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EINSTEIN CENTER DIGITAL FUTURE — ANNUAL REPORT 2022

ANNUAL REPORT 2022

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FOREWORD

ECDF/PR/Christian Kielmann

Dear readers,

In March 2023, the Einstein Center Digital Future (ECDF) celebrated its successful first funding phase with a ceremony and heralded the start of the second funding phase. More than 200 partners from science, business, politics, and society came to the Futurium to learn about the current activities at the ECDF and to exchange ideas on topics related to interdisciplinary digitalization research.

The funding approval from the Einstein Foundation Berlin was preceded by an intensive and time-consuming evaluation process. At the February 2022 walk-through, ECDF professors, members, and partners presented research and outlined plans for the next generation. We found the positive feedback from the international researchers overwhelming: in their review, they emphasized the exceptional breadth and depth of the research activities conducted and the quality of the professors appointed. In addition, the reviewers highlighted the successful establishment of the PPP model. The approval by the Einstein Foundation Berlin is a tremendous sign of recognition for us and at the same time a mandate to continue our successful work.

That is why more researchers have taken up their ECDF professorships in the past year: Prof. Dr. Hanna G.

Zimmermann has been a professor of "Applied Visual System Research" at Charité – Universitätsmedizin Berlin since June 2022. Prof. Dr. Heinz Pampel took up the ECDF professorship "Information Management" at HU Berlin in December 2022. He succeeds Prof. Dr. Rebecca D. Frank, who was appointed to the University of Tennessee-Knoxville, USA, as of August 1, 2022.

In the area of internationalization, the strategic partnership with "Digital Futures" at the KTH Royal Institute of Technology in Stockholm, among others, was intensified in 2022. