitions do not provide a level playing field for participants and can lead to undesirable outcomes such as low effort, lower participation, less diversity, and income inequality. "Affirmative action" can be used to address obstacles resulting from characteristics that the individual cannot change, such as gender and origin.

One of the main aims of these actions is to enable disadvantaged groups to compete with their privileged counterparts. In practice, there are a variety of affirmative action instruments. The best known are the "handicap", in which a disadvantage is imposed on favorites a priori; the "head-start", in which the underdogs are given an advantage a priori; and the "quota", in which a portion of the prizes are reserved for the underdogs. Affirmative action instruments have always been controversial. Advocates claim that they reduce discrimination for those who have been historically disadvantaged in society, lead to fairer outcomes, improve efficiency, and encourage higher effort levels. It is unclear at societal level how specific affirmative action instruments – be they benefits for a disadvantaged group or disadvantages for a privileged group – actually influence people's behavior.

Existing theoretical and empirical studies show that affirmative action can lead to both more egalitarian outcomes and greater effort. However, the direct behavioral effects of the introduction and removal of such measures have not yet been sufficiently researched. The project's researchers investigated this unanswered

"We simulated work situations in a controlled environment and investigated the influence of introducing and discontinuing affirmative action (AA) practices on the performance and sabotage behavior of the study participants," explains Danilov.

research in a laboratory experiment in which the participants were able to sabotage each other. The participants were not only able to improve their performance through their own efforts, they were also able to negatively impact the performance of their competitors through sabotage. Such acts of sabotage include spreading rumors, withholding information, and manipulating results. The study shows that the introduction of affirmative action practices had little to no negative impact. However, removing affirmative action practices had a negative effect on performance and increased sabotage among competitors. "High-performing participants who have already experienced a tournament without affirmative action reduce their effort level after the actions are introduced. We also observed less sabotage under affirmative action when the tournament started with an affirmative action policy already in place. However, the abolition of the affirmative action policy significantly increases sabotage," said Danilov in summary. She believes that the new findings make an important contribution to the existing scientific literature and can also be used in policymaking.

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STATUS QUO AND OUTLOOK – HOW DIGITAL IS THE ENERGY TRANSITION?

Data sufficiency, digital business models, the environmental impact of digital applications – how is the digitalization of the energy transition progressing in Germany? A team of researchers from the ECDF, Technische Universität Berlin, Berlin University of the Arts, and the Institute for Ecological Economy Research (IÖW) quantified a number of theses about the digitalization of the transition to green energy in Germany based on the views of experts. The researchers found that, according to the experts, the technologies needed for the energy transition already exist, but there is a lack of regulation, accessibility of solutions, automation, and integration.

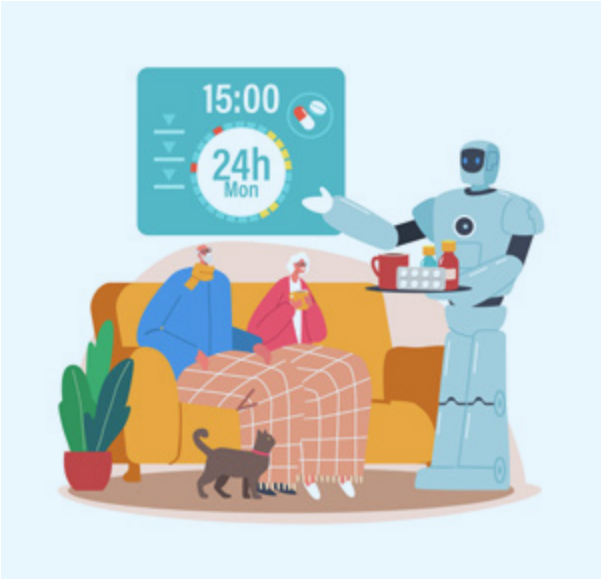
To evaluate the theses, the team interviewed 270 experts with several years of professional experience in academia and the private sector in the fields of energy technology, systems engineering, and heating networks. The interviews involved evaluating 36 statements, such as "We need to aim for a comprehensive ecological assessment of digital applications with positive and negative environmental impacts in order to evaluate their influence on overarching goals (e.g. climate goals)" and "Standardized access to public data would increase the transferability of research findings". The experts rated their level of agreement with these statements in seven gradations from "strongly disagree" to "strongly agree." "The theses focus on using digitalization in climate-friendly planning, construction, and running of buildings, neighborhoods, and heating networks. We developed these theses from previous interviews and workshops and used them here to quantify individual views," explained Prof. Dr. Rita Streblow, professor at the ECDF and project lead.

The answers showed that, according to the experts, the right technologies for the energy transition are already available, but there is a lack of regulation, accessibility of solutions, automation, and integration. Regarding the environmental impact of digital applications, for example, the experts appear to attach great importance to the environmental assessment of digital applications, but they are uncertain when it comes to quantifying the actual effects. According to the team of researchers, there should therefore be a greater focus on the environmental impact of digital applications.

The researchers made four recommendations for action based on these and other examples:

// **Enable and support knowledge transfer** by making the policy and research findings easier to understand and by addressing developments collaboratively
// **Raise awareness of the added value and costs of digitalization** and explain the context in which they can ensure a cost-effective, ecological, and secure energy supply
// **Support the efficient handling of data and methods**, so that, where possible, there is no duplication of efforts in the collection of data and development of standardized methods; at the same time, ensure access to them
// **Increase automation** to support the planning and operation of energy systems

ECDF professors and employees Felix Rehmann, Falk Cudok, Valentin Rupp, Max von Grafenstein, and Rita Streblow were joined by Jan Kegel and Astrid Aretz from the IÖW in the project team.



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AI IN THE CARE SECTOR

Digitalization in the healthcare sector has become an integral part and constant companion of socio-demographic transformation. The care sector, in particular, is facing societal challenges such as an aging population, bureaucracy, and a growing shortage of skilled workers but may also benefit from new developments in the consolidation of health data and the use of artificial intelligence.

In 2023, the ProKIP and KIPSDM research projects continued to focus on these issues around how we shape the digital future. They used the ECDF's premises and infrastructure for weekly meetings, scientific advisory board meetings, and workshops of various sizes.

The project partners from Charité, led by ECDF Associate Researcher Prof. Dr. Daniel Fürstenau, and the teams of ECDF Prof. Dr. Max von Grafenstein (UdK Berlin) and ECDF Prof. Dr. Felix Biessmann (BHT) worked closely together. The two research projects looked at overarching questions on sharing health data for health research and using patient data for prediction models in fall prevention.

As part of ProKIP, a number of qualitative articles were produced within the accompanying study "Artificial Intelligence (AI) in the Care Sector," which examined initiatives with regard to their legal, ethical, and economic delivery in the sharing of health data on designated data platforms. Sharing and merging data is essential in enabling the development, training and evaluation of prediction models, i.e. the use of artificial intelligence. In this context, the team examined the handling of governance, inclusion issues such as the representation of minorities in the database, and the technical and legal implementation of complex data protection requirements. The highlight of the project was a workshop at the ECDF on the secondary use of health data; representatives from academia and research, business, and politics shared insights and took part in a variety of discussion formats focusing on challenges such as the economic sustainability of platforms.

As part of KIPSDM, the research team also developed a number of modeling approaches for the preventive prediction of inpatient falls in hospitals. The aim of the project is to develop an AI model that can be used across different locations and to ensure data protection and ethical considerations when sharing health data by producing synthetic (fictitious) patient data for further use by open source initiatives. The project reached the halfway point in 2023. Key achievements included the development and positive evaluation of the first AI models, as well as detailed data protection impact assessments as a prerequisite for the subsequent sharing of health data.

Both projects aim to develop digital models that address both the legal and socio-ethical considerations of AI in the care sector. In this way, they want to help embed the topic in the public research discourse.

ECDF/PR/Friedrich Schmidgall

WORKING PAPER SERIES

The aim of the ECDF Working Paper Series is to showcase the diversity of digitalization research. Since 2022, the open publication series has been featuring interdisciplinary academic contributions on various aspects of digitalization. All contributions go through a peer review process and are published Open Access under the CC BY 4.0 license. "Our objective with the series is to identify interdisciplinary perspectives and solutions for interdisciplinary research problems, as well as to promote societal solution strategies. So, the series is aimed not only at scientists and researchers but also at policymakers, businesses, NGOs, and the general public," explained Tilman Santarius, ECDF Professor of Social-Ecological Transformation and Sustainable Digitalization at TU Berlin and co-initiator of the paper series.

Two further papers were published in the series in 2023. Hugues Ferreboeuf, entrepreneur and member of the think tank The Shift Project, argues in his paper "Transitioning towards sustainable digital business models" that a move away from digital superpowers such as GAFAM, Netflix, and TikTok is necessary in order to make digitalization sustainable. He sees the solution in the development and acceleration of alternative, sustainable business models, which requires the implementation of appropriate public policies.

The second paper in the 2023 series looks at a variety of studies on the environmental impact of digital technologies, including water pollution and greenhouse gas emissions. There are a large number of studies that attempt to identify these impacts. However, their findings can vary considerably owing to inconsistencies in study design and different assumptions about the future energy needs of data centers and communication networks. Researchers Johanna Pohl and Simon Hinterholzer compare the results of selected studies with regard to the models used and highlight environmental trends. On the basis of their analysis, they show what policies are needed to meet the environmental challenges posed by digital technologies.

The four other papers in the series, which were published in 2022, focus on topics such as shaping digital markets, design in the context of digitalization, the digitalization of industrial agriculture, and the question of how digital innovations can contribute to growth-independent and resilient economies.

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INTERNATIONAL ACTIVITIES

Digitalization impacts science and academia, business, and civil society around the world. As a result, researchers everywhere are facing the challenges of the digital transformation. Global networking and international cooperation with these researchers is particularly important to the ECDF. The ECDF professors maintain an active dialogue with universities and companies in the USA, Australia, Canada, Italy, and Norway, to name but a few. International activities range from conference participation and academic visits to joint publications and research projects with partners from all over the world. Contributions to international conferences, workshops, professional meetings, and symposia are important aspects of the academic and scientific work of ECDF professors. These events provide them with opportunities to share their research findings and are ideal venues for discussions and networking.

Below we present a selection of the ECDF's international activities in 2023.

USA

In 2023, Prof. Dr. Felix Biessmann worked on the project "Machine Learning for Peace and Security" with Prof. Dr. Rebecca D. Frank (University of Tennessee) and Prof. Dr. Alexander Glaser (Princeton University), both also Associate Researchers at the ECDF. The project is funded by the German Foundation for Peace Research. Its aim is to investigate the potential role of citizen-based surveillance and monitoring in peace and security.

Prof. Dr. Leonid Goubergrits continued his cooperation project with the firm Edwards Lifesciences in California in 2023. Project objectives include developing simulations and models for device positioning of the PASCAL system and generating synthetic cohorts for in-silico studies.

EGYPT

On 14 June 2023, we welcomed a delegation from the Deutsche Gesellschaft für Internationale Zusammenarbeit. Ghada Labib, Deputy Minister of the Egyptian Ministry of Communications and Information Technology, and other colleagues from the ministry visited the ECDF. Spokesperson Gesche Joost and ECDF Professor Felix Biessmann gave a guided tour of the Robert Koch Forum and provided an insight into current research projects.

LUXEMBOURG

In August 2023, Prof. Dr. Andreas Schwitalla gave a lecture as part of "Module 9: Prosthetic Solutions on Implants" at the University for Digital Technologies in Medicine & Dentistry in Luxembourg. His talk was entitled: "The bredent TiSi.snap system for easy anchorage of full dentures on 2 (canine region) vs. 4 (canine +1st molar region) dental implants – a clinical trial."

UK

From April to July, Prof. Dr. Berit Greinke was a visiting scholar at Imperial College London. Her work included a practice-based study on hand-embroidered capacitive sensor technology in collaboration with lecturer Dr. Rebecca Stewart. She also initiated a new collaboration with the embroidery studio Hand & Lock in London.

CANADA

Prof. Dr. Guillermo Gallego co-organized the "4th International Event-Based Vision Workshop" in 2023, which took place in Vancouver in collaboration with CVPR 2023. CVPR is the leading conference for computer vision and machine learning.

JAPAN AND SOUTH KOREA

Prof. Dr. Sangyoung Park initiated new research topics with international cooperation partners from Japan and Korea: Prof. Dr. Hiroki Nishikawa (Osaka University) and Prof. Dr. Jong-Chan Kim (Kookmin University). Sangyoung Park also submitted a paper with Hiroki Nishikawa on parameter studies for federated learning on automotive datasets. The German Research Foundation (DFG) awarded Jong-Chan Kim a grant to initiate an international collaboration on the use of vehicle-to-X communication in the electrification of heavy goods vehicles.

On 8 May 2023, Tim Kawalun and ECDF professors and board members Timm Teubner and Philipp Staab hosted the Secretary General of the National Research Council for Economics, Humanities and Social Sciences in South Korea, Ilpyo Hong. In addition to a short tour of the Robert Koch Forum, the participants discussed the digital transformation in Germany and Europe. Following the visit, ECDF Professor Timm Teubner and Samira Franzel wrote an Op-Ed for the journal of the South Korean Research Council on the topic "Future Policy Focus."

LITHUANIA

Prof. Dr. Lydia Kaiser organized a doctoral student workshop in 2023. The design of the workshop was very popular and was offered at the 2023 IEEE-E-TEMS conference in Lithuania. The workshop was aimed at young research talent in systems engineering and supported the establishment of a self-organized network that still meets regularly.

SWEDEN

On 3 February 2023, we hosted an international doctoral colloquium of interaction design students from the KTH Royal Institute of Technology Stockholm and the Digital Futures research center at the ECDF. Doctoral students and professors from the University of Copenhagen were also guests at the colloquium. The visit took place at the initiative of Prof. Dr. Kristina Höök, member of the ECDF Scientific Advisory Board. After a brief introduction to the ECDF by Gesche Joost, the guests visited the Demo Area and Micro Factory. The day was rounded off with presentations by the doctoral students and a discussion on joint research topics.

AUSTRIA

A delegation of 20 participants from Carinthia, Austria visited the ECDF on 1 June 2023 to explore the topic "The Future of Life and Work." Following a brief introduction to the ECDF's projects, Tim Kawalun and Samira Franzel gave a tour of the building and the Demo Area. The representatives of the Carinthian Chamber of Commerce and a number of other Carinthian business initiatives were impressed by the ECDF's interdisciplinary research profile.

SELECTED PUBLICATIONS

B

// Grambow, M., Dockenfuß, T., Schirmer, T., Japke, N., **Bermbach, D.**, 2023. Efficiently Detecting Performance Changes in FaaS Application Releases, in: Proceedings of the 9th International Workshop on Serverless Computing, WoSC '23. Association for Computing Machinery, New York, NY, USA, pp. 13–17. https://doi.org/10.1145/3631295.3631395

// Huber, S., Pfandzelter, T., **Bermbach, D.**, 2023. Identifying Nearest Fog Nodes With Network Coordinate Systems, in: Proceedings of the 11th IEEE International Conference on Cloud Engineering, IC2E 2023. IEEE, New York, NY, USA.

// Japke, N., Witzko, C., Grambow, M., **Bermbach, D.**, 2023. The Early Microbenchmark Catches the Bug -- Studying Performance Issues Using Micro- and Application Benchmarks. https://doi.org/10.1145/3603166.3632128

// Karakaya, A.-S., Ritter, T., **Biessmann, F.**, **Bermbach, D.**, 2023a. CycleSense: Detecting near miss incidents in bicycle traffic from mobile motion sensors. Pervasive and Mobile Computing 91, 101779. https://doi.org/10.1016/j.pmcj.2023.101779

// Karakaya, A.-S., Stef, I.-A., Köhler, K., Heinovski, J., Dressler, F., **Bermbach, D.**, 2023b. Achieving realistic cyclist behavior in SUMO using the SimRa dataset. Computer Communications 205, 97–107. https://doi.org/10.1016/j.comcom.2023.04.015

// Karakaya, A.-S., Thomas, L., Koljada, D., **Bermbach, D.**, 2023c. A Crowdsensing Approach for Deriving Surface Quality of Cycling Infrastructure, in: Proceedings of the 11th IEEE International Conference on Cloud Engineering, IC2E 2023. IEEE, New York, NY, USA.

// Kruber, M., Pfandzelter, T., **Bermbach, D.**, 2023. Efficient Exchange of Metadata Information in Geo-Distributed Fog Systems.

// Pfandzelter, T., **Bermbach, D.**, 2023a. Evaluating LEO Edge Software in the Cloud with Celestial, in: Proceedings of the 11th IEEE International Conference on Cloud Engineering, IC2E 2023. IEEE, New York, NY, USA.

// Pfandzelter, T., **Bermbach, D.**, 2023b. Towards a Benchmark for Fog Data Processing, in: Proceedings of the 11th IEEE International Conference on Cloud Engineering, IC2E 2023. IEEE, New York, NY, USA.

// Pfandzelter, T., **Bermbach, D.**, 2023c. Can Orbital Servers Provide Mars-Wide Edge Computing?, in: Proceedings of the 1st ACM MobiCom Workshop on Satellite Networking and Computing, SatCom '23. ACM, New York, NY, USA, pp. 7–12. https://doi.org/10.1145/3614454.3622997

// Pfandzelter, T., **Bermbach, D.**, 2023d. Edge Computing in Low-Earth Orbit – What Could Possibly Go Wrong?, in: Proceedings of the 1st ACM Workshop on LEO Networking and Communication 2023, LEO-NET '23. ACM, New York, NY, USA, pp. 19–24. https://doi.org/10.1145/3614204.3616106

// Pfandzelter, T., **Bermbach, D.**, 2023e. Enoki: Stateful Distributed FaaS from Edge to Cloud, in: Proceedings of the 2nd International Workshop on Middleware for the Edge, MiddleWEdge '23. Association for Computing Machinery, New York, NY, USA, pp. 19–24. https://doi.org/10.1145/3630180.3631203

// Pfandzelter, T., Dhakal, A., Frachtenberg, E., Chalamalasetti, S.R., Emmot, D., Hogade, N., Enriquez, R.P.H., Rattihalli, G., **Bermbach, D.**, Milojicic, D., 2023a. Kernel-as-a-Service: A Serverless Programming Model for Heterogeneous Hardware Accelerators, in: Proceedings of the 24th International Middleware Conference, Middleware '23. Association for Computing Machinery, New York, NY, USA, pp. 192–206. https://doi.org/10.1145/3590140.3629115

// Pfandzelter, T., Japke, N., Schirmer, T., Hasenburg, J., **Bermbach, D.**, 2023b. Managing Data Replication and Distribution in the Fog with FReD. Software: Practice and Experience 53, 1958–1981. https://doi.org/10.1002/spe.3237

// Schirmer, T., Carl, V., Pfandzelter, T., **Bermbach, D.**, 2023a. ProFaaStinate: Delaying Serverless Function Calls to Optimize Platform Performance, in: Proceedings of the 9th International Workshop on Serverless Computing, WoSC '23. Association for Computing Machinery, New York, NY, USA, pp. 1–6. https://doi.org/10.1145/3631295.3631393

// Schirmer, T., Japke, N., Greten, S., Pfandzelter, T., **Bermbach, D.**, 2023b. The Night Shift: Understanding Performance Variability of Cloud Serverless Platforms, in: Proceedings of the 1st Workshop on Serverless Systems, Applications and Methodologies, SESAME '23. ACM, New York, NY, USA. https://doi.org/10.1145/3592533.3592808

// Stender, N., Pfandzelter, T., **Bermbach, D.**, 2023. Eventually Consistent Configuration Management in Fog Systems with CRDTs, in: Proceedings of the 11th IEEE International Conference on Cloud Engineering, IC2E 2023. IEEE, New York, NY, USA.

// Wang, M., Schirmer, T., Pfandzelter, T., **Bermbach, D.**, 2023. Lotus: Serverless In-Transit Data Processing for Edge-based Pub/Sub, in: Proceedings of the 6th International Workshop on Edge Systems, Analytics and Networking, EdgeSys '23. ACM, New York, NY, USA. https://doi.org/10.1145/3578354.3592869

// Baumgärtner, G.L., Hamm, C.A., Schulze-Weddige, S., Ruppel, R., Beetz, N.L., Rudolph, M., Dräger, F., Froböse, K.P., Posch, H., Lenk, J., **Biessmann, F.**, Penzkofer, T., 2023. Metadata-independent classification of MRI sequences using convolutional neural networks: Successful application to prostate MRI. European Journal of Radiology 166, 110964. https://doi.org/10.1016/j.ejrad.2023.110964

// Bergener, J., Gossen, M., Hoffmann, M.L., **Biessmann, F.**, Veneny, M., Korenke, R., 2023. Evaluating the Quality of ChatGPT's Climate-related Responses. Ökologisches Wirtschaften – Fachzeitschrift 38, 46–50. https://doi.org/10.14512/OEW380346

// **Biessmann, F.**, Kamble, B., Streblow, R., 2023. An Automated Machine Learning Approach towards Energy Saving Estimates in Public Buildings. Energies 16, 6799. https://doi.org/10.3390/en16196799

// Domhoff, D., Seibert, K., Bergmann, L., Theune, S., **Biessmann, F.**, Fürstenau, D., Schulte-Althoff, M., Wolf-Ostermann, K., 2023. Forschungs- und Entwicklungsprojekte in der Pflege erfolgreich planen und umsetzen – Voraussetzungen und Gelingensbedingungen am Beispiel des Einsatzes von künstlicher Intelligenz, in: Krick, T., Zerth, J., Rothgang, H., Klawunn, R., Walzer, S., Kley, T. (Hrsg.), Pflegeinnovationen in der Praxis: Erfahrungen und Empfehlungen aus dem „Cluster Zukunft der Pflege". Springer Fachmedien, Wiesbaden, pp. 379–399. https://doi.org/10.1007/978-3-658-39302-1_21

// Flick, A., Jäger, S., Trajanovska, I., **Biessmann, F.**, 2023. Automated Extraction of Fine-Grained Standardized Product Information from Unstructured Multilingual Web Data, in: Kamps, J., Goeuriot, L., Crestani, F., Maistro, M., Joho, H., Davis, B., Gurrin, C., Kruschwitz, U., Caputo, A. (Hrsg.), Advances in Information Retrieval, Lecture Notes in Computer Science. Springer Nature Switzerland, Cham, pp. 230–235. https://doi.org/10.1007/978-3-031-28241-6_19

// Hamm, C.A., Baumgärtner, G.L., **Biessmann, F.**, Beetz, N.L., Hartenstein, A., Savic, L.J., Froböse, K., Dräger, F., Schallenberg, S., Rudolph, M., Baur, A.D.J., Hamm, B., Haas, M., Hofbauer, S., Cash, H., Penzkofer, T., 2023. Interactive Explainable Deep Learning Model Informs Prostate Cancer Diagnosis at MRI. Radiology 307, e222276. https://doi.org/10.1148/radiol.222276

// Karakaya, A.-S., Ritter, T., **Biessmann, F.**, **Bermbach, D.**, 2023. CycleSense: Detecting near miss incidents in bicycle traffic from mobile motion sensors. Pervasive and Mobile Computing 91, 101779. https://doi.org/10.1016/j.pmcj.2023.101779

// Tschaikner, M., Brandt, D., Schmidt, H., **Biessmann, F.**, Chiaburu, T., Schrimpf, I., Schrimpf, T., Stadel, A., Haußer, F., Beckers Sr, I., 2023. Multisensor data fusion for automatized insect monitoring (KInsecta), in: Remote Sensing for Agriculture, Ecosystems, and Hydrology XXV. SPIE, p. 1272702.

C

// **Christensen, M.**, **Conradi, F.**, Bieling T., (Hrsg.) (2023): NERD – New Experimental Research in Design 3 – Positions and Perspectives. Basel: Birkhäuser (De Gruyter) (im Erscheinen).

// **Christensen, M.**, **Conradi, F.**, Sollfrank, C., Stadler, F. (Conference and publication 2024): Vital Data (im Erscheinen).

// **Christensen, M.**, **Conradi, F.** (Presentation + discussion): Design and the Anthropocene.

// **Christensen, M.**, **Conradi, F.** (Talk): Design Inquiries – Per/forming Critique. Brown Bag Brunch (BBB) lecture series, Central Laboratory, Matters of Activity. Image Space Material. Cluster of Excellence, Humboldt-Universität zu Berlin. 04.07.2023.

// **Christensen, M.**, **Conradi, F.** (Talk + Exhibition): Critical inquiry and Design. LNDW 8 / Lange Nacht der Wissenschaften, Einstein Center Digital Future, Robert-Koch-Forum. 17.06.2023.

// **Christensen, M.**, **Conradi, F.** (Co-hosting international conference): 'Design and Digital Justice', in collaboration with The German Society for Design Theory and Research (DGTF) and the Weizenbaum Institut, Berlin Open Lab, Berlin University of the Arts, 04.06.2023.

// **Christensen, M.**, **Conradi, F.** (Moderation + Co-Curation): 'Invisible Labor and Discrimination: Gender, Diversity and ChatGPT', ECDF Gender & Diversity Network, Einstein Center Digital Future, 31.05.2023.

// **Christensen, M.**, **Conradi, F.** (Exhibition): Berlin Design Week 2023, Designtransfer, Berlin University of the Arts, 08.05.2023.

// **Christensen, M.**, **Conradi, F.** (Co-hosting international conference): 'NERD – New Experimental Research in Design', in collaboration with Birkhäuser / De Gruyter Publisher, Berlin Open Lab, Technische Universität Berlin / Berlin University of the Arts, 04.05.2023.

// **Christensen, M.**, **Conradi, F.** (Curating): Talks: Sénamé Koffi Agbodjinou, 'Vernacular Computationalities: Cosmogony as a New Paradigm for Design' and Alê Costa Barbosa, 'Digital Sovereignty Conceptualised from a Global South Perspective', in collaboration with the Weizenbaum Institut, Berlin Open Lab, Berlin University of the Arts, 28.04.2023.

// **Christensen, M.**, **Conradi, F.**, Sénamé Koffi Agbodjinou (Presentations + Exhibition): 'Design + Crisis – Pluriversal Pathways to a Post-Anthropocene', final course presentations, Berlin Open Lab, 03.03.2023.

// **Conradi, F.**, (Talk and Exhibition): 'Research through Design – Critical Inquires', Einstein Center Digital Future 5+, Futurium Berlin, 20.03.2023.

// **Christensen, M.**, **Conradi, F.** (Presentation + Exhibition): 'Politics of Design', final course presentations, Berlin Open Lab, 21.02.2023.

// **Christensen, M.**, **Conradi, F.** (Talk): 'Critical Perspectives through Design Research', 2nd International Post/Doctoral Colloquium, Berlin Open Lab and ECDF. Exchange between Copenhagen University, KTH Royal Institute of Technology and the Berlin University of the Arts. 02.02.2023.

// **Christensen, M.** (Moderation): Track 'Space and Sustainability'. BOL x Hybrid Plattform Symposium, Berlin Open Lab, Berlin University of the Arts, 26.01.2023.

// **Christensen, M.**, **Conradi, F.** (Talk + Exhibition of Student Works): 'Design + Critical Inquiry', BOL x Hybrid Plattform Symposium.

// Cardell-Oliver, R., **Cominola, A.**, Hong, J., 2024. Activity and resolution aware privacy protection for smart water meter databases. Internet of Things 25, 101130. https://doi.org/10.1016/j.iot.2024.101130

// Castelletti, A., Ficchì, A., **Cominola, A.**, Segovia, P., Giuliani, M., Wu, W., Lucia, S., Ocampo-Martinez, C., De Schutter, B., Maestre, J.M., 2023. Model Predictive Control of water resources systems: A review and research agenda. Annual Reviews in Control 55, 442–465. https://doi.org/10.1016/j.arcontrol.2023.03.013

// Chen, S., Huth, M.A., **Cominola, A.**, 2023. Have roofs in Berlin become greener? Evaluation of Berlin's green roof subsidy program performance using geodata and deep learning EGU-13499. https://doi.org/10.5194/egusphere-egu23-13499

// **Cominola, A.**, Chen, S., 2023. How green are Berlin's roofs? An analysis and assessment of Berlin's green roof subsidy program using geodata and deep learning 2023, GC31E-1088.

// Abhijith G. R., Ivo D., **Cominola A.**, and Ostfeld A. 2023. Hybrid mechanistic and machine learning-based modeling approach for predicting quality fluctuations in drinking water distribution systems. 19th International Computing & Control for the Water Industry Conference, Leicester, UK., September 4-7 (to be presented).

// **Cominola, A.**, Castelletti, A., Gross, M. P., Taormina, R., Cardell-Oliver, R.. Smart meterpowered water end-use activity recognition: data, algorithms, and privacy-enhancing technologies to foster data sharing for research and practice. In World Environmental and Water Resources Congress 2023, Hen- derson, NV, USA, 21-25 May 2023.

// Daniel I., **Cominola A.**. A calibration-free pressure-driven approach to leak detection and localization in water distribution networks. In World Environmental and Water Resources Congress 2023, Henderson, NV, USA, 21-25 May 2023.

// **Cominola, A.**, Daniel, I., Tilcher, D., Alasmar, A.J.S., Ziara, R.M.M., Pedron, G., 2023. Enhancing the resilience of intermittent water supply systems in Khan Younis, Gaza Strip. Knowledge transfer and lessons learned from the Gaza H2.0 project EGU-13100. https://doi.org/10.5194/egusphere-egu23-13100

// **Cominola, A.**, Preiss, L., Thyer, M., Maier, H.R., Prevos, P., Stewart, R.A., Castelletti, A., 2023. The determinants of household water consumption: A review and assessment framework for research and practice. npj Clean Water 6, 1–14. https://doi.org/10.1038/s41545-022-00208-8

// Chen, S., Brokhausen, F., Wiesner, P., Hegyi, D., Citir, M., Huth, M., Park, S., Rabe, J., Thamsen, L., Tscheikner-Gratl, F., Castelletti, A., Thamsen, P.U., **Cominola, A.,** 2024. Coupled simulation of urban water networks and interconnected critical urban infrastructure systems: A systematic review and multi-sector research agenda. Sustainable Cities and Society 104, 105283. https://doi.org/10.1016/j.scs.2024.105283

// Daniel, I., Abhijith, G.R., Kadinski, L., Ostfeld, A., **Cominola, A.**, 2023a. A Machine Learning-Based Surrogate Model for Coupled Hydraulic and Water Quality Simulation in Water Distribution Networks 817–830. https://doi.org/10.1061/9780784484852.077

// Daniel, I., Ajami, N.K., Castelletti, A., Savic, D., Stewart, R.A., **Cominola, A.**, 2023b. A survey of water utilities' digital transformation: drivers, impacts, and enabling technologies. npj Clean Water 6, 1–9. https://doi.org/10.1038/s41545-023-00265-7

// Daniel, I., **Cominola, A.**, 2023. Physics-Informed Neural Networks to enhance leakage detection in drinking water distribution systems EGU-12186. https://doi.org/10.5194/egusphere-egu23-12186

// Gross, M.-P., Ajami, N.K., **Cominola, A.**, 2023. Fast in the pandemic, durable after droughts, inequal during economic downturn. A 20 year multi-dimensional retrospective analysis of water demand change in Southern California. Environ. Res. Lett. 18, 094067. https://doi.org/10.1088/1748-9326/acf32b

// Gross, M.-P., Escriva-Bou, A., Porse, E., **Cominola, A.**, 2024a. Leveraging explainable Machine Learning to discover trade-offs between water supply and demand management strategies in California (No. EGU24-16197). Presented at the EGU24, Copernicus Meetings. https://doi.org/10.5194/egusphere-egu24-16197

// Gross, M.-P., Escriva-Bou, A., Porse, E., **Cominola, A.**, 2024b. CaRDS – the statewide California Residential water Demand and Supply open dataset. Sci Data 11, 632. https://doi.org/10.1038/s41597-024-03474-y

// Hao, W., **Cominola, A.**, Castelletti, A., 2024. Combining wavelet-enhanced feature selection and deep learning techniques for multi-step forecasting of urban water demand. Environ. Res.: Infrastruct. Sustain. 4, 035005. https://doi.org/10.1088/2634-4505/ad5e1d

// Hao, W., **Cominola, A.**, Castelletti, A., 2023a. A Neural Granger Causality Inference Approach to Identify Meteorological and Socio-Demographic Drivers of Urban Water Demand in the Contiguous United States.

// Hao, W., **Cominola, A.**, Castelletti, A., 2023b. From Correlation to Causation: Discovering the Drivers of Urban Water Demands in the Contiguous United States EGU-7355. https://doi.org/10.5194/egusphere-egu23-7355

// Hao, W., **Cominola, A.**, Vertommen, I., Castelletti, A., 2023c. Evaluating the Value of Water Demand Forecasts for Real-Time Operation of Water Distribution Networks 2023, H13S-1738.

// Stillwell, A.S., **Cominola, A.**, Beal, C.D., 2023. Understanding resource consumption and sustainability in the built environment. Environ. Res.: Infrastruct. Sustain. 3, 030201. https://doi.org/10.1088/2634-4505/ace738

// Veigel, N., Kreibich, H., **Cominola, A.**, 2023a. Interpretable Machine Learning Reveals Potential to Overcome Reactive Flood Adaptation in the Continental US. Earth's Future 11, e2023EF003571. https://doi.org/10.1029/2023EF003571

// Veigel, N., Kreibich, H., de Bruijn, J.A., Aerts, J.C.J.H., **Cominola, A.**, 2023b. A Transformer-Based Analysis of Tweets in Germany to Investigate the Appearance and Evolution of the 2021 Eifel Flood in Social Media EGU-6038. https://doi.org/10.5194/egusphere-egu23-6038

D

// Baumann, J., **Danilov, A.**, Stavrova, O., 2023. Self-control and performance while working from home. PLOS ONE 18, e0282862. https://doi.org/10.1371/journal.pone.0282862

// Chugunova, M., **Danilov, A.**, 2023. Use of Digital Technologies for HR Management in Germany: Survey Evidence. CESifo Economic Studies 69, 69–90. https://doi.org/10.1093/cesifo/ifad005

F

// **Flügge, T.**, Gross, C., Ludwig, U., Schmitz, J., Nahles, S., Heiland, M., Nelson, K., 2023. Dental MRI — only a future vision or standard of care? A literature review on current indications and applications of MRI in dentistry. Dentomaxillofacial Radiology 52, 20220333. https://doi.org/10.1259/dmfr.20220333

// Kernen, F., Brändle, D., Wagendorf, O., Recca, M., Mehrhof, J., Vach, K., Nahles, S., Nelson, K., **Flügge, T.**, 2023. Enhancing intraoral scanner accuracy using scan aid for multiple implants in the edentulous arch: An in vivo study. Clinical Oral Implants Research 34, 793–801. https://doi.org/10.1111/clr.14107

// Vinayahalingam, S., Kempers, S., Schoep, J., Hsu, T.-M.H., Moin, D.A., van Ginneken, B., **Flügge, T.**, Hanisch, M., Xi, T., 2023. Intra-oral scan segmentation using deep learning. BMC Oral Health 23, 643. https://doi.org/10.1186/s12903-023-03362-8

// Wagendorf, O., Nahles, S., Vach, K., Kernen, F., Zachow, S., Heiland, M., **Flügge, T.**, 2023. The impact of teeth and dental restorations on gray value distribution in cone-beam computer tomography: a pilot study. International Journal of Implant Dentistry 9, 27. https://doi.org/10.1186/s40729-023-00493-z

G

// Brüning, J., Yevtushenko, P., Schlief, A., Jochum, T., van Gijzen, L., Meine, S., Romberg, J., Kuehne, T., Arndt, A., **Goubergrits, L.**, 2023. In-silico enhanced animal study of pulmonary artery pressure sensors: assessing hemodynamics using computational fluid dynamics. Front. Cardiovasc. Med. 10. https://doi.org/10.3389/fcvm.2023.1193209

// Froese, V., **Goubergrits, L.**, Kertzscher, U., Lommel, M., o. J. Experimental validation of the power law hemolysis model using a Couette shearing device. Artificial Organs n/a. https://doi.org/10.1111/aor.14702

// **Goubergrits, L.**, Schafstedde, M., Cesarovic, N., Szengel, A., Schmitt, B., Wiegand, M., Romberg, J., Arndt, A., Kuehne, T., Brüning, J., 2023. CT-based comparison of porcine, ovine, and human pulmonary arterial morphometry. Sci Rep 13, 20211. https://doi.org/10.1038/s41598-023-47532-8

// Katz, S., Caiazzo, A., Moreau, B., Wilbrandt, U., Brüning, J., **Goubergrits, L.**, John, V., 2023. Impact of turbulence modeling on the simulation of blood flow in aortic coarctation. Int J Numer Method Biomed Eng 39, e3695. https://doi.org/10.1002/cnm.3695

// Obermeier, L., Korte, J., Vellguth, K., Barbieri, F., Hellmeier, F., Berg, P., **Goubergrits, L.**, 2024. Inter-model and inter-modality analysis of left ventricular hemodynamics: Comparative study of two CFD approaches based on echocardiography and magnetic resonance imaging. GAMM-Mitteilungen 47, e202370004. https://doi.org/10.1002/gamm.202370004

// Versnjak, J., Yevtushenko, P., Kuehne, T., Bruening, J., **Goubergrits, L.**, 2024. Deep learning based assessment of hemodynamics in the coarctation of the aorta: comparison of bidirectional recurrent and convolutional neural networks. Front. Physiol. 15. https://doi.org/10.3389/fphys.2024.1288339

// Yevtushenko, P., **Goubergrits, L.**, Franke, B., Kuehne, T., Schafstedde, M., 2023. Modelling blood flow in patients with heart valve disease using deep learning: A computationally efficient method to expand diagnostic capabilities in clinical routine. Front. Cardiovasc. Med. 10. https://doi.org/10.3389/fcvm.2023.1136935

// Mihaljević, H., Müller, I., Dill, K., Yollu-Tok, A., von **Grafenstein, M.**, 2023. More or less discrimination? Practical feasibility of fairness auditing of technologies for personnel selection. AI & Soc. https://doi.org/10.1007/s00146-023-01726-w

// Pohle, J., Ulich, A., von **Grafenstein, M.**, 2023. Human-centred Data Governance in Health and Care Sectors. https://doi.org/10.5281/zenodo.7643098

// Rupp, V., von **Grafenstein, M.**, 2024. Clarifying "personal data" and the role of anonymisation in data protection law: Including and excluding data from the scope of the GDPR (more clearly) through refining the concept of data protection. Computer Law & Security Review 52, 105932. https://doi.org/10.1016/j.clsr.2023.105932

// de Macedo Schäfer, N., Schweinberg, M.J., Stenzel, M., **Grafenstein, M.**, 2023. Data Governance im Spannungsfeld datengetriebener Verwaltung. Herausforderungen von Kommunen bei der Etablierung einer Smart City Administration. Zenodo. https://doi.org/10.5281/zenodo.8297607

// von **Grafenstein, M.**, Kiefaber, I., Heumüller, J., Rupp, V., Graßl, P., Kolless, O., Puzst, Z., 2024. Privacy icons as a component of effective transparency and controls under the GDPR: effective data protection by design based on art. 25 GDPR. Computer Law & Security Review 52, 105924. https://doi.org/10.1016/j.clsr.2023.105924

// Ray, L.S.S., Geißler, D., Zhou, B., Lukowicz, P., **Greinke, B.**, 2023. Capafoldable: Self-tracking Foldable Smart Textiles With Capacitive Sensing, in: Adjunct Proceedings of the 2023 ACM International Joint Conference on Pervasive and Ubiquitous Computing & the 2023 ACM International Symposium on Wearable Computing, UbiComp/ISWC '23 Adjunct. Association for Computing Machinery, New York, NY, USA, p. 197. https://doi.org/10.1145/3594739.3610791

H

// **Hromada, D.**, 2022a. Humans teaching, machines learning / machines teaching, humans learning: invitation to peer learning of human and artificial pupils. https://doi.org/10.13140/RG.2.2.35146.08649

// **Hromada, D.**, 2022b. Once upon a time: on Kung-Fu lambs, role models and inherent notions of morality in a mainstream conservative ChatGPT-I. system. https://doi.org/10.13140/RG.2.2.27258.36805

// **Hromada, D.**, Kim, H., 2023a. Digital Primer Implementation of Human-Machine Peer Learning for Reading Acquisition: Introducing Curriculum 2. https://doi.org/10.54941/ahfe1004027

// **Hromada, D.**, Kim, H., 2023b. Personal Primer Prototype 1: Invitation to Make Your Own Embooked Speech-Based Educational Artifact.

// **Hromada, D.**, o. J. Teacher.solar : open source/hardware toolbox for CO2-neutral outdoor digital education: Abschlussbericht.

// **Hromada, D.**, Hsu, J., o. J. Short Plaidoyer for Introduction of EcoArtificial Education in Diverse Curricular Systems of the Planet Earth.

// **Hromada, D.**, Kim, H., 2023. Proof-of-concept of feasibility of human–machine peer learning for German noun vocabulary learning. Front. Educ. 8. https://doi.org/10.3389/feduc.2023.1063337

M

// Engel, O., Zimmer, L.M., Lörz, M., **Mayweg-Paus, E.**, 2023. Digital studying in times of COVID-19: teacher- and student-related aspects of learning success in german higher education. International Journal of Educational Technology in Higher Education 20, 12. https://doi.org/10.1186/s41239-023-00382-w

// **Mayweg, E.**, Enders, N., Bohndick, C., Rückmann, J., 2023. Online, blended oder Präsenz? Ein systematisches Literaturreview von Metaanalysen zur Effektivität hochschulischer Lehrformate 7, 96–122. https://doi.org/10.3224/zehf.v7i1.07

// Ruwe, T., **Mayweg-Paus, E.**, 2023. "Your argumentation is good", says the AI vs humans – The role of feedback providers and personalised language for feedback effectiveness. Computers and Education: Artificial Intelligence 5, 100189. https://doi.org/10.1016/j.caeai.2023.100189

// Zimmermann, M., **Mayweg-Paus, E.**, Ruwe, T., Maine, F., 2023. Teacher evaluations of open educational resources designed to support dialogic cultural literacy learning in schools. European Journal of Open, Distance and E-Learning 25, 136–147.

P

// **Pampel, H.**, 2023. Promoting Open Access in Research-Performing Organizations: Spheres of Activity, Challenges, and Future Action Areas. Publications 11, 44. https://doi.org/10.3390/publications11030044

// **Pampel, H.**, Weisweiler, N.L., Strecker, D., Witt, M., Vierkant, P., Elger, K., Bertelmann, R., Buys, M., Ferguson, L.M., Kindling, M., Kotarski, R., Petras, V., 2023. re3data – Indexing the Global Research Data Repository Landscape Since 2012. Sci Data 10, 571. https://doi.org/10.1038/s41597-023-02462-y

// Strecker, D., **Pampel, H.**, Schabinger, R., Weisweiler, N.L., 2023. Disappearing repositories: Taking an infrastructure perspective on the long-term availability of research data. Quantitative Science Studies 4, 839–856. https://doi.org/10.1162/qss_a_00277

// Kremer, P., Nourani-Vatani, N., **Park, S.**, 2023a. A Digital Twin for Teleoperation of Vehicles in Urban Environments, in: 2023 IEEE International Conference on Robotics and Automation (ICRA). Presented at the 2023 IEEE International Conference on Robotics and Automation (ICRA), pp. 12521–12527. https://doi.org/10.1109/ICRA48891.2023.10161556

// Kremer, P., Nourani-Vatani, N., **Park, S.**, 2023b. Digital Twin Enabled Teleoperated Driving Under Network Delay Using Ego Vehicle Tracking. https://doi.org/10.1109/ITSC57777.2023.10422456
// Lee, K., Bühs, F., Göhlich, D., **Park, S.**, 2023. Towards Reliable Design and Operation of Electric Road Systems for Heavy-Duty Vehicles Under Realistic Traffic Scenarios. IEEE Transactions on Intelligent Transportation Systems PP, 1–14. https://doi.org/10.1109/TITS.2023.3280948
// Reindl, A., Eriksson, L., Hans, M., Niemetz, M., **Park, S.**, 2022. Control Concepts for a Decentralized Battery Management System to Optimize Reliability and Battery Operation.

S

// Z., Beuer, F., Wu, D., Zhu, Q., Yassine, J., **Schwitalla, A.**, Schmidt, F., 2023. Microleakage along the implant–abutment interface: a systematic review and meta-analysis of in vitro studies. International Journal of Implant Dentistry 9, 34. https://doi.org/10.1186/s40729-023-00494-y
// Wang, Y., Ulbricht, A., Schmidt, F., Müller, B.R., Kupsch, A., **Schwitalla, A.**D., 2023. Micro-CT analysis and mechanical properties of low dimensional CFR-PEEK specimens additively manufactured by material extrusion. J Mech Behav Biomed Mater 146, 106085. https://doi.org/10.1016/j.jmbbm.2023.106085
// **Staab, P.**, 2023. Der Konflikt um den digitalen Kapitalismus – Kein Jenseits von Markt und Technokratie, in: Carstensen, Tanja/Schaupp, Seimon/Sevignani, Sebastian (Hrsg.): Theorien des digitalen Kapitalismus, Berlin: Suhrkamp, pp. 307 – 325, o. J.
// **Staab, P.**, 2023. Digitalisierung als Produktivitäts- und Wachstumschance, in: Blum-Geenen, Sabine/Luz, Rudolf/Schaumburg, Stefan/Smolenski, Tanja (Hrsg.): Aufbruch. Die IG Metall in der Transformation, Frankfurt: IG Metall, pp. 103–113. (mit Cornelius Markert), o. J.
// Piétron, D., **Staab, P.**, Hofmann, F., 2023. Digital circular ecosystems: A data governance approach. GAIA – Ecological Perspectives for Science and Society 32, 40–46. https://doi.org/10.14512/gaia.32.S1.7
// Santarius, T., Dencik, L., Diez, T., Ferreboeuf, H., Jankowski, P., Hankey, S., Hilbeck, A., Hilty, L.M., Höjer, M., Kleine, D., Lange, S., Pohl, J., Reisch, L., Ryghaug, M., Schwanen, T., **Staab, P.**, 2023. Digitalization and Sustainability: A Call for a Digital Green Deal. Environmental Science & Policy 147, 11–14. https://doi.org/10.1016/j.envsci.2023.04.020
// Biessmann, F., Kamble, B., **Streblow, R.**, 2023. An Automated Machine Learning Approach towards Energy Saving Estimates in Public Buildings. Energies 16, 6799. https://doi.org/10.3390/en16196799
// Cudok, F., Rehmann, F., **Streblow, R.**, 2023. BIM im Gebäudebestand – Herausforderungen in der Sanierung.
// Rehmann, F., Cudok, F., Rupp, V., von Grafenstein, M., Kegel, J., Aretz, A., **Streblow, R.**, 2023. Thesen zur Digitalisierung der Energiewende in Deutschland: Status quo und Ausblick – eine Expert*innenbefragung der deutschen Forschungslandschaft.

T

// Baltuttis, D., Teubner, T., Adam, M.T.P., 2024. A typology of cybersecurity behavior among knowledge workers. Computers & Security 140, 103741. https://doi.org/10.1016/j.cose.2024.103741
// Chowdhury, N.H., Adam, M.T.P., **Teubner, T.**, 2023a. Rushing for security: a document analysis on the sources and effects of time pressure on organizational cybersecurity. Information & Computer Security 31, 504–526. https://doi.org/10.1108/ICS-01-2021-0013
// Chowdhury, N.H., Adam, M.T.P., **Teubner, T.**, 2023b. Rushed to crack – On the perceived effectiveness of cybersecurity measures for secure behaviour under time pressure. Behaviour & Information Technology 42, 1568–1589. https://doi.org/10.1080/0144929X.2022.2092030
// Corten, R., Kas, J., **Teubner, T.**, Arets, M., 2023. The role of contextual and contentual signals for online trust: Evidence from a crowd work experiment. Electron Markets 33, 41. https://doi.org/10.1007/s12525-023-00655-2
// Korneeva, E., Salge, T.O., **Teubner, T.**, Antons, D., 2023. Tracing the legitimacy of Artificial Intelligence: A longitudinal analysis of media discourse. Technological Forecasting and Social Change 192, 122467. https://doi.org/10.1016/j.techfore.2023.122467

// Lichtinger, Y., Engelen, A., **Teubner, T.**, 2023. Time and timing in entrepreneurship research: insights from a systematic literature review. Int. J. Innov. Mgt. 27, 2330001. https://doi.org/10.1142/S1363919623300015

// Menzel, T., **Teubner, T.**, 2024. Signaling sustainability and regionality in the electricity market: An eye-tracking study on visual labels. Applied Energy 353, 122127. https://doi.org/10.1016/j.apenergy.2023.122127

// **Teubner, T.**, Camacho, S., 2023. Facing Reciprocity: How Photos and Avatars Promote Interaction in Micro-communities. Group Decis Negot 32, 435–467. https://doi.org/10.1007/s10726-023-09814-4

// **Teubner, T.**, Dann, D., Hawlitschek, F., Möhlmann, M., 2023a. First vs. Lasting Impressions: How Cognitive and Affective Trust Cues Coordinate Match-Making in Online Sharing Platforms. Group Decis Negot. https://doi.org/10.1007/s10726-023-09860-y

// **Teubner, T.**, Flath, C.M., Weinhardt, C., van der Aalst, W., Hinz, O., 2023b. Welcome to the Era of ChatGPT et al. Bus Inf Syst Eng 65, 95–101. https://doi.org/10.1007/s12599-023-00795-x

// Thäter, L., **Teubner, T.**, Tran Nhat, D., 2023. How Making Crowdworkers' Ratings Portable Across Platforms Can Increase Market Concentration. Proceedings 2023, 17834. https://doi.org/10.5465/AMPROC.2023.17834abstract

Z

// Andorra, M., Freire, A., Zubizarreta, I., de Rosbo, N.K., Bos, S.D., Rinas, M., Høgestøl, E.A., de Rodez Benavent, S.A., Berge, T., Brune-Ingebretse, S., Ivaldi, F., Cellerino, M., Pardini, M., Vila, G., Pulido-Valdeolivas, I., Martinez-Lapiscina, E.H., Llufriu, S., Saiz, A., Blanco, Y., Martinez-Heras, E., Solana, E., Bäcker-Koduah, P., Behrens, J., Kuchling, J., Asseyer, S., Scheel, M., Chien, C., **Zimmermann, H.G.**, Motamedi, S., Kauer-Bonin, J., Brandt, A., Saez-Rodriguez, J., Alexopoulos, L.G., Paul, F., Harbo, H.F., Shams, H., Oksenberg, J., Uccelli, A., Baeza-Yates, R., Villoslada, P., 2024. Predicting disease severity in multiple sclerosis using multimodal data and machine learning. J Neurol 271, 1133–1149. https://doi.org/10.1007/s00415-023-12132-z

// Khodabandeh, Z., Rabbani, H., Ashtari, F., **Zimmermann, H.G.**, Motamedi, S., Brandt, A.U., Paul, F., Kafieh, R., 2023. Discrimination of multiple sclerosis using OCT images from two different centers. Mult Scler Relat Disord 77, 104846. https://doi.org/10.1016/j.msard.2023.104846

// Lin, T.-Y., Chien, C., Kuchling, J., Asseyer, S., Motamedi, S., Bellmann-Strobl, J., Schmitz-Hübsch, T., Ruprecht, K., Brandt, A.U., **Zimmermann, H.G.**, Paul, F., 2024. Interactions of optic radiation lesions with retinal and brain atrophy in early multiple sclerosis. Annals of Clinical and Translational Neurology 11, 45–56. https://doi.org/10.1002/acn3.51931

// Scheibenbogen, C., Bellmann-Strobl, J.T., Heindrich, C., Wittke, K., Stein, E., Franke, C., Prüss, H., Preßler, H., Machule, M.-L., Audebert, H., Finke, C., **Zimmermann, H.G.**, Sawitzki, B., Meisel, C., Toelle, M., Krueger, A., Aschenbrenner, A.C., Schultze, J.L., Beyer, M.D., Ralser, M., Mülleder, M., Sander, L.E., Konietschke, F., Paul, F., Stojanov, S., Bruckert, L., Hedderich, D.M., Knolle, F., Riemekasten, G., Vehreschild, M.J.G.T., Cornely, O.A., Behrends, U., Burock, S., 2023. Fighting Post-COVID and ME/CFS – development of curative therapies. Front Med (Lausanne) 10, 1194754. https://doi.org/10.3389/fmed.2023.1194754

// Wicklein, R., Yam, C., Noll, C., Aly, L., Banze, N., Romahn, E.F., Wolf, E., Hemmer, B., Oertel, F.C., **Zimmermann, H.G.**, Albrecht, P., Ringelstein, M., Baumann, C., Feucht, N., Penkava, J., Havla, J., Gernert, J.A., Mardin, C., Vasileiou, E.S., Van Der Walt, A., Al-Louzi, O., Cabello, S., Vidal-Jordana, A., Krämer, J., Wiendl, H., Preiningerova, J.L., Ciccarelli, O., Garcia-Martin, E., Kana, V., Calabresi, P.A., Paul, F., Saidha, S., Petzold, A., Toosy, A.T., Knier, B., IMSVISUAL Consortium, 2023. The OSCAR-MP Consensus Criteria for Quality Assessment of Retinal Optical Coherence Tomography Angiography. Neurol Neuroimmunol Neuroinflamm 10, e200169. https://doi.org/10.1212/NXI.0000000000200169

GENDER & DIVERSITY NETWORK

2023 was an eventful year for the ECDF Gender & Diversity Network. The ECDF aims to use network, which was founded in 2022, to promote more diverse and gender-inclusive perspectives in digitalization research and to improve diversity in research communities. The network's team of professors and ECDF members – Helena Mihaljević, Michelle Christensen, Christine Kurmeyer, Florian Conradi, Tabea Flügge, Elisabeth Mayweg, Hanna Zimmermann, and Laura Rothfritz – want to highlight the relevance of gender and diversity in specific areas of the digital transformation and its impacts. The question of how digitalization research can contribute to inclusion, equal opportunities, diversity, and digital empowerment is an important starting point. "With the network, we also want to make it clear that all research topics have a gender and diversity dimension," says Dr. Christine Kurmeyer, member of the Board of Directors of the ECDF. Prof. Dr. Michelle Christensen adds: "We want to understand diversity in a comprehensive, intersectional, and transdisciplinary sense." In 2023, the Gender & Diversity Network went live with its website and two funding activities – for project work and an annual award. It also held a launch event on the topic of "Invisible Labor and Discrimination – Gender, Diversity and ChatGPT."

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"INVISIBLE LABOR AND DISCRIMINATION: GENDER, DIVERSITY AND CHATGPT" – GENDER & DIVERSITY NETWORK LAUNCH

The ECDF Gender & Diversity Network, which launched at the beginning of 2023, held two public events at the ECDF on 31 May 2023: the launch of the newly founded network and the opening of the exhibition "Capital of Female Scientists." The general public and guests from Berlin-based researchers in digitalization, gender, diversity, and equality were invited to join the panel in discussing "Invisible Labor and Discrimination: Gender, Diversity and ChatGPT." Before and after the discussion, the guests had the chance to learn about the lives and scientific achievements of outstanding women from the past hundred years and more in the "Capital of Female Scientists" exhibition at a reception in the foyer of the ECDF.

AI applications generally help redistribute work. The fact that applications such as ChatGPT are programmed to avoid racist and sexist remarks comes at the cost of the fact that poorly paid workers in the Global South have to sort through and flag illicit and offensive content. At the first meeting of the ECDF Gender & Diversity Network, participants discussed gender considerations and the potential for discrimination in AI applications. The panel included the researchers Maris Männiste (Södertörn University, Sweden), Leah Nann (LMU Munich) and Corinna Canali (UdK Berlin/Weizenbaum Institute). The ECDF was represented by Florian Conradi (TU Berlin) and panel chairs Helena Mihaljević (HTW Berlin) and Michelle Christensen (TU Berlin).

The three guest experts kicked off the event by presenting aspects of their work, which addresses discrimination and participation in AI. Leah Nann, who works on the AI4Dignity project at LMU Munich, is currently researching anti-migrant discourse in social media and online misogyny towards female politicians with a migrant background in the German-speaking context. Corinna Canali, a doctoral student at the Weizenbaum Institute and Berlin University of the Arts, is investigating online moderation of nudity and sexual activity, particularly in Western social networks. She is exploring which digital systems and power structures perpetuate the perception of femininity as obscenity. Maris Männiste, who works as a postdoc at Södertörn University in Sweden, is focusing on government welfare systems that are attempting to harness recent technological advances such as neurolinguistic programming in developing user-centered chatbots for citizen services. Examples from Sweden and Estonia show that even with simple, precise requests, the applications have not yet made government services more accessible or visible to citizens.

The discussion focused on the issue of content moderation. The question of who was responsible for ensuring diversity was particularly controversial. Referring to examples from Corinna Canali's presentation, panelists questioned who sets the rules and makes decisions in cases where people enter coding manually as opposed to machines learning giant datasets. The panelists said that relationships between data annotators and commercial platforms where crucial in this regard. "In my opinion, a key problem with digital technology is the belief that human behavior can and will be reduced to simple binary

categories of right and wrong. For example, attempts are being made to manage the complexity of body images through automated systems that apply local logic to a global audience. This is then packaged as a universally valid truth," commented Corinna Canali.

As content moderation is in the hands of the large corporations who operate the platforms, the panelists and audience wondered how critical interventions could be made at all. One suggestion was through participation. "The only way things can change is if everyone starts writing, speaking, and shaping these platforms," the person said. Gesche Joost was skeptical of this proposal, arguing that it is not possible to bring about change purely through increased participation because entrenched power structures are at play. Corinna Canali agreed that it was a structural issue, pointing by way of example to the fact that the female body is seen as obscene and is censored. This has primarily been decided over the centuries by white men. Christine Kurmeyer offered an answer to the question of who was responsible for ensuring diversity: "A systematic and institutional approach is needed, otherwise it will only be the same people coming forward and there will not be a diversity of opinions represented. This has to be actively created. Digitalization in particular is finally offering opportunities to analyze these structures in more detail and to identify more effective ways of addressing the situation at a structural level." Following the discussion, guests continued to share their views on the issues raised while visiting the "Capital of Female Scientists" exhibition.

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THREE PROJECTS RECEIVE FUNDING FROM THE GENDER & DIVERSITY NETWORK

This was the first year of applications for project funding from the ECDF Gender & Diversity Network. Along with the Annual Award for Digitalization and Diversity, project funding is the network's key financing activity for advancing diversity and inclusion in digitalization research and practice. The network offers quick and uncomplicated support for smaller projects up to a maximum of 2,000 euros. Funding is provided for activities that focus on equality, diversity, and empowerment that relate to digitalization and a connection to ECDF personnel. The jury selected three projects:

Edit-a-thon: Diversity in Wikipedia Articles on Library and Information Science

Heinz Pampel and Laura Rothfritz from the Berlin School of Library and Information Science (IBI) at HU Berlin were successful in their application to organize the "Edit-a-thon: Diversity in Wikipedia articles on library and information science", which aimed to make Wikipedia articles on library and information science more comprehensive and diverse. The objective was to better represent previously underrepresented perspectives and individuals and increase the visibility of topics dealing with diversity in library and information science. The action also aimed to address aspects such as interculturality, gender, and inclusion in library and information science. It was also an opportunity to learn more about editing Wikipedia articles. The edit-a-thon took place on 6 October 2023 at the ECDF.

Gender Diversity in Computer Science. A Live Podcast

The two computer scientists Sara Nill and Elisabeth Steffen, who are current/former students of ECDF professor Helena Mihaljević, believe that "there are still far too few women venturing into the world of computer science." With the project funding, they produced a live episode of their podcast Female TechTalk on "Diversity in computer science." The podcast aims to break down barriers and empower women to get excited about computer science and tech. Social justice & diversity trainer and engineer Franziska Beckert was their guest for the live open air episode. Sara Nill and Elisabeth Steffen spoke to her about her study on "Gender Diversity in the Tech Industry" at the club and cultural center ://about blank on 22 June 2023.

Equality and Diversity in Online HR Selection Procedures at Berlin Universities

Bianca Beyer and Viola Schmitt, both employees at the office of the State Conference of Women's and Equal Opportunities Officers at Berlin's Universities (LakoF), received funding approval for their project to investigate digital processes in HR selection procedures at Berlin universities. They want to find out the extent to which the participation rights of women's and gender equality officers are upheld and the constitutional gender equality directive is taken into account in the online HR selection procedures of some universities.

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ECDF AWARD FOR DIGITALIZATION AND DIVERSITY 2023 GOES TO DANIELA ROSNER AND HELENA MIHALJEVIĆ

Daniela Rosner and Helena Mihaljević received the 2023 award for the best work at the ECDF on issues of gender and diversity in relation to digitalization. Daniela Rosner was recognized for the publication "The Bias Cut: Toward a Technopoetics of Algorithmic Systems" (2022), and Helena Mihaljević as the lead author of the publication "Towards gender-inclusive job postings: A data-driven comparison of augmented writing technologies" (2022). The award is bestowed by the ECDF Gender & Diversity Network and comes with cash prize of 1,000 euros for each recipient. Two awards were made for the 2023 opening round.

BIAS AND DIGITALIZATION

Both authors explore current practices for dealing with bias in the context of digitalization, but from varying perspectives. Bias refers to distortions based on stereotypes, cultural norms, gender structures, and prejudices which – when incorporated into data or algorithms, for example – can in their application negatively impact and exclude underrepresented groups. In their work, Helena Mihaljević et al. take a close look at software applications designed to ensure that job advertisements are less gender-biased, i.e. the advertisements are not worded in a way that appeals to male applicants. Daniela Rosner draws on meanings of bias from the textile sector (e.g. "the bias grain") to propose a positive understanding of bias as a practice of social change in conjunction with digital technologies.

DANIELA ROSNER: BIAS AS A STARTING POINT FOR PRACTICES OF SOCIAL CHANGE

Daniela Rosner teaches and researches as an Associate Professor in Human Centered Design & Engineering at the University of Washington and is Co-Director of the Tactile and Tactical Design (TAT) Lab. For the ECDF Associate Researcher, gender and diversity are crucial. "Gender, alongside other categories of social difference (race, disability, religion, etc.), affects the questions we ask and whose bodies, stories, and experiences play a role in digitalization research," says Rosner. Her award-winning text, which focuses on the conceptual connections between textile fibers and bits, she proposes a productive and innovative approach to bias. It is not about avoiding or eliminating biases. Rather, they should be used collectively to "work against the grain" in everyday life, as an invitation to change. She wants her work to be understood as a call to AI analysts "to consider the material impacts of their processes. How is what counts as a dataset, algorithmic process, or alignment connected to their material and infrastructural actions, including with regard to bodies marked by gender, race, disability, and other categories of difference?"

HELENA MIHALJEVIĆ INVESTIGATES TECHNOLOGIES WITH THE AIM OF AVOIDING GENDER BIAS IN JOB ADVERTISEMENTS

Gender and diversity play a substantial role in the research of Helena Mihaljević, ECDF Professor of Data Science at HTW Berlin – University of Applied Sciences. "I've been researching the underrepresentation of women in mathematics in science and academia for some time. I also evaluate technologies in terms of fairness, with a focus on gender, but also other diversity characteristics," she says. Her award-winning

“With this network, we also want to highlight the fact that all research topics have a gender and diversity aspect,” says Dr. Christine Kurmeyer, board member of the ECDF.

text is part of her work in this area. The publication takes a close look at technologies that offer automated analysis and help write job advertisements in order to increase gender inclusion, for example in male-dominated professions and in management positions. “We’re investigating augmented writing technologies,” says Mihaljević. “Suggestions are automatically generated for job advertisements so that more women feel they speak to them. In our research, we compared tools in this area, looked at the robustness of their results and how (and how well) the scientific findings (in this case from psychology and linguistics) are generally translated into AI technology.” The authors conclude by describing the translation of research findings into technology as “extremely complex.” In order to assess their potential for improving gender equality, further studies are needed on their application in practice.

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EDIT-A-THON FOR MORE DIVERSITY IN WIKIPEDIA

Editing Wikipedia together and making underrepresented perspectives and people more visible in order to increase the diversity of the platform: This was the aim of the edit-a-thon on 6 October 2023 hosted by the Chair of Information Management at the Berlin School of Library and Information Science (IBI). Participants at the in-person event focused on Wikipedia articles on library and information science, jointly editing them and adding sources.

"Wikipedia should become more diverse in general, and with our edit-a-thon we want to contribute to this specifically in library and information science," explained Laura Rothfritz, who initiated the edit-a-thon together with ECDF Professor Heinz Pampel. "In addition to working on the Wikipedia articles, we also exchanged views on diversity issues and discussed how we can make the different voices in our field better heard in the future," said Rothfritz.

The participants reflected on how epistemic inequality could be addressed in information management and knowledge organization. They agreed that open science was key to making different voices and findings visible. At the same time, Wikipedia should be viewed in a more nuanced and critical way as a source of information and as a representation of society. "Although Wikipedia's claim to provide open knowledge for all normatively overlaps with that of library and information science, there is a structural and gender-based inequality in editing practices, especially for female editors and those from underrepresented groups," explained Professor Heinz Pampel, Professor of Information Management at Humboldt-Universität zu Berlin. During the edit-a-thon, it became clear that tackling the problem was long overdue. Some of the Wikipedia articles on library and information science topics are outdated and often not written in a gender-appropriate way. "Further work is necessary, and we are thinking seriously about other formats that can make structural improvements in this area," said Pampel.

The event was funded as part of the ECDF's Gender & Diversity Network and aimed at cultivating a broader perspective on topics such as interculturality, gender, inclusion and digitalization in this specific scientific discipline. The edit-a-thon was not the first event on diversity topics organized by the Chair of Information Management at the Berlin School of Library and Information Science (IBI) at Humboldt-Universität zu Berlin. In 2020 and 2021, the chair organized a series of workshops on data feminism. The edit-a-thon was a continuation of this series.

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"BERLIN – CAPITAL OF FEMALE SCIENTISTS": EXHIBITION DISPLAYED AT THE ECDF

Following appearances at the Social Science Research Center Berlin and HTW Berlin – University of Applied Sciences, the exhibition "Berlin – Capital of Female Scientists" was on display in the foyer of the ECDF from 15 May to 15 June 2023.

Across 20 panels, the exhibition showcases exceptional female scientists who have shaped and continue to shape Berlin as a city and a center for science and research. The women are pioneers in their field and trailblazers for future generations of female scientists. They include Dr. Gesche Joost, ECDF Spokesperson and design researcher at Berlin University of the Arts, and associate ECDF member Juliane Siegeris, expert in information systems management and professor of software engineering at HTW Berlin – University of Applied Sciences. The portraits also include Agnes Zahn-Harnack, who was the first female student in the city to be officially matriculated in 1908, and Marlis Dürkop-Leptihn, who was elected the first female president of Humboldt-Universität zu Berlin in 1992, following 118 male predecessors. The idea for the exhibition came from experts at the Berlin Institute of Health at Charité (BIH) and the then Governing Mayor of Berlin, Michael Müller, as part of Wissensstadt Berlin 2021 ("Knowledge City"). On 31 May 2023, the exhibition was officially opened at the network meeting and launch of the ECDF Gender & Diversity Network with a panel discussion on "Invisible Labor and Discrimination: Gender, Diversity, and ChatGPT."

NETWORKS AND COOPERATION

Since it was founded, close relationships with existing research centers has been one of the ECDF's key strengths and contributes to enhancing Berlin as a center for digitalization. Such work has included interdisciplinary and inter-institutional health research at the Digital Urban Center for Aging & Health (DUCAH), the fostering of young STEM talent, collaborative AI research, and close ties with the deep-tech start-up scene. The ECDF has succeeded in building a comprehensive network of strategic collaborations with partners in order to strengthen digitalization research in Berlin as center for science and research. As a PPP model, the ECDF also attaches importance to close but independent collaboration with private firms. Working with public and private partners, the ECDF is tackling the major challenges of digital transformation in the form of research projects, events, and joint initiatives. Some examples are presented below.

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FOCUS ON STEM: GIRLS' DAY 2023 WITH CORNELSEN

The joint Girls' Day with Cornelsen at the ECDF was a chance to learn about exciting examples of STEM subjects from everyday life, meet professionals, and talk to female politicians. The aim was to get girls and young women interested in STEM careers (science, technology, engineering, and mathematics), give them an engaging and realistic insight, and remove barriers to starting a career.

Girls' Day is an opportunity for girls and young women to learn more about professions and degree subjects in which the proportion of women is under 40%. At the ECDF, Berlin schoolgirls explored programming, 3D printing, and augmented reality in a STEM-themed circuit with six stations. The joint initiative with Cornelsen aimed to introduce schoolgirls to the diversity and attractiveness of STEM professions, while at the same time promoting dialogue between STEM and policymakers. "As a partner in the joint Girls' Day, we can actively contribute to more equal opportunities in the STEM area and provide insights into current digitalization research projects. I hope that we can inspire many young women and encourage them to pursue a future in STEM," said ECDF Spokesperson Gesche Joost, Professor of Design Research at Berlin University of the Arts.

In order to provide the students with the best possible support, ECDF and Cornelsen employees were on hand at the different stations to talk about their own experiences and professional careers as programmers, scientists, EdTech specialists, and copywriters. The school students had the opportunity to program the heat and power supply of an eco-building using renewable energies, as well as to work out their preferred temperature using fitness trackers and machine learning. The event was hosted by Sarah Parvanta (KiKa live).

Romy Krull, a pupil at the Felix Mendelssohn Bartholdy School, saw why Girls' Day was important: "I think there's a preconception that girls aren't that good at math, and I think that's just not true. Girls can be just as good at math as boys. At Girls' Day, we did a lot of experiments, and I learned a lot of things that I would never have come across otherwise."

After completing the circuit, the students spoke with Members of the Bundestag Rasha Nasr (SPD), Nina Stahr (Greens), Ria Schröder (FDP), and Mareike Wulf (CDU) about the challenges, equal opportunities, and career opportunities in scientific and technical professions. Wulf also emphasized the importance of Girls' Day in "showing young women what amazing professions there are and what diversity there is. But it's also about providing role models of brilliant female engineers, and women working in science, technology, and politics."

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SCIENCE IN THE DIGITAL FUTURE – RESPONSIBLE AI OR DISINFORMATION ON A GRAND SCALE?

Artificial intelligence systems have become a ubiquitous part of our daily lives. Recent advances have reignited the debate about the benefits and risks of AI systems – from ChatGPT to deep fake images. Based on these developments, the ECDF and Elsevier have taken the opportunity to organize an open discussion series on the impact of digitalization on science and research entitled "Conversations on Science in the Digital Future." Following the first discussion in 2022 on data protection in the digital age, the second panel on "Responsible AI or Disinformation at Scale?" took place on 20 April 2023 with Dr. Felix Biessmann, Professor of Data Science at the ECDF and the Berliner Hochschule für Technik (BHT), Harry Muncey, Director of Data Science and Responsible AI at Elsevier, and Tabea Rößner, Member of the Bundestag for Alliance 90/The Greens and Chair of the Digital Committee. The event was chaired by journalist Katharina Heckendorf.

The latest installment of the discussion series drew on three articles on the Dutch algorithm scandal, AI for drug research, and the outsourced work used in the run-up to the launch of ChatGPT. In the Netherlands, the tax authorities used automated systems that falsely accused thousands of families of fraud, discriminating against them based on nationality; in the pharmaceutical industry, AI is being used to improve drug discovery by analyzing large amounts of data and predicting successful compounds; OpenAI, the company behind the latest AI system ChatGPT, profited from outsourcing and paid Kenyan workers just $2 an hour to remove violent content from the algorithms. Workers had to sift through data, some of which contained graphic violence and abuse. So, is responsible AI even possible? How can we ensure good quality datasets? And to what extent should we trust AI?

With regard to responsible AI and the Dutch example, Harry Muncey saw the problem as "the result of several failures around responsible AI: lack of oversight, accountability, transparency, and explanations, with the humans that were impacted by the algorithms' decisions not having the ability to challenge the outcomes. It's a prime example of how we can reproduce existing biases in our systems through the use of AI." In other words, there were human biases that were likely embedded in the data used to train the algorithms used by the Dutch tax authorities. "We need good, open data to ensure that the datasets used are appropriate. However, some risks cannot be minimized, even if the data is good," commented Tabea Rößner. She referred to the new AI law and the risk-based approach that the European Union is currently working on to protect human rights and personal data in a world of algorithms.

Felix Biessmann added that "we assume that the data is representative enough to train a model that can make predictions about any type of data. However, this is generally not the case: algorithms can reinforce biases and further marginalize groups. Many of these problems have nothing to do with AI, but with data. The example of ChatGPT also shows the importance of data: the OpenAI program is largely trained using the internet, where anyone can post content that is then evaluated by the AI. This is why we need appropriate regulations for training systems on high-quality data." When it came to

"We need to work more on the diversity and heterogeneity of our data. However, private information has to be protected – especially when it comes to patient data" Felix Biessmann, ECDF-Professor for Data Science

the human side of AI, he said that both approaches were wrong: "not trusting AI systems enough and following them blindly."

"What does it contain? How was it developed? What do doctors say? We need human decisions in these cases," stressed Tabea Rößner, who acknowledged the possibilities and opportunities of AI in medicine, but advocated carefully weighing up "whether we really want to know everything that AI can tell us." Felix Biessmann pointed out the importance of data quality and representative datasets: "The facial expression dataset, for example, is one of the most important datasets in AI health research. But it is being tested and developed for white people. We need to work more on the diversity and heterogeneity of our data." However, private information has to be protected – especially when it comes to patient data. A compromise must be found between privacy concerns and the benefits of AI. "We can't force people to hand over their data. The patient could be identifiable, especially in the case of rare diseases. It is a balancing act to have good data, harness the benefits and protect people at the same time," said Tabea Rößner. This includes human oversight, which Harry Muncey believes will always be necessary, "especially in healthcare, the area with the highest risk for the application of AI, but also one of the areas where we will see the biggest gains. We won't be able to avoid needing a basic level of human oversight."

When it comes to the dataset behind ChatGPT, do we still need people to tag the data in order to address the violent prejudices or hate speech it might contain? "Outsourcing is a general problem; even if workers earned more, they would still see traumatic content. It is our responsibility to protect these people," says Tabea Rößner, referring to the Kenyan workers behind the OpenAI datasets. For Harry Muncey, this is not an AI-specific problem: "We have a responsibility to check the supply chains of the products and technologies we use, just as we would for things that are not AI." The introduction of a supply chain law for digital applications, similar to the German supply chain law, would be one possibility. According to Felix Biessmann, it would be helpful to see the data on which the model was trained, although it would be difficult to implement.

While the EU is working on an AI law, Tabea Rößner emphasized that it is not easy to define appropriate regulations: "Responsible AI for certain algorithms is a very context-specific challenge. The risks that AI poses for drug discovery or treatment algorithms are different from those of algorithms recommending what to watch next on Netflix. The data contains biases and a degree of human oversight and transparency is required. Depending on the context, different levels of safety precautions are necessary," said Tabea Rößner.

The guests also discussed the extent to which the power and monopoly of a few large companies in the AI world can be challenged. As a researcher, Felix Biessmann wanted to see more open datasets that rely less on companies and more on science. Harry Muncey believed that more collaboration between academia and industry could promote openness and information sharing. He emphasized the need for more diverse voices to be heard in the dialogue on AI.

What does this mean for science in the digital future? Panel chair Katharina Heckendorf asked the three panelists to take a look into the future and complete the sentence: "To develop responsible AI, we need ..." For Tabea Rößner it was "... public money, an open society, a public code, transparency, good quality data, authorities that control it, and oversight of the risks involved." Felix Biessmann completed the sentence with "... transdisciplinary efforts for automated data quality," while Harry Muncey saw the focus on collaborative and transparent cooperation, where "as many different voices as possible must be included so that we can ensure that the systems work for everyone and not just for a few."

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OPENING OF THE EXHIBITION "UNBLACKBOXING"

On 13 October 2023, the ECDF opened its doors for the launch of the art exhibition "Unblackboxing. Artistic investigations into digital realms of exploitation and control." The exhibition addressed the conditions underlying digital societies and offered a space for critical reflection through aesthetic interventions.

Digital technologies are firmly embedded in our everyday lives and influence us in many ways. But often the effects on society, its power structures, and imbalances remain hidden. "This is where the arts come in: they illuminate the 'black boxes' of the digital world and make the social and ecological consequences visible. With the exhibition at the ECDF, we want to make these consequences tangible for a wider audience," explained Gesche Joost, Professor of Design Research at UdK Berlin and Spokesperson of the ECDF.

From 17:00, the participating artists and activists, including Kim Albrecht, Sarah Grant, Adam Harvey, Joana Moll, Julian Oliver, Juan Pablo García Sossa, Danja Vasiliev, and Hana Yoo, presented their work as part of a panel. All the projects provided insights into the complex connections between digital technologies and their often hidden effects on our lives.

Artist Kim Albrecht explained his project "#MeToo Anti-Network," which depicts a random selection of tweets with the hashtag #MeToo. These were selected from a set of one million tweets each of which had been retweeted at least 100 times. What was particularly striking was that only 8 of the 894 tweets displayed were actually tweets about sexual assault or experiences related to #MeToo. Of the remaining tweets, the vast majority were news articles and political discussions (including trolling), most of which took no account of the voices of those affected. The work increased the visibility of gender-based violence and gives the viewer a real sense of the social implications of digital technologies.

At the "Vending Private Network" exhibit in the foyer, visitors were invited to equip themselves with four different VPNs (virtual private networks) by inserting a USB stick and a coin into the machine. The machine transfers a file onto the USB stick that enables secure and private surfing on the internet and makes it look as if the user is at a vacation destination. With every purchase from the machine, users help the network to run. It offers the same service free of charge to people living in countries where state surveillance is part of everyday life – in Russia, an exhibition of the machine in 2021 was banned because the Russian state has made VPNs illegal.

The exhibition was curated by Daniel Irrgang (University of Copenhagen) and organized in collaboration with Friedrich Schmidgall and Gesche Joost (ECDF). The book project "Weak Signals" by Lukas Freireiss and Florian Hadler was also presented as part of the opening. The book examines the potential for art, science, and technology to be used in combination to bring about paradigm shifts.

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RBB-INFORADIO-FORUM – THE AI REVOLUTION: WHO CONTROLS THE SMART MACHINES?

Self-driving cars, robots that perform open-heart surgery, software that writes award-winning novels – none of these things are new anymore. Humans have developed machines that can act more reliably and with more foresight than they can themselves. We had to build the machines in the first place – and feed them with our own intelligence. So can machines be smarter than humans? And would we even notice? These questions formed the backdrop to broadcast at the rbb-Inforadio-Forum on 21 November 2023. The discussion involved Philipp Staab, ECDF Professor of the Sociology of the Future of Work, Tina Klüwer, Director of K.I.E.Z. – the Artificial Intelligence Entrepreneurship Center in Berlin, Aljoscha Burchardt, expert in language technology and AI at the German Research Center for Artificial Intelligence, and Gero Keil, Managing Director of the AI start-up Levity and regional group leader of the German AI Association. The program was hosted by rbb journalist Dietmar Ringel.

He began the discussion by asking what exactly we meant when we talked about artificial intelligence. And what consequences do the latest developments have on our society? The term "artificial intelligence" has changed a lot since the 1950s. For Tina Klüwer, AI is a set of technologies that have been continuously developed since the 1950s and enabled software to behave in a way that comes close to human intelligence. What we call artificial intelligence today, didn't exist back then, and what we would have called artificial intelligence back then would no longer be referred to using the term today. The scientist Aljoscha Burchardt said that intelligence comes from us as users, and illustrated this using the example of how we use search engines: "AI begins where normal programming ends. If I enter 'forest fires in Canada' into a search engine, then of course no one can have programmed in advance where I can find videos, websites, newspaper articles about that subject, because they simply didn't exist. The search engine must somehow learn which pages are relevant from our user activity." The AI learns with every search query and produces different results.

Data is crucial for this, because AI learns from data instead of being programmed by humans. When the AI then comes across a similar, but not identical, question, "we now have the huge advantage that we don't have to teach the AI how to deal with this situation, because it can now work this out itself based on the similarity of the data," added Klüwer. ECDF Professor Philipp Staab calls these types of machines "stochastic parrots": The decisions are based on probabilities – a method that is particularly suitable for simple processes – but which now also works for more complex ones such as language. But it also creates monotony, as the plethora of similar formats on streaming services shows. This phenomenon is not limited to AI – successful formats are also reproduced without AI – "but AI repeats these stochastic patterns. But this is the opposite of what is meant by intelligent or creative behavior, namely that it is capable of producing emergence that is not purely stochastic. AI can simulate this very well," says Philipp Staab.

Host Martin Riegel explained to the panelists that until recently, AI played no role at all in his everyday life; translation programs such as Google Translate were

now changing that. However, AI was not a phenomenon that has only become part of our everyday lives in recent weeks and months. "The paradox is that AI that is used in everyday life is not perceived as AI. The good old Sat Nav – there's a lot of AI in it, AI from the 60s. Finding the optimal route from A to B used to be a huge problem for science," said Aljoscha Burchard. Then there are the voice dialogue systems, traffic jam forecasts, etc. We expect these systems to just work and no longer even notice them. What people are now paying attention to is generative AI such as ChatGPT. But Aljoscha Burchardt predicted that people would also become accustomed to these over time.

The panel participants were not in agreement on data protection issues. Some users complain about the lax handling of personal data and therefore do not use the services. But Gero Keil saw the advantages of the technology and the added value that the collected data creates for all users, such avoiding traffic jams. It was unclear to him what purpose this movement data should serve other than to optimize the services. On the other hand, he said the situation was different when it came to health data. For Tina Klüwer, the main issue was the economic power and competitive advantage that the collected data gave to a company. Philipp Staab also highlighted the dependencies that can arise, even where municipalities may have benefited from the data. "What kind of state are we in if no local authority in Germany can do without Microsoft? Of course they benefit from Microsoft, but they can no longer do without Microsoft, and that's a problem," he said. Philipp Staab was also much more critical of the collection of movement data than Gero Keil.

Overall, we as a society need to develop a way of addressing the latest developments. For example, how do we deal with the fact that students can now write their essays using ChatGPT and entire master's theses are written by artificial intelligence? For Aljoscha Burchard, the flaw lies more in a system that no longer meets people's needs, and less in the use of AI. One thing society as a whole needs to do, he said, is to identify the skills that we want to develop in people, even though a machine could do them for us. According to Tina Klüwer, we will have no choice but to come to terms with these innovations, because the tools exist now. However, she also saw this as an opportunity: "I also find it really exciting – what does it mean for education now that these tools exist? What does it mean for the skills I teach and expect from students? We have to look again very carefully at what we actually want to test and whether it is absolutely necessary that the text was written by the individual. Or is something else more important – and can I perhaps test that in a different way?" This might include skills such as teamwork, critical thinking, and evaluation. In these cases, the text itself can certainly come from ChatGPT, and the students can then use it to develop these skills.

However, at the end of the discussion, Philipp Staab painted a bleak picture: Legislators are lagging behind these rapid innovations and the undesirable developments they bring. The disinformation of citizens supported by AI is currently unstoppable. This could pose a problem for European economic models and political systems, because political decision-making cannot take place without a general public that is able to discern the truth. For Gero Keil, this development is being accelerated by AI, but it came about without AI. So, instead of demonizing AI, he said, we need to combat this development with critical thinking and verified sources.

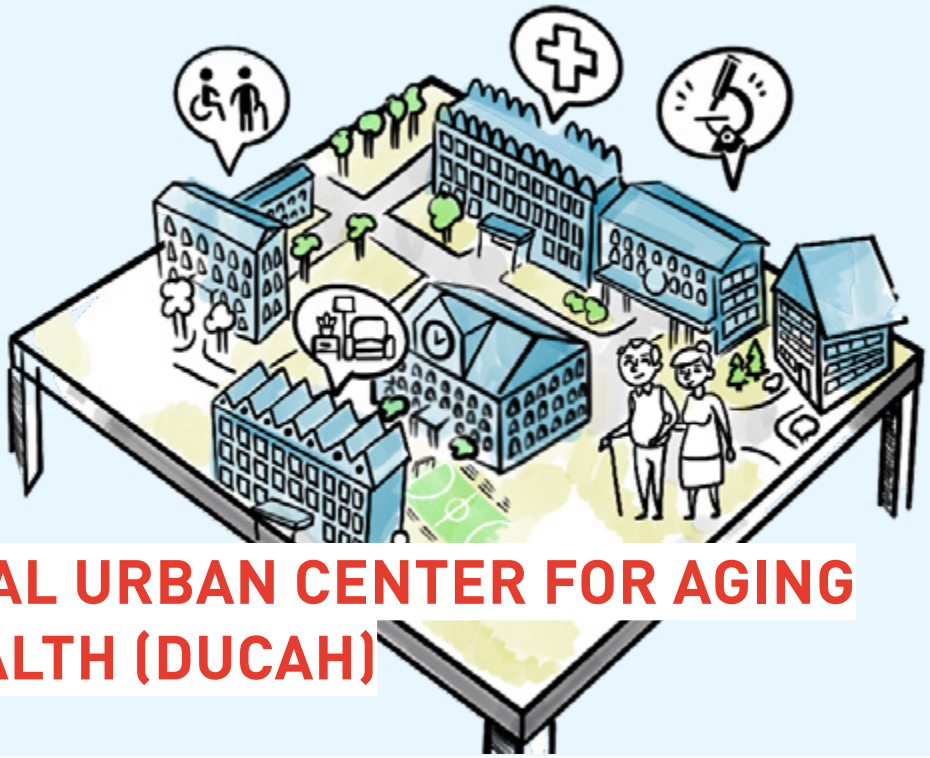
ECDF/PR/Sandra Pravica

BIFOLD / DATA SCIENCE+X

In 2023, the international graduate program HEIBRiDS carried out joint activities with other doctoral schools in the Berlin research landscape focusing on data science, machine learning, and their application. The program was launched by the ECDF in cooperation with the Helmholtz Centers in Berlin and Potsdam in 2018. The events were a chance for the students from the various programs get to know each other, identify common methodological problems in their projects, and engage in interdisciplinary discussions on the challenges of machine learning and data science in various scientific applications.

Three events were held in cooperation with the BIFOLD doctoral program. BIFOLD is TU Berlin's institute for basic research in big data management and machine learning. On 17 May and 28 June 2023, students from BIFOLD and HEIBRiDS presented their projects in joint PhD seminars held on the ECDF premises. The whole group then took part in both sessions of the bi-weekly HEIBRiDS Lecture Series. A particular highlight of the collaboration with BIFOLD was the joint workshop on "Intercultural Communication and Awareness" on 22 November 2023 at the ECDF. The workshop was run by an external trainer, and the HEIBRiDS PhD candidates received credit points in the soft skills area for taking part.

HEIBRiDS and the graduate program of the Data Science +X project of the Berliner Hochschule für Technik (BHT) held a joint colloquium initiated by Prof. Dr. Felix Biessmann (BHT/ECDF) on November 29, 2023 in the conference room of the ECDF. It was particularly productive. The students discussed five PhD projects with the supervisors Demir Begüm (TU Berlin/BIFOLD), Felix Biessmann (BHT/ECDF), Andrea Cominola (TU Berlin/ECDF/HEIBRiDS), Guillermo Gallego (TU Berlin/ECDF), Felix Gers (BHT), Kristian Hildebrand (BHT), Alexander Löser (BHT), Agathe Merceron (BHT), and Jana Wolf (MDC/HEIBRiDS) on. The projects were presented by both HEIBRiDS and BHT.



DUCAH

DIGITAL URBAN CENTER FOR AGING & HEALTH (DUCAH)

The Digital Urban Center for Aging & Health (DUCAH) was founded jointly by the ECDF, the Internet and Society Foundation, and the Alexander von Humboldt Institute for Internet and Society (HIIG). The Center is home to interdisciplinary research at the intersection of digitalization, urbanization, and health – in urban neighborhoods, care facilities, and hospitals. The ECDF is represented by Associate Researcher Prof. Dr. Dr. Thomas Schildhauer and the two ECDF professors Prof. Dr. Dr. Felix Balzer and Prof. Dr. Tabea Flügge, who co-initiated the project. In addition, a number of ECDF professors, including Felix Biessmann, Philipp Staab and Rita Streblow, are helping progress research at DUCAH. "DUCAH is a huge win for the ECDF. This is about human-centered research that not only helps patients, but also means people can use the innovations we develop in a preventative way," said Tabea Flügge.

The ECDF primarily contributes to the Center through its expertise in digital infrastructures, methods and algorithms, digital health, digital society, and digital industry and services. The planned research projects will focus, for example, on the use of artificial intelligence in nursing, wearables for heart failure, and online platforms in nursing. The aim of DUCAH is to provide caregivers, relatives, and doctors with better support in using digital technologies in a humane, ethical, and sustainable manner. The researchers will conduct scientific analyses, transfer them into practice, and develop prototypes which will continue to receive scientific support.

One of the projects involves the deployment of the ComfortCube, which is coordinated by ECDF Professor Rita Streblow (TU Berlin). The ComfortCube is an innovative mobile measuring system for objectively recording indoor comfort parameters combined with a subjective survey of well-being. It was developed by Heinz Trox Wissenschafts gGmbH. In the DUCAH context, the ComfortCube was further expanded to monitor and improve indoor space quality in retirement homes. Data collection is simple and enables the user to precisely compare measurable environmental conditions with the perceptions of the residents, which contributes significantly to improving their well-being. In this way, DUCAH is making a key contribution to harmonizing indoor comfort with energy-efficient system designs in order to improve the living conditions of older people and those in need of care.

RE:PUBLICA

The theme of the 2023 edition of the annual conference re:publica was Cash. re:publica explores various aspects of the digital society. Representatives from science and academia, politics, the private sector, hacker cultures, NGOs, media and marketing, as well as bloggers, activists, artists, and social media experts discussed the current issues and trends of the digitalized society. The conversation took place both via the podium and informally around the venue. This year, the ECDF was represented by two speakers. Our Associate Researcher Thomas Ramge gave a talk on "Do you really want to live forever?" in the Festsaal Kreuzberg. He outlined the advantages and disadvantages of the longevity movement to the re:publica audience. ECDF Professor Timm Teubner, for his part, was part of the hackathon jury on the subject of Circular Economy & AI. Various start-ups presented their solutions and the current state of progress to the audience and the interdisciplinary jury. The winning entrant was the clothes swap app uptrading.

DEEP TECH AWARD 2023

This year, the ECDF was a partner of the Deep Tech Awards for the first time. This is the eighth time that the Senate Department for Economic Affairs, Energy and Public Enterprises has awarded the prize for applied tried-and-tested solutions and products using deep tech. Across five categories – Artificial Intelligence, IT Security, Internet of Things / Industry 4.0, Web3, and Social & Sustainable Impact – an independent jury of experts evaluated the submissions according to innovation and market potential. The ECDF provided communication support and awarded a partner prize. "Berlin is a hub for leading scientists, is culturally diverse, and has a creative start-up scene – what better place to develop interdisciplinary solutions?" said ECDF professor and Board Member Timm Teubner. This was the basis for cooperation with the Deep Tech Award, which is set to continue in 2024.

Privat

IHK FUTURE FAIR: SIMRA

At the Berlin Chamber of Commerce and Industry's summer festival, scientists presented forward-thinking ideas and products relating to the topic of "public street space." The SimRa (cycle safety) project team led by Prof. Dr. David Bermbach presented the SimRa app for recording near-miss accidents in cycling to around 2,000 guests from the worlds of business, politics, administration, and civil society in Berlin. Visitors to the stand included Berlin's Senator for Urban Mobility, Transport, Climate Action and the Environment, Manja Schreiner, the Governing Mayor of Berlin, Kai Wegner. SimRa collects data (in accordance with privacy laws) on where cycle hazards occur in the city, what type of hazards these are, and whether they occur more frequently at specific times or locations. Using GPS data, the app tracks cycle routes and uses acceleration sensors to detect dangerous situations such as sudden braking, swerving, and even falls. Cyclists are then asked to categorize these hazardous situations, add any similar situations that have not been identified, and approve the upload of the data to the project server.

/ TEACHING AND SUPPORT FOR YOUNG RESEARCH TALENT

/ JOINT TEACHING / HEIBRIDS

JOINT TEACHING AND SUPPORT FOR YOUNG RESEARCH TALENT

Since its launch in 2017, the ECDF has been a driving force in Berlin's academic landscape, which comprises more than 1,000 professors and over 120,000 students. The additional ECDF professorships strengthen teaching capacities at Berlin's universities and colleges so that students can be offered research-based and relevant teaching. In 2023, ECDF researchers again offered a wide range of courses. Here we present a selection.

In the summer semester block course "Smart Home," ECDF professor Rita Streblow (TU Berlin) introduced her students to home energy management systems, protocols, the Internet of Things, load management concepts and machine learning algorithms. At the end of the course, students spent two intensive days of work at the ECDF programming simple home energy management concepts in openHAB. The course received an evaluation of "very good" from students.

Contemporary societies have to adapt significantly in order to deal with the challenges of climate change and environmental degradation. In the project seminar "Legitimacy and Criticism in Green Capitalism," ECDF Professor Philipp Staab (HU Berlin) and his students examined the attitudes and actions of the pioneers of green capitalism. They analyzed how this group perceives the world, how it acts, what values it shares, and what political views it holds.

In the seminar "Artificial Intelligence in Schools and Teaching," ECDF professor Elisabeth Mayweg (HU Berlin) and students explored the growing role of AI in educational contexts, in particular the conversation around new developments such as generative language models. The project investigated the extent to which AI-based processes will influence text and image generation and communication, and what impact this will have on school-level education, skills transfer, and examination formats. The focus was on how AI can be integrated into lessons in order to develop skills for lesson design. The students chose between several online courses on the AI Campus which introduce various aspects of AI, and then discussed specific AI applications in the classroom by creating their own lesson plans.

ECDF Professor Sangyoung Park (TU Berlin) offered the lecture "Electric Vehicle Technologies and Applications" to bachelor's students of mechanical engineering and transport systems in the summer semester. The lecture provides a comprehensive overview of electric vehicle technologies, which include the drivetrain, battery, charger, grid services, and other components.

In the lecture "Fluid Mechanics in Medicine I and II," ECDF Professor Leonid Goubergrits (Charité – Universitätsmedizin Berlin) provided students of engineering subjects with a basic introduction to the human circulatory system from an engineering perspective as well as a fundamental understanding of artificial organs for the treatment of pathologies. Students learned the physical principles and gained an understanding of human physiology and the role of blood circulation. They also gained insights into medical measurement procedures in order to make diagnoses and therapy decisions.

In 2018, the ECDF and the Helmholtz Association founded the Helmholtz Einstein International Berlin Research School in Data Science or HEIBRiDS. The interdisciplinary graduate program trains young scientists in data science and how it intersects with a natural science such as astronomy, materials science, or molecular medicine. The HEIBRiDS program will train a new generation of young top-level researchers to become leading data scientists and experts who understand the specific challenges of their scientific domain.

The four university partners from the ECDF are cooperating with six Helmholtz Centers in these fully funded doctoral projects, which cover overlapping areas of data management, machine and deep learning, imaging, mathematical modeling, and high-throughput data analysis. Doctoral students are supervised in tandem by one supervisor from the Helmholtz partners and one supervisor from the ECDF partners. The curriculum consists of elective courses, a basic training program and annual meetings with the Thesis Advisory Committee (TAC).

Six of the 13 doctoral students who started their projects in the fall of 2018 have already successfully completed the HEIBRiDS program, received their doctorate, and begun a career in academia or industry – four of them in 2023. A further 13 outstanding PhD candidates began their work at the start of 2020. In the latest round of applications, seven prospective doctoral students were selected and have been working on their PhD projects since the fall of 2022.

Privat

ENVIRONMENTALLY FRIENDLY WEED CONTROL THROUGH MACHINE LEARNING: EKIN CELIKKAN DEVELOPS APPLICATIONS FOR AGRICULTURE

Ekin Celikkan has been working as a PhD student at HEIBRiDS since 2022 in the project "Bayesian Machine Learning with Uncertainty Quantification for Detecting Weeds in Crop Lands from Low Altitude Remote Sensing." Her supervisors are Nadja Klein, who has been a professor for Uncertainty Quantification and Statistical Learning at TU Dortmund University since April 2023 (and previously a professor at HU Berlin) and Prof. Dr. Martin Herold, Head of Remote Sensing and Geoinformatics at the German Research Center for Geosciences in Potsdam (GFZ).

Ekin, I'm delighted to welcome you to the ECDF for the interview. You've been a doctoral student at HEIBRiDS since 2022 and are working on weed detection and machine learning. What exactly is your project about?
In agriculture, weeds are among the biggest competitors of crops. They are one of the main causes of yield losses. Farmers are therefore always looking for ways to combat weeds. The standard approach here is to spray herbicides uniformly over the entire field. As you can imagine, this isn't very effective and causes many problems. The aim of my project is to develop algorithms to use low-altitude remote sensing data – based on drone imagery – to identify and localize weeds. To implement these algorithms, we use Bayesian machine learning for computer vision.

Is this the first time machine learning has been applied in this area?
There's two ways of looking at that. In general, from the perspective of remote sensing data research, this is not new. But in the specific context of drones and weed control, I would say that this is more or less the first time. And if you're thinking about whether this is actually applied in practice, i.e. the extent to which farmers are already using these approaches, it has to be said that they're not yet particularly mature and therefore not yet very widespread. This is precisely why we are working on algorithms and systems that can be used in the real world. In agricultural practice, their application would be a real novelty.

What still needs to be done for them to be applied in practice?
We already have models that work well and enable the effective segmentation and identification of weeds. However, a few additional criteria must be met for them to be fully applicable. For example, they must be reliable and "explainable." This is also the reason why I'm working with Bayesian learning methods. These kinds of models not only allow you to generate a calibrated forecast, they also tell you how certain or uncertain it is. They're therefore particularly suitable for use in the real world, taking risk factors into account. There are also other restrictions, such as those imposed by the hardware. And you also have to clarify where the model is to be used and what type of automated system it is to be integrated into. It also needs to be tested. All of this takes time, including communicating with the farmers.

And what are the intended practical uses for your research findings?
Farmers can use a drone, just like we do, to take pictures of their fields. Our algorithm then processes the drone images for them and creates a map of where the weeds actually are and what species they are.

Where do you get the test data you are currently working with?
We are currently working with a number of test locations in Brandenburg, particularly around the Potsdam area. The fact that this is so close to Berlin gives us flexibility and we can carry out a relatively large number of test campaigns. We concentrate mainly on crops that are very common and widespread in Germany – cereals like barley and maize. In addition to the data that we obtain with our own drones and sensors from test fields, we also use open source datasets that other groups or individuals have collected, created, and made publicly available. This is especially useful in algorithmic research.

Who do you work with on the tests in the field?
The fields we use are specifically intended for use in scientific contexts, but these are managed by local farmers and agricultural experts. So we have direct access to people who have the required expertise and know the common practices. We benefit from their expertise and experience in cultivating the land.

What did you find particularly interesting about this project when you applied for it?
I found the positive effects on the environment and biodiversity particularly exciting. The common approaches to weed control, where herbicides are sprayed evenly everywhere, have a very negative impact on the environment. They contaminate the soil, can pollute the groundwater, and the weeds can develop resistance to herbicides. This is detrimental to biodiversity and also very costly. The project aims to make improvements in all these areas. What appealed to me was the fact that we can actually solve real problems with the algorithms we develop and the methods we use.

What is your academic background and how are you using it in your PhD project?
I have a bachelor's degree in Electrical and Electronic Engineering and a master's degree from a program called Electrical Engineering Information Technology and Computer Engineering. The project I'm working on in my PhD mainly comes under computer science, I would say. Overall, I have a lot of experience in programming, linear algebra, probability, and statistics. The main areas of application for my doctoral project are remote sensing and geosciences. I use my academic background to implement methods and develop algorithms in these areas. Conversely, I'm learning a lot from the geosciences and environmental sciences and about remote sensing in general.

ECDF/PR/Sandra Pravica

HEIBRIDS RETREAT, 27-28 MARCH 2023, SCHLOSS DIEDERSDORF

What is the disciplinary background of the other people in your team?

I'm working with people from a wide variety of fields, such as geology, remote sensing, environmental science, climate science, mathematics, statistics, and computer science. In my previous degrees and internships, I mostly worked with engineers or computer scientists. This interdisciplinarity is new for me, and it's a very enriching experience. Of course, everyone is an expert in their own area. But they're also super open and willing to learn, so everyone is able to take in new information from the different fields. I feel that we really complement each other in this group work, and that our skill sets build on one another.

What do you see as the main advantage of HEIBRiDS for you as a doctoral student?

A really big advantage is that it is a structured program, so there is a roadmap for what needs to be done. I think a clear plan helps you enormously in making progress with your PhD thesis. The regular meetings at the bi-weekly PhD seminar are also very helpful. They are always a chance for everyone to reflect on what they have done recently and what their next steps will be. This gives you an idea of where you currently stand with your work. I also find it exciting that as HEIBRiDS doctoral students we are working in so many different areas of application. So, we're always learning something about research and progress in completely different areas. We're at the cutting edge, and it's very interesting to see how machine learning is being used in different areas.

Do you already have plans for what you'll do after your PhD?

I don't know what form it will take, but I can say that I'd like to continue my research in the field of computer vision.

LIST OF HEIBRIDS PHD PROJECTS

Name of Doctoral Candidate	Working Title of Doctorate	Supervisors	Cohort
Ekin Celikkan	Bayesian Machine Learning with Uncertainty Quantification for Detecting Weeds in Crop Lands from Low Altitude Remote Sensing	Martin Herold (GFZ) and Nadja Klein (HU)	2022
Daniel Collin	Predicting Geomagnetic Conditions on the Earth from Multi-Spectral Images of the Sun by Combining Data Science and Physical Models	Yuri Shprits (GFZ) und Guillermo Gallego (ECDF, TUB)	2022
Veronika Döpper	Tracing 3-D High Latitude Environmental Change with Billions of Remotely Sensed Points	Ulrike Herzschuh (AWI), Guido Grosse (AWI), and Birgit Kleinschmit (TUB)	2022
Viktoriia Huryn	Multi-Resolution Models for Single-Cell Genomics Data	Uwe Ohler (MDC) and Markus Schülke-Gerstenfeld (Charité)	2022
Daniel León Periñán	Towards Molecular Digital Pathology: Leveraging Spatial Transcriptomics and Deep Learning to Predict Gene Expression from Tissue Morphology in Solid Tumors	Nikolaus Rajewsky (MDC), Klaus-Robert Müller (ECDF, TUB) and Frederick Klauschen (Charité)	2022
Abhay Mehta	Context Awareness in Real-Time Image Classification for Ground-Based Gamma-Ray Telescopes	David Berge (DESY) and Matthias Weidlich (ECDF, HU)	2022
Jonas Schaible	Data-Driven Performance Optimization of Colored and Textured Solar Modules	Christiane Becker (HZB), Christof Schütte (FU), and Sven Burger (ZIB)	2022
Thorren Gimm	Data-Driven Time-Dependent Multiphysics Simulation and Optimization of Electron Solvation from Nanodiamonds	Joachim Dzubiella (HZB) and Frank Noé (ECDF, FU)	2020
Brian Groenke	A Data-Centric Workflow for Autonomous Monitoring of Arctic Land Surface Parameters	Julia Boike (AWI) and Guillermo Gallego (ECDF, TUB)	2020

Name of Doctoral Candidate	Working Title of Doctorate	Supervisors	Cohort
Oleksii Martynchuk	Identification of Rock Falls in Mars Reconnaissance Orbiter Images Using Machine Learning	Jürgen Oberst (DLR) and Odej Kao (ECDF, TUB)	2020
Lusine Nazaretyan	Identification of Disease-Causing Genetic Variants by Genome-Wide Predictions of Human Variant Effects	Martin Kircher (Charité) and Dieter Beule (MDC)	2020
Elizabeth Robertson	Building a Photonic Processor for Energy-Efficient AI	Janik Wolters (DLR) and Guillermo Gallego (ECDF, TUB)	2020
Hermann Julius Stolte	Dynamic Scheduling of Gamma-Ray Source Observations	Matthias Weidlich (ECDF, HU) and Elisa Pueschel (DESY)	2020
Kevin Styp-Rekowski	Multi-Satellite Approach of Monitoring Atmosphere/Magnetosphere Space Weather Interactions	Odej Kao (ECDF, TUB) and Claudia Stolle (GFZ)	2020
Christian Utama	Explainable Artificial Intelligence and Trust in the Energy Sector	Christian Meske (ECDF, FU) and Rutger Schlatmann (HZB)	2020
Nadja Veigel	Data Mining Dynamic Human Behaviors for Flood Risk Assessment in Coupled Human Environment Systems	Andrea Cominola (ECDF, TUB) and Heidi Kreibich (GFZ)	2020
Xiaoyan Yu	Deep Learning with Sparse Annotations for the Analysis of Lung Tissue Microscopy Images	Dagmar Kainmüller (MDC) and Andreas Hocke (Charité)	2020

/ EVENTS

/ HACKATHONS / WORKSHOPS / CONFERENCES / SEMINARS / KICK-OFF / SUMMER SCHOOLS / PRESENTATIONS / PROTOTYPING / DESIGN THINKING / BOOK LAUNCHES / RECEPTIONS / SCIENCE MATCHES / PAIRING RESEARCH TALKS / INDUSTRY FORUM / SHORT TALKS / GET TOGETHER / FILM SHOOTS / LECTURES / MEETING POINT

ECDF/PR/berlin-eventfotograf.de

EVENTS

A key focus of the first quarter of 2023 was preparing for the ceremony to mark the extension of the Digitalization Research Centre at Futurium on 20 March. 2023 also saw a large number of events, some of which were organized by the ECDF itself and some by network partners or in collaboration with them. Our researchers were also once again in high demand as guest speakers, panelists, and representatives of the ECDF at external events. In addition to taking part in long-standing events such as the Long Night of the Sciences and Berlin Science Week, the ECDF also held a wide range of conferences, workshops, webinars, and panel discussions. Below we present a list of events and provide more detailed reports of a selection of events in 2023.

OVERVIEW EVENTS 2023 (SELECTION)

11.01.2023
BOOK LAUNCH: THE DIFFICULT SEARCH FOR HOW TO ORGANIZE INDIVIDUALITY IN BUSINESS AND POLITICS

Book launch
ECDF
Prof. Dr. Philipp Staab

18.01.2023
HEIBRIDS LECTURE SERIES: PROF. INGMAR POSNER (OXFORD UNIVERSITY) – LEARNING TO PERCEIVE AND TO ACT – DISENTANGLING TALES FROM (STRUCTURED) LATENT SPACE

Lecture
ECDF
Prof. Dr. Guillermo Gallego

24.01.2023
WORKSHOP DESIGNING DIGITAL ECOSYSTEMS

Workshop
ECDF
Prof. Dr. Philipp Staab

01.02.2023
HEIBRIDS LECTURE SERIES: PROF. HANNA ZIMMERMANN, DR. AMIR MOTAMEDI – INTERDISCIPLINARY RETINA RESEARCH: PUTTING DEEP LEARNING INTO PRACTICE

Lecture
ECDF
Prof. Dr. Hanna Zimmermann
Prof. Dr. Guillermo Gallego

08.02.2023
UBER, TAXIS, AND URBAN MOBILITY INFRASTRUCTURES: EXPLORING PATHWAYS TOWARDS PLATFORM FUTURES

Workshop
ECDF
Prof. Dr. Philipp Staab

14.02.2023
GENDER GAP IN SCIENCE

Webinar
Online
Prof. Dr. Helena Mihaljević

15.02.2023
HEIBRIDS LECTURE SERIES: DR. LUIS GÓMEZ NAVAS (HUB/SCIENCE OF INTELLIGENCE) – LEARNING OF INTELLIGENT SWARM BEHAVIOR

Lecture
ECDF
Prof. Dr. Guillermo Gallego

16.–17.02.2023
WORKSHOP: DIGITAL APPLICATIONS FOR BIPOLAR DISORDERS

Workshop
ECDF
Prof. Dr. Daniel Fürstenau

22.02.2023
LAUNCH: SMART WATER PROJECT

Launch
ECDF
Jochen Rabe

23.02.2023
HEARING: JUSTICE AND RESPONSIBILITY IN THE FACE OF CLIMATE CHANGE

Livestream / Hearing
Online
Prof. Dr. Philipp Staab

23.02.2023
PANEL DISCUSSION: CRYPTO, BLOCKCHAIN & FUTURE FINANCE – MONEY AND FINANCE IN THE DIGITAL TRANSFORMATION

Livestream
ECDF und Livestream
Prof. Dr. Florian Tschorsch
Prof.in Dr. Gesche Joost

20.03.2023
CEREMONY: THE ECDF ENTERS ITS SECOND FUNDING PHASE

Ceremony
Futurium
Multiple attendees

18.04.2023
BOOK LAUNCH: "DO YOU WANT TO LIVE FOREVER? THE CURSE OF IMMORTALITY AND THE BLESSING OF BIOTECHNOLOGY"

Book Launch
ECDF
Prof. Dr. Gesche Joost

19.04.2023
HEIBRIDS LECTURE SERIES: TATIANA TOMMASI (POLITECNICO DI TORINO) – TOWARDS TRUSTWORTHY COMPUTER VISION MODELS

Lecture
ECDF and online (hybrid)
Prof. Dr. Guillermo Gallego

03.05.2023
HEIBRIDS LECTURE SERIES: PROF. DR. DAVID BERMBACH (TUB) – SIMRA: SAFETY IN BICYCLE TRAFFIC

Lecture
ECDF
Prof. Dr. David Bermbach
Prof. Dr. Guillermo Gallego

15.05.–15.06.2023
EXHIBITION AT THE ECDF: "BERLIN – CAPITAL OF FEMALE SCIENTISTS"

Exhibition
ECDF
Prof.in Dr. Gesche Joost
Prof.in Dr. Juliane Siegeris

17.05.2023
HEIBRIDS LECTURE SERIES: PROF. DR. SANGYOUNG PARK (TUB) – DEALING WITH DATA FROM CONNECTED CARS: HOW DO WE ENSURE DATA INTEGRITY AND TRAFFIC SAFETY?

Lecture
ECDF
Prof. Dr. Sanyoung Park
Prof. Dr. Guillermo Gallego

31.05.2023
HEIBRIDS LECTURE SERIES: PROF. DR. JULIA BOIKE (AWI) – LONG TERM PERMAFROST OBSERVATIONS AND THE RAPIDLY CHANGING ARCTIC

Lecture
ECDF
Prof. Dr. Guillermo Gallego

31.05.2023
INVISIBLE LABOR AND DISCRIMINATION – GENDER, DIVERSITY, AND CHATGPT

Panel discussion
ECDF
Prof. Dr. Helena Mihaljević
Prof. Dr. Gesche Joost

12.06.2023
NETWORK MEETING: AG EDUCATION/D21

Network meeting
ECDF

17.06.2023
THE LONG NIGHT OF THE SCIENCES 2023

Exhibition
ECDF
Multiple ECDF professors

22.06.2023
LIVE PODCAST: GENDER DIVERSITY IN COMPUTER SCIENCE

Live Podcast
Berlin Cultural Center
ECDF Gender & Diversity Network

28.06.2023
HEIBRIDS LECTURE SERIES: BENJAMIN BACH (UNIVERSITY OF EDINBURGH) – SHOW ME THE DATA: FROM DATA TO INSIGHTS AND STORIES WITH VISUALIZATIONS

Lecture
ECDF and online (hybrid)
Prof. Dr. Guillermo Gallego

03.07.2023
THE DIGITALIZATION OF HEALTHCARE FOR OLDER PEOPLE

Workshop
ECDF
Prof. Dr. Philipp Staab

04.–05.07.2023
FRAUNHOFER FUTURE FORUM 2023: THE FUTURE OF VALUE CREATION

Conference
Fraunhofer Heilbronn
Prof. Dr. Dr. Ayad Al-Ani

10.07.2023
ECDF GENERAL MEETING

ECDF
All ECDF members

12.07.2023
HEIBRIDS LECTURE SERIES: PROF. DR. ALEX GLASER (PRINCETON UNIVERSITY), VY NGUYEN (BHT) – CITIZEN-BASED MONITORING FOR PEACE & SECURITY IN THE ERA OF SYNTHETIC MEDIA AND DEEPFAKES

Lecture
ECDF
Prof. Dr. Alex Glaser
Prof. Dr. Guillermo Gallego

24.08.2023
OPEN TALK AT CORNELSEN SUMMER UNI: COOPERATION IN THE CLASSROOM

Panel discussion
ECDF

11.09.–15.09.2023
BIFOLD WEIZENBAUM SUMMER SCHOOL

Summer School
EUREF Campus TU Berlin
Prof. Dr. Andrea Cominola

13.09.–13.11.2023
ROUND TABLES – FAIRTECHR

Round Table
Online and in-person (hybrid)
Prof. Dr. Helena Mihaljević

14.09.2023
PATIENT MONITORING ROUND TABLE

Round Table
ECDF
Prof. Dr. Dr. Felix Balzer

21.09.2023
DATA BREAKFAST: POTENTIAL OF PRIVACY ENHANCING TECHNOLOGIES

Workshop
ECDF
Prof. Dr. Max von Grafenstein

21.–22.09.2023
FAKE PROVENANCES IN LITERATURE AND LITERARY STUDIES

Conference
Hybrid/DLA Marbach
Prof.in Dr. Meike Hopp

26.–27.09.2023
NETWORK MEETING ON ARTIFICIAL INTELLIGENCE IN THE CARE SECTOR

Network Meeting
Urania Berlin
Rahel Gubser

26.09.2023
OPEN-ACCESS-TAGE 2023

Conference
IBI (HU Berlin)
Prof. Dr. Heinz Pampel

27.–29.09.2023
12TH IFIP/IEEE INTERNATIONAL CONFERENCE ON PERFORMANCE EVALUATION AND MODELING IN WIRED AND WIRELESS NETWORKS (PEMWN)

Conference
ECDF
Prof. Dr. Emmanuel Baccelli, Falko Dressler, Jochen Schiller

06.10.2023
DIVERSITY IN WIKIPEDIA ARTICLES ON LIBRARY AND INFORMATION SCIENCE

Edit-a-thon
ECDF
Prof. Dr. Heinz Pampel

11.–12.10.2023
4TH INRIA – DFKI WORKSHOP

Workshop
ECDF
Prof. Dr. Emmanuel Baccelli
Prof. Dr. Andrea Cominola

12.10.2023
AUTOMATED DETECTION OF ONLINE HATE SPEECH

Workshop
Online (Zoom)
Prof.in Dr. Helena Mihaljević

13.10.2023

EXHIBITION OPENING: UNBLACKBOXING. ARTISTIC INVESTIGATIONS INTO DIGITAL REALMS OF EXPLOITATION AND CONTROL

Vernissage
ECDF
Prof. Dr. Gesche Joost

18.10.2023

HOW SEXUALIZED DEEPFAKES UNDERMINE OUR DEMOCRACY

Parliamentary evening
ECDF

18.10.2023

HEIBRIDS LECTURE SERIES: PROF. DR. FATMA DENIZ (TUB) – NATURAL LANGUAGE REPRESENTATIONS IN THE HUMAN BRAIN: A COMPUTATIONAL APPROACH

Lecture
ECDF
Prof. Dr. Guillermo Gallego

25.–26.10.2023

CLEAN-IT CONFERENCE 2023

Conference
Hasso Plattner Institute
Prof. Dr. Felix Biessmann

01.–10.11.2023

ECDF@BERLIN SCIENCE WEEK 2023

Various formats
ECDF
Multiple attendees incl. Prof.in Dr. Helena Mihaljević
Prof.in Dr. Gesche Joost
Prof. Dr. Andrea Cominola

01.11.2023

HEIBRIDS LECTURE SERIES: XIAOXIANG ZHU (TU MUNICH) – EARTH OBSERVATION DATA SCIENCE

Lecture
ECDF and online (hybrid)
Prof. Dr. Guillermo Gallego

08.11.2023

DISCUSSION AND PERFORMANCE: DARING TO EXPLORE QUANTUM CREATIVITY

Symposium
ECDF
Prof. Dr. Gesche Joost

08.11.2023

CLOSING THE LOOP – CIRCULAR WATER ECONOMY

Online conference
Prof. Dr. Andrea Caminola

15.11.2023

HEIBRIDS LECTURE SERIES: PROF. DR. FELIX BIESSMANN (BHT) ARTIFICIAL INTELLIGENCE – OPPORTUNITIES AND RISKS FOR APPLICATIONS IN SUSTAINABILITY AND HEALTHCARE

Lecture
Prof. Dr. Felix Biessmann,
Prof. Dr. Guillermo Gallego

30.11.2023

MONITORING OF RESEARCH DATA PUBLICATIONS

Workshop
Online (Zoom)
Prof. Dr. Heinz Pampel

13.12.2023

HEIBRIDS LECTURE SERIES/ HIDA LECTURE: PROF. DR. NATHAN KUTZ (UNIVERSITY OF WASHINGTON) – THE FUTURE OF GOVERNING EQUATIONS

Lecture
ECDF
Prof. Dr. Guillermo Gallego

BOOK LAUNCH

The Difficult Search for How to Organize Individuality in Business and Politics

11 January 2023
ECDF

Since the industrial revolution, individuals have worked and studied in hierarchies based on the division of labor. But there is now some evidence to suggest that individuals may not fully return to traditional institutions based on the division of labor. Are communities emerging online that could influence companies or even nations? Is the digital sphere becoming a lifeboat that is helping to transfer new ideas and concepts into the mainstream? Prof. Dr. Dr. Ayad Al-Ani proposed possible answers to these questions in the third edition of his book "Resistance in Organizations – Organizations in Resistance – Revisited. Platforms, edupunks, and the Free Crowd." The book launch took place at the ECDF on 11 January 2023 and was followed by a discussion involving Prof. Dr. Dr. Ayad Al-Ani (Stellenbosch University), Prof. Dr. Philipp Staab (Humboldt-Universität zu Berlin), Prof. Dr. Anastasia Danilov (Humboldt-Universität zu Berlin) and Tina Groll (ZEIT Online).

WORKSHOP

Designing Digital Ecosystems

24 January 2023
ECDF

Low-emission circular economy ecosystems are the key to a sustainable economy within planetary boundaries. In order to enable successful and self-organized ecosystems, certain design mechanisms must be in place. In her groundbreaking work on sustainable ecosystems, Elinor Ostrom identified eight design principles for systems in order to ensure successful cooperation where resources are scarce. But adapting these principles for digital ecosystems is a complex task. What processes and components need to be made data-secure? How do we foster trusting relationships online? What standards do we need to enable efficient resource allocation with the Digital Product Passport – an important new tool for combining all information in the life cycle of a product? On 24 January 2023, ECDF Professor Dr. Philipp Staab and the SINE Foundation hosted a workshop on Designing Digital Ecosystems for doctoral students and postdocs. The aim of the interactive workshop was to identify the mechanisms that were most needed in sustainable business ecosystems and then to map them in digital interaction frameworks and define how they can be implemented in software and software-based services.

WORKSHOP

Exploring Pathways Towards Platform Futures

8 February 2023
ECDF

Over the past decade, urban mobility infrastructures around the world have been transformed. The rise of ride-hailing services has played a key role in this. This process of composition and recomposition has created socio-material infrastructures and called into question work relationships and conditions, for example through the formalization of informal work. With this event, ECDF Professor Dr. Philipp Staab and colleagues wanted to take stock of the impacts of these developments in different regions of the world.

They asked a number of questions relating to mobility, work, and the urban sphere: How are mobility platforms embedded in the city's socio-material infrastructure? What remains the same and what has changed? What practices of solidarity among workers have developed? And, based on these observations, what can we say from about the possibility of future platforms? In the workshop, they discussed these questions focusing on a number of cities: Buenos Aires, Mumbai, Toronto, and Berlin. By drawing parallels between developments in each of these cities and in conversation with representatives of the local taxi sectors, the aim was to stimulate a productive exchange about the current status and the future of urban mobility.

LIVESTREAM AND PUBLIC HEARING

Justice and Responsibility in the Face of Climate Change

13 February 2023
Online

The impacts of climate change and how to mitigate them raise ethical questions, which the German Ethics Council has recently begun to address. In February 2023, the German Ethics Council held a public hearing on "Justice and Responsibility in the Face of Climate Change," which included a statement by ECDF Professor Dr. Philipp Staab. He was joined by other experts who spoke on the various aspects of climate change and covered a wide range of issues relating to the topic. For example, they explored questions around people's responsibility to take climate action and their responsibilities towards other people and nature. They also discussed how climate change affects existing global injustices and how the burden of combating it can be distributed fairly (e.g. burden sharing according to historical cumulative greenhouse gas emissions or current contribution to population growth).

WORKSHOP

Digital Applications for Bipolar Disorders

16–17 February 2023
ECDF

On 16 and 17 February 2023, a workshop took place at the ECDF with the title "Exploration of Needs, Goals, and Past Use of Digital Applications by People Affected by Bipolar Disorder: A Cross-Sectional Mixed-Methods Study (Digi-Bipo)." The main objective of the project was to investigate the unmet care needs, the current use of digital health technologies, and the digital health literacy of people with bipolar disorder. An online survey was also used to help achieve this objective. The aim is to use the data collected to develop a digital health app for people with bipolar disorder. People with bipolar disorder are involved as co-researchers not only in the data collection, but also in the creation and evaluation of the survey (participatory research). This should enable a deeper understanding of the individual perspectives of people with bipolar disorder through the project's implementation and therefore to improve knowledge about the health needs and digital health literacy of this patient group as a whole. The workshop was organized and initiated by ECDF Professor Dr. Daniel Fürstenau.

LAUNCH

Smart Water Projekt

22 February 2023
ECDF

Smart Water is about managing water resources and urban green spaces in a climate-friendly way. Integrating blue-green infrastructure and other planning considerations can significantly mitigate the effects of the climate crisis and bring additional improvements to urban spaces. Smart Water aims to use agile rainwater management planning to enable climate-smart urban planning that reduces water pollution, heat islands, and flooding hotspots. The project was launched at an event at the ECDF on 22 February 2023. The Smart Water Project is run by the Berlin Centre of Competence for Water (KWB), whose former managing director was ECDF Associate Member Jochen Rabe. Smart Water is funded through Berlin's smart city strategy. The strategy offers a platform for bringing together stakeholders from across Berlin's civil society, providing the tools needed, and planning good delivery processes. The aim is to create a smart Berlin. This will be achieved when digitalization and technology generate social benefits and strengthen local democratic structures. With this in mind, the goal is to implement digital and smart transformation in Berlin in way that serves the public interest, and also to bring about a cultural change in the administration. New forms of collaboration will be created in order to address overarching challenges and solutions.

EXHIBITION

"Berlin – Capital of Female Scientists"

30 May 2023
ECDF

Following appearances at the Social Science Research Center Berlin and HTW Berlin – University of Applied Sciences, the exhibition "Berlin – Capital of Female Scientists" was on display in the foyer of the ECDF from 15 May to 15 June. Across 20 panels, the exhibition showcased exceptional female scientists who have shaped and continue to shape Berlin as a city and a center for science and research. The women are pioneers in their field and trailblazers for future generations of female scientists. They include Prof. Dr. Gesche Joost, ECDF Spokesperson and design researcher at Berlin University of the Arts, and ECDF Associate Member Juliane Siegeris, expert in information systems management and professor of software engineering at HTW Berlin – University of Applied Sciences. The portraits also include Agnes Zahn-Harnack, who was the first female student in the city to be officially matriculated in 1908, and Marlis Dürkop-Leptihn, who was elected the first female president of Humboldt-Universität zu Berlin in 1992, following 118 male predecessors. The idea for the exhibition came from experts at the Berlin Institute of Health at Charité (BIH) and the then Governing Mayor of Berlin, Michael Müller, as part of Wissensstadt Berlin 2021 ("Knowledge City").

WORKSHOP

Automated Detection of Online Hate Speech

12 October 2023
Online

On 12 October 2023, the sixth in a series of seven workshops took place as part of the research project "Decoding Antisemitism: An AI-driven Study on Hate Speech and Imagery Online" of the Center for Research on Antisemitism in Berlin. The workshop explored the opportunities and limits of artificial intelligence in the qualitative research of online hate speech. The main focus was on the potential for programming language-based AI models (such as RoBERTa) based on the findings from detailed qualitative analysis. This makes it possible to achieve a level of representativeness for studies of online discourse that was previously not possible. ECDF Professor of Data Science Helena Mihaljević held a workshop on the "Automated Detection of Online Hate Speech" together with Julia Mendelsohn (University of Michigan School of Information, USA), which addressed questions including: What do the latest research findings tell us about the current possibilities and limitations of iterative exchanges between human coders and AI models? What are the current models and their capabilities, weaknesses, and lessons for future approaches?

ECDF/PR/berlin-eventfotograf.de

PANEL DISCUSSION: CRYPTO, BLOCKCHAIN & FUTURE FINANCE – MONEY AND FINANCE IN THE DIGITAL TRANSFORMATION

23 February 2023
ECDF

The digital transformation is revolutionizing the world of finance and business, with innovative currency systems and financing solutions becoming increasingly popular. On 23 February 2023, experts at the ECDF discussed the latest technical developments in Web3, crypto, and blockchain, as well as their impact on the future of finance. Panelists included Michael Clijdesdale, Chief Information Officer at ING DiBa, Matthias Jugel, Chief Technology Officer at UBIRCH GmbH, and Florian Tschorsch, ECDF Professor for Distributed Security Infrastructures at TU Berlin. The event was chaired by ECDF Spokesperson Gesche Joost, Professor for Design Research at Berlin University of the Arts.

Cryptocurrencies such as Bitcoin, Ethereum, and Ripple have become increasingly popular in recent years, especially among younger investors. The guest experts said it was difficult to determine when it had become clear that this was what the future of the financial and economic world would look like. Florian Tschorsch described how it was hard to gather information at the beginning of his research because there were so many different publications, from specialist literature to blogs and newspaper articles. In 2016, he used the information he had gathered to write his own academic paper, "Bitcoin and beyond," in which he summarized the developments of recent years. A few years later, he worked on cryptocurrencies as part of his professorship, so this first paper was a special moment for him. He sees cryptocurrencies and their growing popularity today as a form of protest against the banking crisis of 2007 and 2008. "The inventors saw a problem and presented a solution to what they viewed as a contemporary system that wasn't working. Whether cryptocurrencies are actually the solution remains to be seen," said the ECDF professor.

For banks, cryptocurrencies therefore initially posed more of a threat, as one aim of cryptocurrencies is to abolish traditional banks and replace them with a new financial model. "In the beginning, all the banks were talking about why cryptocurrencies had any value at all. Many people couldn't imagine that this was what the future would look like, as the crypto market was completely unregulated. Where would all the trust come from? How would it replace the banking system?" Michael Clijdesdale recalled. Today, banks such as ING DiBa are more likely to see the potential for the financial sector and are only just getting started. In addition to trust and regulation, Matthias Jugel from the start-up UBIRCH also believed that the user experience was a decisive factor in making digital currencies and digital identities suitable for mass use, because the systems were currently still very technical. For him, the aim was for users to approach them like their smartphones: "You don't have to understand the system to be able to use it," explained the CTO. Private bank customers are still very conservative, but the situation within the banking sector is somewhat different. Regulated systems, which are monitored in Germany by BaFin (the

“The inventors saw a problem and presented a solution to what they viewed as a contemporary system that wasn’t working. Whether cryptocurrencies are actually the solution remains to be seen,” Florian Tschorsch, ECDF-Professor for Distributed Security Infrastructures

German Federal Financial Supervisory Authority) and the Bundesbank, make it easier to move money directly on the international market and so this is already happening.

Security aspects of digital money systems and new business models were as much as a topic of discussion as the differences in user behavior for the younger generation. For young crypto investors, functionality must be smooth and direct; for many of the younger generation, mostly male investors, trading is part of everyday life. With the climate crisis, sustainability also plays an important role. While the first and probably best-known cryptocurrency consumes an estimated 100 to 130 terawatt hours per year, the cryptocurrency Ethereum has reduced its annual consumption to 0.0026 terawatt hours by switching to the proof-of-stake (POS) algorithm – a remarkable improvement. However, the main goal of cryptocurrencies is decentralization with an open system and distributed trust. Whether proof-of-stake can also achieve this is still unclear. “Many blockchains that start with proof-of-stake have a problem because users have a certain number of stakes, i.e. a certain number of coins, and then have a weighted vote,” explained Florian Tschorsch. This is not as easy to implement with POS as it is with the proof-of-work algorithm, which also consumes significantly more energy. “Saying goodbye to proof-of-work and finding a good, low-energy alternative is still the Holy Grail,” explained the ECDF professor.

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BOOK LAUNCH: DO YOU WANT TO LIVE FOREVER? THE CURSE OF IMMORTALITY AND THE BLESSING OF BIOTECHNOLOGY

18 April 2023
ECDF

How long do we want to live for? And is living longer thanks to biotechnology a curse or a blessing? This is the question Thomas Ramge, science journalist and Associate Researcher at the ECDF, explores in his German-language book Do You Want to Live Forever? The Curse of Immortality and the Blessing of Biotechnology.

Thomas Ramge researches and writes about the interactions between technology, business, and society. On 18 April 2023, he presented his book at the ECDF and took part in a discussion with ECDF Spokesperson Gesche Joost and guests about the rapid advances in longevity medicine and what they could mean for individuals, society, and the planet. Will they lead to enduring happiness or eternal boredom? Will those who live longer act in more forward-thinking ways or should we expect gerontocracy and overpopulation? All participants were invited to take part in the discussion. Thomas Ramge began by proposing three possible scenarios to the audience: He calls the first scenario the “same as today but better” option; in this scenario, you take a white pill that allows you to live healthily for 100 years and then die peacefully. In the second option, you swallow a yellow pill, which grants a healthy life for 200 to 400 years followed by a peaceful death. The third and final option, the “Greenland shark scenario,” involves a green pill which gives you eternal life for 1000 years or more, but with the option of an early exit. The guests chose their preferred option and then discussed their choice as a group – ultimately, they did not reach a consensus regarding the “best” option.

In his latest book, Thomas Ramge outlines the consequences of medical progress. Thanks to drastically improved medical research, life expectancy is increasing worldwide, doubling in recent years. One of the main reasons for this is that the causes of early mortality, particularly in childhood, have decreased. Nowadays, most people die from age-related diseases. In the book, Thomas Ramge describes aging as a “mode of attack against mortality” and a radical fight against death. But what medical approaches seem promising? Current treatments include, for example, the transfusion of younger blood into an older individual and the removal of zombie cells. Stem cell and gene therapy also promise a longer life. But despite medical progress, there is still the question of costs: Who can pay for it? Is eternal life only for the rich? And who has access to this information? Only those who have paid for the research? And what does eternal life expectancy mean for the individual? The answers to these questions vary considerably from person to person, and there is no “right” answer.

Eternal life is not only associated with positive outcomes. Just because the body does not age, this does not mean that the mind also stays young. This could lead to psychological problems. In addition to the personal consequences, it is also unclear what

“The likelihood is that we’ll live in a world of child poverty and fierce battles over resources – a world that is more burdened by the curse,” Thomas Ramge, Science journalist and Associated Researcher at the ECDF

“eternal life” would mean for society, the environment and our planet. The possible consequences include overpopulation, a two-tier healthcare system, and unreliable pensions. For Thomas Ramge, everything that is subject to medical testing and approval over the next few years could be a blessing and a curse: “The likelihood is that we’ll live in a world of child poverty and fierce battles over resources – a world that is more burdened by the curse,” said the non-fiction author. For many European researchers, the hope lies in Teflon effects: significant investments in longevity research are leading to new findings that make the first scenario more likely and will enable individuals to live to be almost 100 in good health.

THE LONG NIGHT OF THE SCIENCES 2023

17 June 2023
ECDF

At the Long Night of the Sciences 2023 at the ECDF, visitors were once again taken on a journey through a variety of interdisciplinary projects dealing with current challenges and innovative solutions in digital transformation. The ECDF was one of around 60 scientific and research organizations that opened their doors to 300,000 visitors on 17 June 2023.

From late afternoon until midnight, guests had the opportunity to learn about twelve projects and try some things out for themselves. From improving personal safety in road transport to designing climate-neutral cities, the event highlighted various aspects of digitalization and its impact on our daily lives.

ECDF Professor Rita Streblow and her team presented the Personal Comfort Model project. The project uses data from fitness apps and smart wearables to develop models and predictions for how comfortable a person feels in their thermal environment. Visitors were invited to actively participate in developing the model using their own fitness watch data and thus contribute to improving future smart building systems.The serious game ConnectiCity by ECDF professor Andrea Cominola looks at the optimization of water infrastructure in growing cities. Players made their own planning decisions – for example creating rain gardens and green roofs. This helped them develop a better understanding of the complex challenges of urban water management. The aim of the game is to prevent flooding.

The Quantum Escape Challenge was very popular once again. In this escape room, participants have to solve various puzzles involving quantum computers. As in previous years, the exhibit was fully booked within a few minutes. The field of digital health was represented by ECDF Professor Tabea Flügge and the Intraoral Scan project. The project is looking at digital methods for planning surgical procedures to the face. Tabea Flügge explained to visitors how 3D scans of the oral cavity can be used in computer-aided surgical planning and to produce implants using 3D printing.

In addition to presenting our own research projects, the Long Night of the Sciences is also a welcome opportunity to collaborate with our partner institutions. The Future Security Lab took part once again, providing an engaging insight into the future of security research. Visitors got to experience interactive simulations up close using virtual reality glasses and find out about innovative approaches to tackling challenges such as climate change. The Climate Change Center Berlin Brandenburg looked at how artificial intelligence can help to make life in the region more climate-neutral.

The Long Night of the Sciences has been held every year since 2001 (with the exception of 2020 and 2021). This year, visitors had more than 260 events to choose from, including experiments, talks, science shows, and guided tours.

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VERNISSAGE

Exhibition Opening: Unblackboxing. Artistic Investigations into Digital Realms of Exploitation and Control

13 October 2023
ECDF

For the first time, the ECDF invited artistic projects which addressed the conditions underlying digital societies and offered a space for critical reflection through aesthetic interventions. The exhibition was officially opened at the ECDF on 13 October 2023 at 17:00.

Digital infrastructures, devices, and practices are so deeply embedded in our daily lives that it is becoming increasingly difficult to step back and understand their impact on the world we live in. Artistic practice can help here thanks to its ability to break down norms and customs by revealing the underlying power structures and imbalances. We all understand that digital technologies are able to connect the world and provide us with a wealth of information. But the level of complexity of exploitation and control that has developed alongside these technologies is difficult for most people who interact with them to grasp. This exhibition brought together artistic projects that examine these "black boxes" of digital society. Based on extensive research into the operating principles of opaque applications, devices, and infrastructures, the projects make tangible the social and environmental impact of digital technologies on the world we live (or want to live in). The participating artists and activists are Kim Albrecht, Sarah Grant, Adam Harvey, Joana Moll, Julian Oliver, Juan Pablo García Sossa, Danja Vasiliev, and Hana Yoo. The exhibition was curated by Daniel Irrgang (University of Copenhagen) and organized in collaboration with Friedrich Schmidgall and Prof. Dr. Gesche Joost (ECDF). Alongside the opening event, the publication project "Weak Signals," by Lukas Freireiss and Florian Hadler, was also presented. In keeping with the exhibition themes, the book examines the how art, science, and technology intersect and generate paradigm shifts. The exhibition ran until the end of March 2024.

PARLIAMENTARY EVENING

How Sexualized Deepfakes Undermine Our Democracy

18 October 2023
ECDF

The face of a female politician, journalist, or scientist involuntarily pasted onto someone else's naked body – it has become a genuine danger. Fake and real images are now almost indistinguishable. "Deepfakes" are used almost exclusively to create image-based sexualized violence, i.e. non-consensual sexualized images. The majority of those affected are women. The aim of these deepfakes is to humiliate and silence those affected. This has consequences for society as a whole – and is undermining our democracy. Criminal law is currently unsystematic and insufficient to tackle this problem. On 18 October 2023, HateAid, the German Women Lawyers Association (djb) and the Federal Association of Rape Crisis Centres and Women's Counselling Centres (bff) jointly organized a parliamentary evening on "How sexualized deepfakes are undermining our democracy – and everyone is looking away." In cooperation with the Human Rights Film Festival Berlin, the twenty-minute short film My Blonde GF was also shown. This was followed by a panel discussion on the loopholes in legal protection, dangers of deepfakes for democracy, and policy recommendations. The experts on the panel were Prof. Dr. Alexander Godulla (University of Leipzig), PD Dr. Anja Schmidt (German Women Lawyers Association), Dr. Laura Braam (Media Authority NRW) and Josephine Ballon (HateAid).

LECTURE SERIES

HEIBRiDS Lecture Series

February 2023 – November 2023
ECDF

In collaboration with the Helmholtz Association, the ECDF has set up a graduate program in data science, which enables the three Berlin universities, Charité and six Helmholtz centers in the greater Berlin area to work together in various scientific fields.

Founded in 2018, the Helmholtz Einstein International Berlin Research School in Data Science (HEIBRiDS) is an interdisciplinary program that trains young scholars at the intersection of data science and other academic disciplines. The goal is to train a generation of researchers who are exceptional data scientists and understand the demands and challenges of disciplines of which data science is an integral part.

In 2023, the HEIBRiDS Graduate School's "Applying Data Science" lecture series took place again at the ECDF. Every two weeks, data science experts from research and academia and industry presented their work.

ROUND TABLES

FairTecHR

13 September – 13 November 2023
Online and in person (hybrid)

The FairTecHR project addressed the need to develop auditing processes for high-risk systems in human resources selection. The researchers presented a concept for the contextualized, participatory auditing of fairness in technology-supported HR selection, which takes into account the needs of various interest groups in producing and using fair HR products. The project aimed to enable cross-company analyses based on data from different organizations and their applicants in collaboration with third parties such as researchers or advocacy organizations. At the heart of this was a data trust that enables independent, fiduciary management of data and protects the privacy of individuals.

Via a series of group discussions and a workshop looking at future practice, the aim was to share knowledge, address the various issues in turn while focusing on specific aspects, and develop the ideas for practical application. These topics includes the interpretation of the terms fairness and diversity in selection processes, understanding and operationalizing fairness in the context of technologies, and legal and organizational frameworks for data-based fairness analyses. Another aim of the project was to raise awareness of the potential risks and challenges associated with the use of HR technologies (including those based on AI) and to promote a critical and reflective approach to their development and use.

The findings from the joint project were disseminated to all round table participants. The aim was to pass on interdisciplinary knowledge at the intersection of AI and other technologies, fairness, data protection, and HR selection to practitioners, with a view to helping them develop relevant skills and prepare for future developments.

A number of industry partners participated in the project: public enterprises such as BVG and HOWOGE, which are increasingly using technological solutions; IT development companies such as Milch & Zucker and Ines Analytics, which produce HR software with a focus on diversity or fairness; and non-profit organizations such as BQN Berlin e. V. and FrauenComputerZentrumBerlin.

SYMPOSIUM

Discussion and Performance: Daring to Explore Quantum Creativity

8 November 2023
ECDF

Innovation in the arts: on 8 November, Berlin University of the Arts, Roman Lipski Studio, and the Goethe-Institut Ireland hosted an evening of talks and performances in the ECDF on the potential of quantum creativity, as part of Berlin Science Week. Prof. Dr. Oliver Benson (Professor for Experimental Physics, HU Berlin) opened the evening with an introduction to quantum mechanics. The visual artist Roman Lipski presented his innovative work on "Quantum Blur," a technique for manipulating images using quantum operations, before taking part in an interdisciplinary discussion with Prof. Dr. Tim Schröder (Head of the Integrated Quantum Photonics Group, HU Berlin). Berlin-based choreographer, dancer, and visual artist Hannah Schillinger performed part of her solo piece screen play, which brings together quantum theory with performance art and presents new perspectives and principles of quantum physics. Studio Quantum artist Amy Karle (USA) also attended and provided valuable insights into the development of her multidisciplinary research and practice. Her work is about how art can help us understand quantum technologies. Concluding, Prof. Dr. Gesche Joost (ECDF Spokesperson, Head of the UdK Design Research Lab, and Vice President of the Goethe-Institut) spoke about the potential of quantum technologies and interdisciplinary creativity.

ONLINE-WORKSHOP

Monitoring of Research Data Publications

30 November 2023
Online

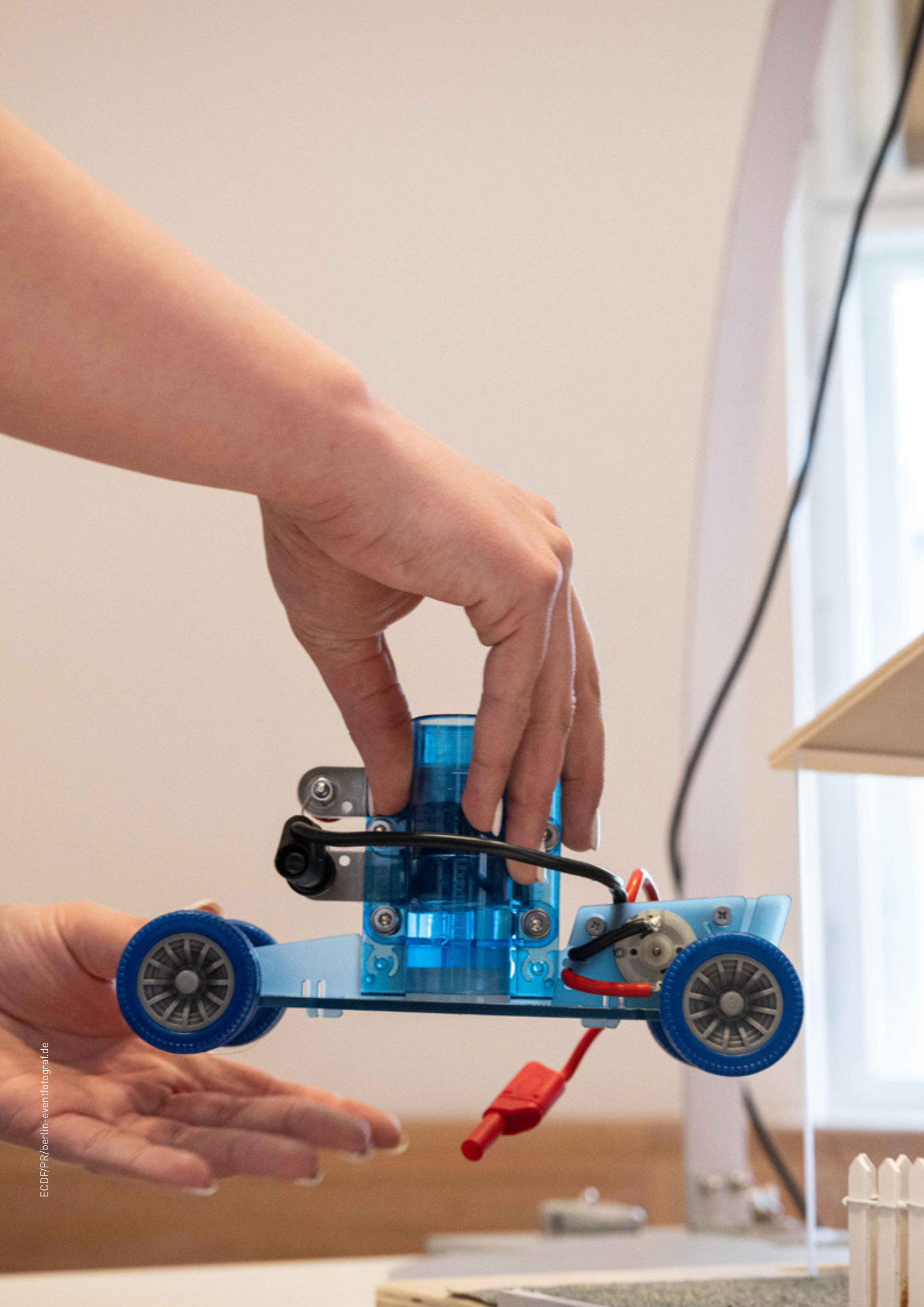
On 30 November 2023, an online workshop on the monitoring of research data publications was held on Zoom. The workshop was led by ECDF Professor Dr. Heinz Pampel and was aimed at professionals working in research data management, publication management, and research information at science and research institutions, libraries, data centers, and in public administration. The workshop focused on various topics, such as current challenges in the monitoring of research data publications and the identification of obstacles. Successful solutions for monitoring research data publications in the context of scientific information management were presented and discussed on the basis of best practices and experiences. The participants examined tried-and-tested methods for identification, standardization, and citation. The workshop provided an opportunity to exchange ideas and develop further activities and ways forward in this area.

WORKSHOP

Hackathon on Digital Energy

From February 2023
ECDF

With digitalization, every sector of the energy system can be developed using information technology. The aim is to integrate energy sectors and make the supply more efficient and climate-friendly. After an introduction to digital urban infrastructures and the availability of data in urban contexts, students worked with data from the Mierendorff-INSEL in Berlin as part of a hackathon at the ECDF in February 2023. Among other things, a web app was created to analyze the use of wastewater heat on Mierendorff-Insel. External lecturers were invited to discuss specific aspects in greater depth. During the project, students were encouraged to develop their own solutions to a case study of an urban energy supply problem. They were given guidance in implementing data-driven solutions based on open source applications. The students learned about methods and tools to support them in implementing their solutions. Assessment included a short project report and a presentation.



/ SCIENCE COMMUNICATION

/ KNOWLEDGE TRANSFER / EXHIBITIONS / TOURS / WEBSITE / SOCIAL MEDIA / TRANSPARENCY / NEWSLETTER / MEDIA INFORMATION / #DIGITALFUTURE

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SCIENCE COMMUNICATION

The digital transformation affects science and research, business, policy making, and civil society. Insights from digitalization research can inform decision-making and help meet the challenges of the digital future. In this work, the ECDF would like to involve people from different backgrounds in the conversation. Science communication therefore comes with a particular responsibility. Since its launch, the ECDF has developed various channels and formats to provide insights into its activities and promote intensive exchange with different stakeholders.

//ONLINE COMMUNICATION

As a center of digitalization research, online communication plays a significant role in the ECDF's science communication portfolio. In this work, we use various channels to reach our different target groups. All information about projects, events, publications, and other activities that are aimed at partners and the public are published on our website www.digital-future.berlin and also shared on Twitter (@ECDigitalFuture) and LinkedIn (@EinsteinCenterDigitalFuture). The ECDF's hashtag for online posts will continue to be #digitalfuture for the second funding phase. We also occasionally use the hashtag #ECDFNG. In addition, we produce a regular newsletter, and use internal mailing lists and the instant messaging service Slack.

//WEBSITE

Since its relaunch in 2019, the website www.digital-future.berlin has become an important communication tool for the ECDF. In order to appeal to an international audience, content is published in both German and English. The website provides information about the ECDF, its professors, strategic partnerships, collaborations, research projects, and much more. It provides an easy way for partners and interested members of the public to get in touch. On the homepage under "News", we provide information on research projects, new professorships, awards, and initiatives. Users can also find information about upcoming events. To ensure transparency, the website contains official ECDF documents such as statutes, rules, guidelines, statements, and annual reports. The recent X posts from @ECDigitalFuture are automatically embedded on the homepage. Events and press releases since the founding of the ECDF are presented in an archive.

//TWITTER/X

On our Twitter/X channel, we present scientific and academic content from our researchers and announce our own events. We also give updates on events involving our professors, such as conferences. In addition, we post about upcoming media appearances of our professors on television, podcasts, newspapers, magazines, and radio. And we use Twitter/X to share the activities of our partners and other digitalization initiatives. We currently have 2,857 followers. Thanks to close collaboration with the press offices of the Berlin universities, Charité – Universitätsmedizin Berlin, and our partners, we can also publish our articles on their X channels as well as on other social media platforms such as Facebook and Instagram. Sharing and liking each other's posts contributes to the reach of the ECDF.

//LINKEDIN

LinkedIn has proven to be extremely successful for the ECDF. Since 2021, we have been sharing longer content on the platform in order to reach an additional target group: industry partners, experts, and professionals. LinkedIn offers us the opportunity to maintain existing business networks and build new connections with a wide global reach, especially in European regions. We post about events that are relevant to our partners, such as the ECDF Industry Forum and the German-language "One Room – Four Perspectives" format. In 2023, we also advertised a number of vacancies on LinkedIn. The job advertisements received a particularly high number of hits. We now have almost 2,000 subscribers on the platform.

//SLACK

Slack, the web-based instant messaging service, has proven useful since its introduction during the COVID-19 pandemic. The collaborative software enables our members to communicate quickly and directly via open and closed channels, including channels for professors, the Micro Factory and the Management Office. Slack facilitates direct communication between professors and the Management Office and serves as a platform for sharing calls for applications, project information, job vacancies, cooperation requests, and the latest news.

//NEWSLETTER

With over 1,000 subscribers, our newsletter is an important communication channel for the ECDF network. It gives readers information about the current activities of the professors, initiatives, job vacancies, and upcoming events. It is sent out regularly, which strengthens relationships with interested parties from different fields and provides a direct means of communication. The newsletter also offers incentives to find out more on our website, and the mailing list mainly contains people who have actively signed up to receive the newsletter.

//PRESS RELEASES, IDW

The ECDF uses press releases to keep interested journalists abreast of current developments in digitalization research and relevant events. The press offices

of the participating universities, the Einstein Foundation Berlin, and our partners are responsible for coordinating content and publication. The Informationsdienst Wissenschaft e. V. (idw – scientific information service) has also proved useful, as it pools press releases and event information from around 1,000 science and research institutions and makes them accessible to journalists.

//MEDIA MONITORING

Monitoring publications on digital transformation and media coverage of the ECDF is an important tool in our press work and public relations. Cision monitors online, print, radio, and TV publications and helps with the internal evaluation of the quality of our press work. It also enables us to identify suitable media representatives for future press engagements and events and pools content that we distribute via the various communication channels.

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CELEBRATION ON THE EXTENSION OF THE ECDF

We marked the end of first funding phase of the ECDF in March 2023 with a ceremony at the Futurium. And the event also offered a glimpse into the digital future of the second funding phase. Science communication played a part in the ceremony. We designed our own exhibition for the event, focusing on presenting the research topics of our ECDF scientists. The exhibition was opened as part of a joint press tour with Berlin journalists. Experience Digitalization Research presents groundbreaking technologies and visionary ideas from the world of digitalization research at the ECDF and its partners. Visitors had an opportunity to explore interactive exhibits and gain a deeper insight into the ECDF's three main research priorities. The exhibition then moved to the ECDF so that national and international delegations and other visitors could explore ECDF research in an interactive way.

As part of the ceremony, we also launched a social media series in which ECDF professors briefly outline their research at the ECDF based on a question relating to everyday issues. The tiles were shared on Twitter/X and LinkedIn to show how ECDF research is relevant to daily life.


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/ ROBERT KOCH FORUM

/ HOUSE OF DIGITALIZATION / FUTURE SECURITY LAB / MICRO FACTORY / DEMO AREA / EVENT SPACES

ECDF/PR/Felix Noak

ROBERT KOCH FORUM
An interdisciplinary research and meeting place

//DEMO AREA

The Demo Area was established at the ECDF to make the latest technology trends and research approaches accessible to visitors. Prototypes and research findings from various ECDF members (research institutes, industrial partners involved in joint projects, start-ups) are presented at this constantly changing location. The diversity of the exhibits is a testament to the interdisciplinary approach of the ECDF. The Demo Area serves as an exhibition space that continuously raises new questions about various aspects of society, community, culture, health, and new forms of knowledge generation in the digital future. It regularly attracts student groups, delegations, and international visitors. It is also regularly visited by guests at ECDF events. The current exhibits include:

SIMRA – CYCLE SAFETY – A citizen science project by Prof. Dr. David Bermbach that collects and analyzes cycling data to identify locations where cyclists are often at risk. The data collected via an app is visualized in the Demo Area. Visitors can view the initial results on an animated 3D city model.

BBBLOCKCHAIN – An online participation platform based on blockchain technology. The project by Prof. Dr. Florian Tschorsch and Prof. Jochen Rabe is researching a new option for digital citizen participation in urban development.

CONDUCTOR SUIT AND ELECTRONIC TEXTILES PROTOTYPES – Using interactive prototypes, ECDF professors Berit Greinke, Emmanuel Baccelli, and Felix Biessmann are exploring the possibilities of electronic textiles and textile sensors. The prototypes were made using traditional textile production methods such as sewing, weaving, and knitting as well as conductive fabrics and threads. They allow the wearer to control electronic music through body movements and gestures.

WOELAB LOMÉ – The concept of a bottom-up smart city is presented on an animated 3D map, which was created in collaboration with Berlin University of the Arts' Critical Maker Lab. It shows the WoeLab campus in Lomé, Togo, where Sénamé Koffi Agbodjinou is developing and trialling concepts for sustainability and cooperation. Sénamé Koffi Agbodjinou is the founder of WoeLabs, a network of Togolese tech hubs that aim to promote equality and equal opportunities in the digital transformation.

ECDF/PR/Friedrich Schmidgall

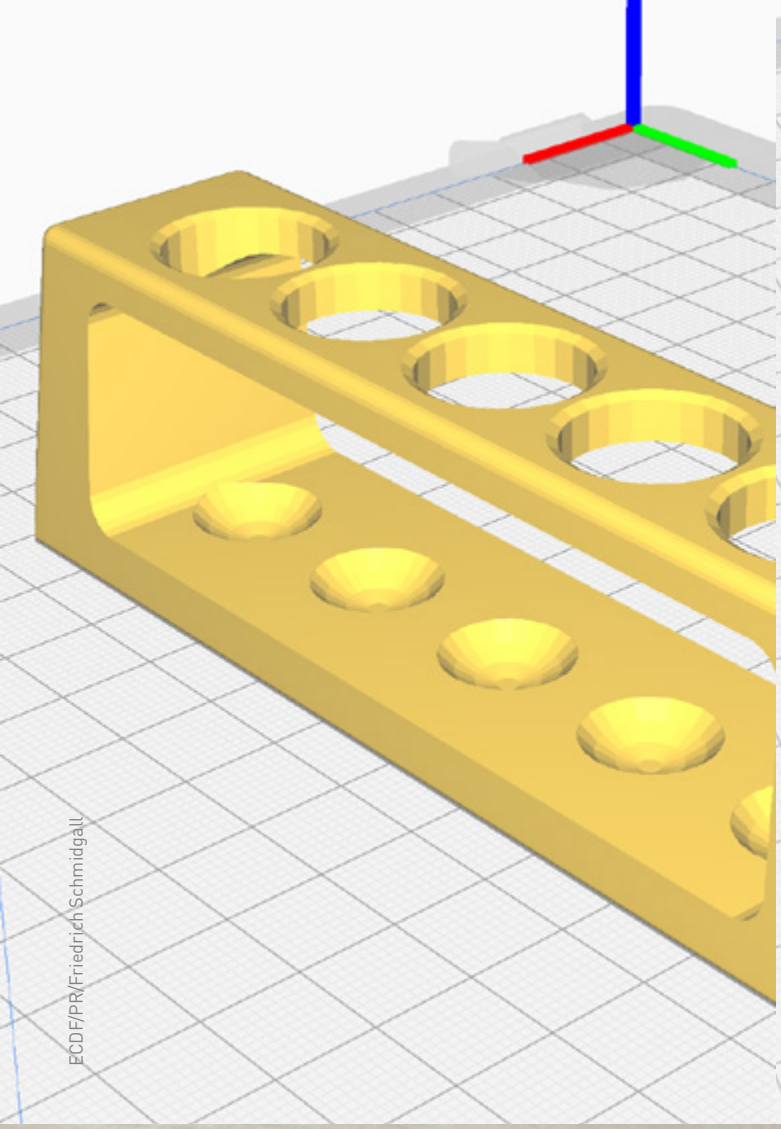
MICRO FACTORY

The Micro Factory is the ECDF's makerspace. ECDF researchers receive support in developing models and prototypes as well as designing interactive exhibition objects. Equipped with CNC machines such as a laser cutter, 3D printer, and a CNC milling machine, the Micro Factory enables the rapid and iterative development of ideas and solutions using rapid prototyping methods.

The Micro Factory is headed by industrial designer Friedrich Schmidgall, who supports and advises scientists and students, from the initial idea to design and implementation. During the lecture period, the Micro Factory offers workshops on "3D Modeling," "3D Printing," "Laser Cutting," "An Introduction to Electronics," and "Arduino Microcontrollers." The target group comprises ECDF professors, research assistants, doctoral candidates, and students, and they can pop by the Micro Factory to visit or receive advice at any time. It can be used as a creative space for seminars or other events such as the Long Night of the Sciences or the ECDF Kids Day and, alongside the Demo Area, is a highlight for visitor groups to the ECDF.

Since the Micro Factory opened in the summer semester of 2018, around 20 workshops have been held – of varying levels of formality – each with 3 to 12 participants. When the ECDF premises were closed due to the coronavirus pandemic, a more limited program of workshops continued to be offered online, including "Basics of the Arduino Microcontroller," which was organized in collaboration with ECDF professor Andrea Cominola. Participants were sent the necessary workshop materials by post.

In 2023, the Micro Factory was expanded to include the capability of milling and etching PCB boards. In an initial workshop, the first PCBs were produced together with students from Berlin University of the Arts. The collaboration with Berlin University of the Arts' Berlin Open Lab (BOL) continues to play an important role for the Micro Factory. New models and prototypes have been produced by BOL students in the Micro Factory.



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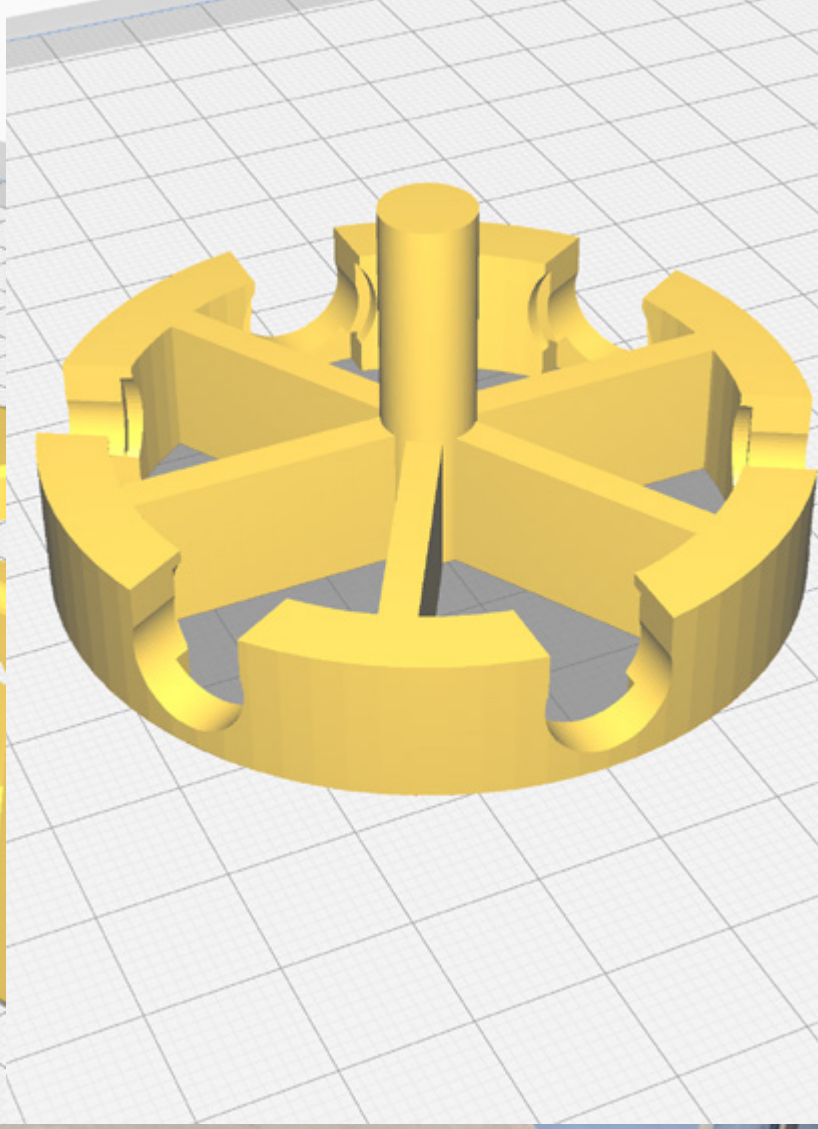
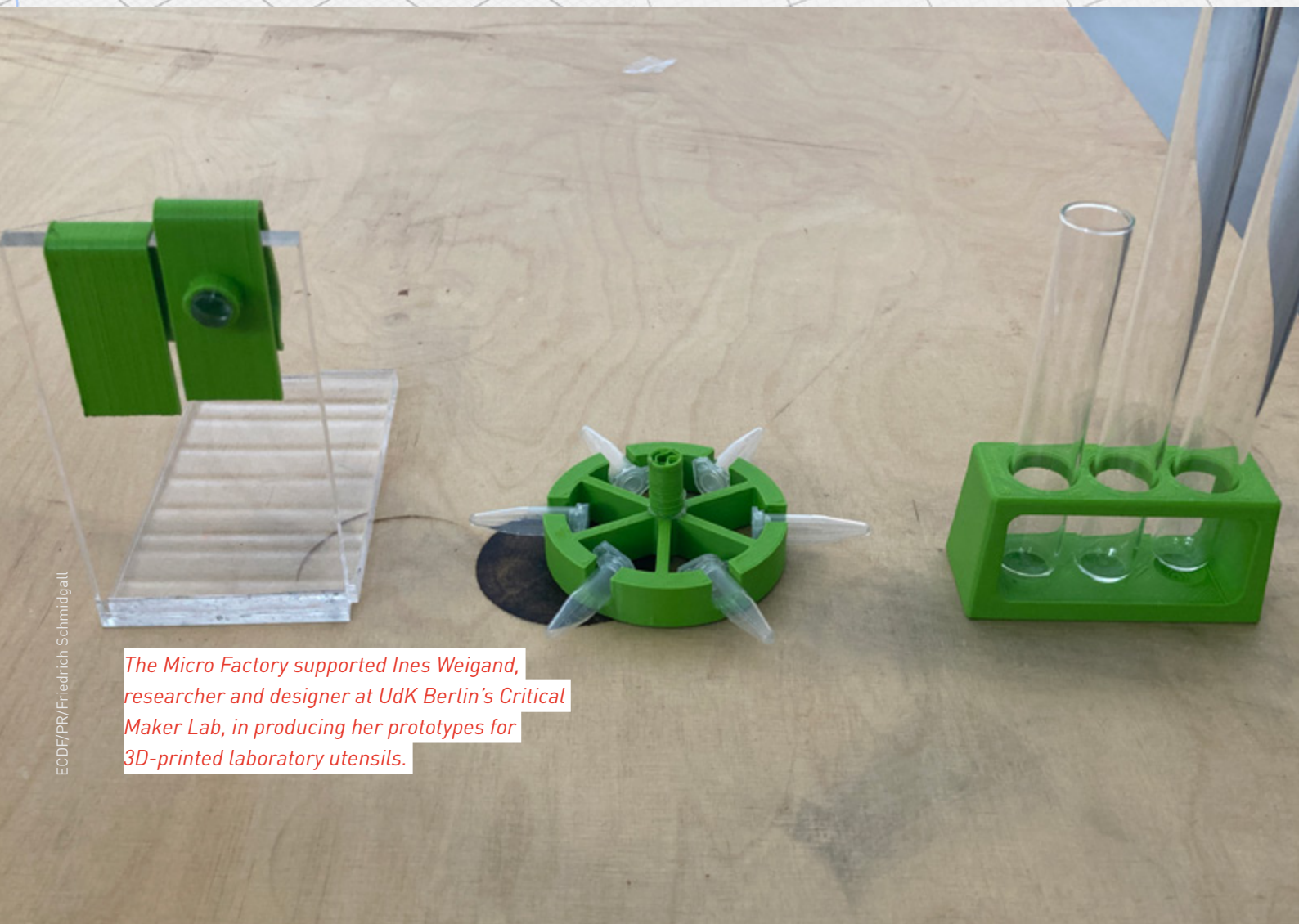




ECDF/PR/Friedrich Schmidgall

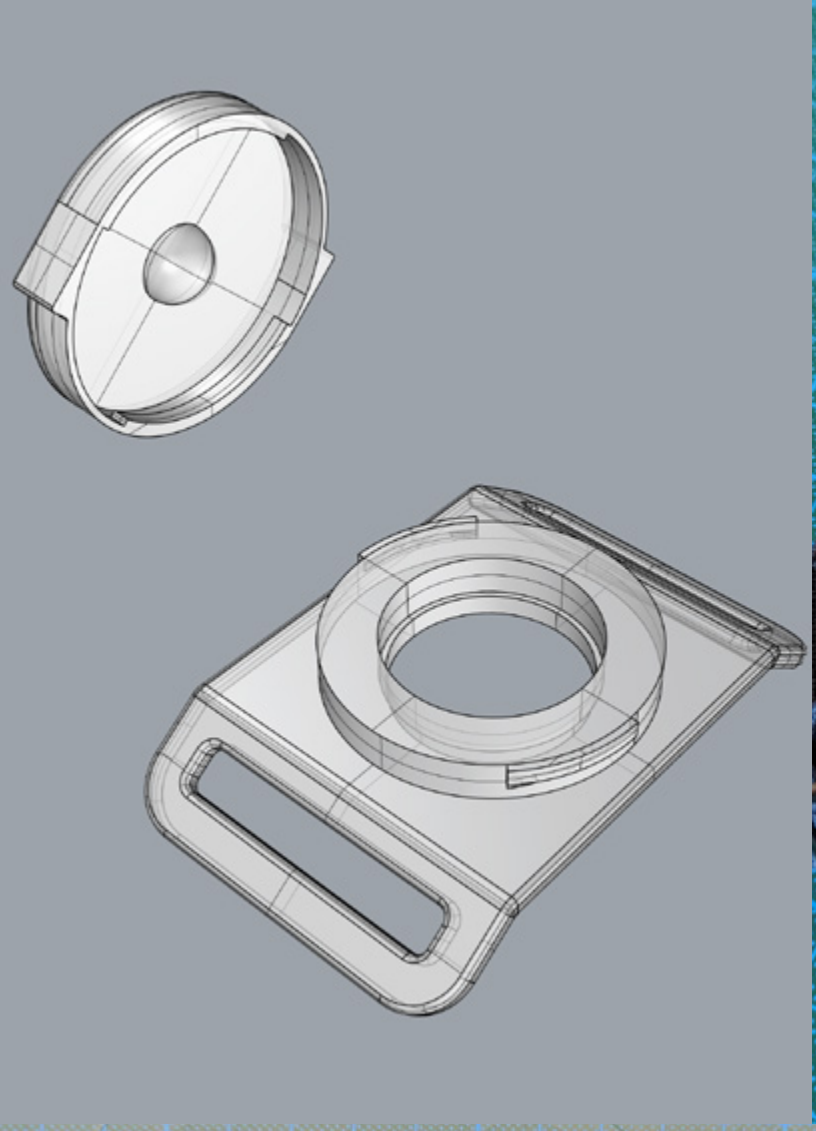
The Micro Factory supported Ines Weigand, researcher and designer at UdK Berlin's Critical Maker Lab, in producing her prototypes for 3D-printed laboratory utensils.

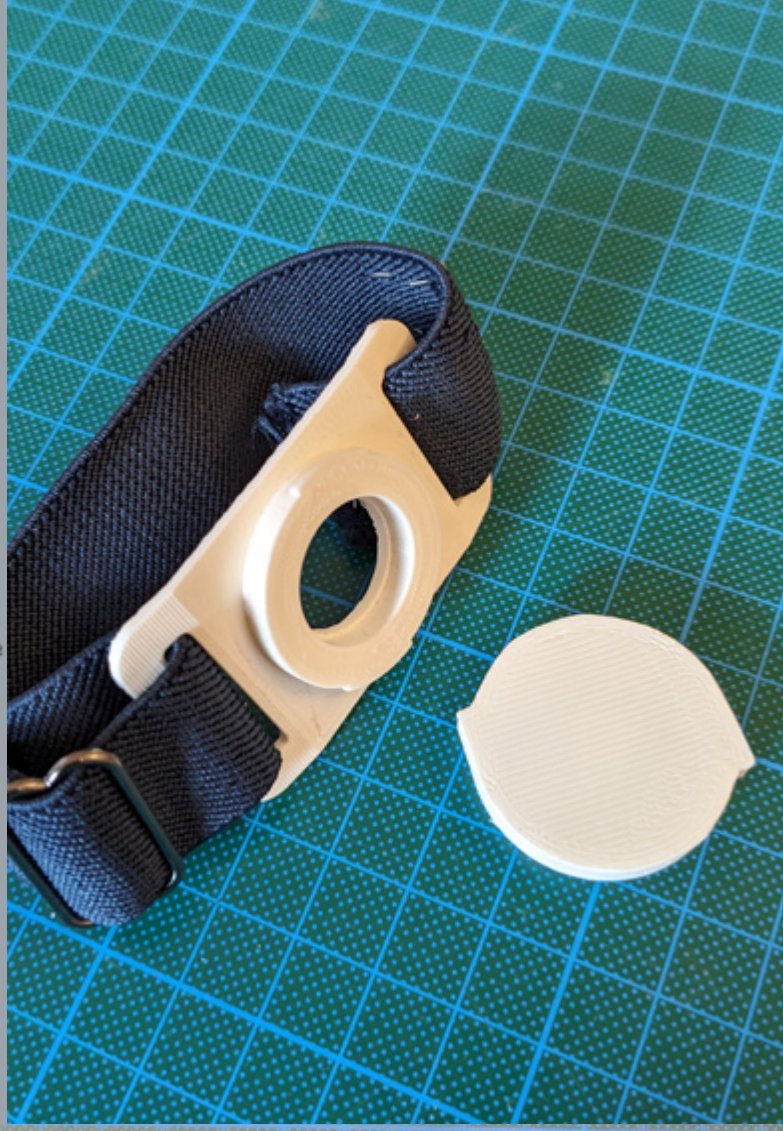
ECDF Professor Florian Conradi, Sénamé Koffi Agbodjinou, and Athena Grandis developed the WoeLab Lomé exhibit for the ECDF Demo Area in cooperation with the 3D Lab at TU Berlin, the Micro Factory, and the Critical Maker Lab at UdK Berlin. It shows the WoeLab campus in Lomé, Togo, where Sénamé Koffi Agbodjinou is developing a bottom-up smart city.

ECDF/PR/Friedrich Schmidgall

In collaboration with ECDF professor Rita Streblow and her doctoral student Felix Rehmann, an exhibition object was developed in the Micro Factory as part of the "Building the Energy Transition" project. The aim was to visualize the use of building sensors and other building data. With this in mind, a 3D model of part of the Robert Koch Forum was printed, which served as a projection surface for visualizations of the building data onto the roofs of the model. In this way, a dynamic data layer is metaphorically added to the static building.

ECDF/PR/Friedrich Schmidgall





The "Personal Comfort Model" project is also led by ECDF Professor Rita Streblow. Her staff member Julianah Odeyemi developed a sensor holder in the form of a fitness watch for an experiment that investigates the correlation between indoor climate and perceived levels of personal comfort. The Micro Factory supported Julianah Odeyemi in iteratively developing the sensor holder and producing it in small series using the 3D printer.

ECDF/PR/Friedrich Schmidgall

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FUTURE SECURITY LAB

Transfer of innovations and findings from civil security research.

The Future Security Lab at the ECDF is an integral part of the activities of the Research Forum on Public Safety and Security. The starting point for these activities is civil security research. Special attention is paid to public safety precautions, and thus to a number of empirical fields including emergency food supply, extreme weather events, resilience, and security research itself.

The Research Forum offers a platform for in-depth discussion and exchange on topics in this area, in particular with representatives from policymaking, science and research, public administration, and security organizations. The interdisciplinary and transdisciplinary research results will be used to develop recommendations for action for these target groups, identify future research topics, and synthesize knowledge.

As a space for exchange, the Future Security Lab, located on the first floor of the ECDF, plays a central role in these efforts. It serves as a space for experimentation and communication, where visitors can gain insights into civil security research through narrative scenarios and interactive approaches (supported by augmented and virtual reality, among other things). In this way, abstract concepts are made more tangible, and visitors can understand their practical application. Scenarios such as evacuating the population in the event of flooding, guiding firefighters through smoke-filled spaces, and coordinating volunteers in crisis situations are brought to life. A visit to the Future Security Lab is often the starting point for events with politicians and researchers, panel discussions, and workshops. These immersive experiences can therefore be complemented by dialogue and discussion.

And these conversations can make the practical aspects and challenges of civil security tangible.

Activities for 2023 included organizing the 43rd Future Forum on Public Security at the ECDF on "Civil Defense: Research and Population – Communication and Resilience," which brought together over 60 participants from policymaking, research, public administration, and security organizations. Another focus of past activities was consultations with politicians, including a visit to the Future Security Lab by Parliamentary State Secretary Mario Brandenburg and the Bochum city administration, as well as an in-depth dialogue with parliamentary members of the Research Forum on Public Safety and Security. In June 2023, the Future Security Lab once again took part in the ECDF's Long Night of the Sciences. In 2023, the general public once again had the opportunity to learn about the latest developments in public security research. In addition, a key focus throughout 2023 was on the conceptual development of the Future Security Lab and the Research Forum on Public Safety and Security. This is now being progressed as part of the newly launched BMBF-funded BeLIFE project.

Prof. Dr. Lars Gerhold and Prof. Dr.-Ing. Jochen Schiller, both Associate Researchers of the ECDF, are responsible for the scientific direction of the Research Forum on Public Safety and Security. In addition, Lars Gerhold holds the Chair of the Psychology of Socio-Technical Systems at the TU Braunschweig and is project leader of the BeLIFE research network, while Jochen Schiller is head of the Computer Systems & Telematics working group at FU Berlin.

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ESCAPE ROOM: QUANTUM ESCAPE CHALLENGE

The research project "Escape Challenge Quantum Technologies (EsCQuTe)" takes a hands-on approach to quantum physics. The Escape Room at the ECDF has been run by ECDF Professor Janik Wolters, Robert Richter, Benjamin Maaß, and other colleagues since the beginning of 2022 and is very popular. In the Escape Room, visitors are immersed in a world in which second-generation quantum technologies are used. As in typical escape rooms, visitors solve puzzles in an attempt to "escape" the room. No specialist knowledge of physics is required.

"The rules of quantum theory are very well described mathematically, but they often remain a mystery to laypeople. We want to change that with our escape room," said Wolters. And the attraction was very well received once again in its second year. It is now a permanent fixture at the Robert Koch Forum. The Escape Room was open to Berlin's general public for the Long Night of the Sciences in June 2023, and the time slots were fully booked within a few hours. The duration of the game was adjusted and additional instructions provided so that as many visitors as possible could take part. This significant interest has prompted the scientists to plan the introduction of a booking system in the course of 2024 in order to be able to offer regular slots. In the future, there will be new puzzles on quantum memories based on the latest research findings by ECDF Professor Janik Wolters, as well as training sessions for teachers and students.

The Quantum Escape Challenge is part of the "EsCQuTe" project funded by the BMBF. Since the grant approval, the team of researchers has been working on the storyline and experiments. The project is led by Dr. Robert Richter from the Chair of Work, Technology, and Participation at TU Berlin.

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/ COMMITTEES AND GOVERNANCE

/ EXECUTIVE BOARD / SCIENTIFIC ADVISORY BOARD / MANAGEMENT OFFICE / PUBLIC-PRIVATE PARTNERSHIP

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BOARD OF DIRECTORS

The Board of Directors of the ECDF is responsible for the strategic development and scientific direction of the research areas, for the coordination and support of collaborative activities, for the allocation of resources within the ECDF, and for the scientific research program, including decisions on changes to the overarching research agenda that involve the introduction or removal of research topics. In addition, the Board decides on the admission of new Associate Researchers and visiting scholars. It reviews and makes decisions regarding the addition of new professorships and funders in order to ensure that additional research directions are consistent with the overall vision of the ECDF. The members prepare the ECDF's statements on various topics including open access, digitalization in education, and guidelines on equal opportunities.

With the start of the second funding phase of the ECDF in April 2023, a new Board of Directors was also elected. The new Board was officially inaugurated on 19 June 2023. The Board consists of eleven members and is composed of:

// The Spokesperson
// Five members of the Board of Directors, who each hold a professorship at one of the participating institutions (TU Berlin, FU Berlin, HU Berlin, UdK Berlin, Charité)
// One member of the Board representing the Associate Researchers
// One member of the Board representing the research assistants/postdocs
// One member of the Board, who is delegated by the State Conference of Women's Representatives of the Berlin Universities and University Hospitals of the State of Berlin (LaKoF)
// The Managing Director, who attends all meetings in an advisory capacity.

Working with the international Scientific Advisory Board (SAB), board members implement the governance and quality assurance strategy and define KPIs and milestones in order to continuously review and manage the center's vision and mission.

The members of the Board of Directors are:

// **Spokesperson:**
Prof. Dr. Gesche Joost

// **Representatives of the ECDF professors**
Prof. Dr. Andrea Cominola
Prof. Dr. Michelle Christensen
Prof. Dr. Tabea Flügge
Prof. Dr. Philipp Staab
Prof. Dr. Timm Teubner

// **Representative of LaKoF:**
Dr. Christine Kurmeyer

// **Representative of the doctoral candidates and postdocs**
Laura Rothfritz

Until 31 March 2023, the following representatives were on the ECDF Board of Directors:

// **Spokesperson**:
Prof. Dr. Odej Kao

// **Digital Infrastructure, Methods, and Algorithms:**
Prof. Dr. David Bermbach

// **Digital Industries and Services:**
Prof. Dr. Anastasia Danilov

// **Digital Health:**
Prof. Dr. Tabea Flügge

// **Digital Infrastructure, Methods, and Algorithms:**
Prof. Johann-Christoph Freytag, PhD

// **Digital Humanities and Society:**
Prof. Dr. Gesche Joost

// **Representative of LaKoF:**
Dr. Christine Kurmeyer

// **Digital Health:**
Prof. Dr. Axel Radlach Pries

// **Industry and Services:**
Prof. Dr. Jochen Schiller

// **Representative from the universities of applied science:**
Prof. Dr. Juliane Siegeris

SCIENTIFIC ADVISORY BOARD

The members of the Scientific Advisory Board (SAB) are internationally renowned experts working in the field of digitalization with a focus on one or several ECDF research areas. In the first funding phase, the SAB consisted of seven members who advised the ECDF until 31 March 2023 on future developments, be it the scientific development of its professors or the strategic direction of the center. SAB members also help to foster collaboration with other research institutions and organizations and to formulate medium- and long-term goals related to the global development of digital transformation.

With the second funding phase, the ECDF will also appoint a new SAB, which will be involved in the center's future direction and development. The Scientific Advisory Board must have at least four members but should have no more than nine.

ECDF/PR/Kay Herschelmann

MANAGEMENT OFFICE

The ECDF Management Office is located in the Robert Koch Forum. It supports the Board of Directors and the ECDF Professors and is responsible for the operational and strategic development of the ECDF. It not only serves as the center's administrative backbone, but is also responsible for internal and external communications. The members of the office are continuously developing the ECDF – whether it is setting up the Micro Factory, developing new event formats, or redesigning the co-working spaces. The Management Office works closely with TU Berlin as the host university on administrative matters.

The Management Office is composed of the following positions and persons:

// Managing Director:
Simone Harr (until March 2023)
Sina Born (June to October 2023)
Tim Kawalun (Acting Managing Director from November 2023)

// Public Relations:
Samira Franzel

// Events and Cooperation:
Tim Kawalun

// Interdisciplinarity and Open Labs:
Friedrich Schmidgall

// Graduate Program and Teaching:
Dr. Sandra Pravica

// Finances:
Anja Hertel
Jennifer Friese (until March 2023)
Nico Rudolph (from December 2023)

// Office Management:
Ursula Menzel

PUBLIC-PRIVATE PARTNERSHIP

The ECDF is financed by industry, non-university research institutions and the state of Berlin. This is made possible by a public-private partnership model which is unique in Germany.

More than 20 companies are involved in the initiative. They provide more than twelve million euros to finance the professors during the project period. The companies include Amazon, Berliner Sparkasse, Berliner Verkehrsbetriebe, Berliner Wasserbetriebe, Bundesdruckerei GmbH, Commerzbank-Stiftung, Cornelsen Verlag, Daimler Fonds im Stifterverband, Deutsche Kreditbank AG, Elsevier B.V., GESOBAU AG, HOWOGE Wohnbaugesellschaft mbH, Roche Pharma, Siemens AG, Viessmann Werke GmbH & Co. KG, and Zalando SE.

The state of Berlin adds 50 cents for every euro raised from privately financed companies – this is known as "match funding". In addition, the Federal Ministry of Labor and Social Affairs and the Federal Ministry of Education and Research each contribute funding for one professorship.

Further partners are the Berlin Institute of Health (BIH), the German Research Center for Artificial Intelligence (DFKI), Fraunhofer FOKUS, the Fraunhofer Heinrich Hertz Institute (HHI), the Fraunhofer Institute for Reliability and Microintegration (IZM), the German Aerospace Center Berlin (DLR), and the National Metrology Institute (PTB).

Funding is provided through the Einstein Foundation Berlin. The foundation receives the corporate donations via the Stifterverband and applies for the matched funds from the state of Berlin. As a partner of the Einstein Foundation Berlin, TU Berlin receives all private and public funds and forwards them to the other partners involved in the center.

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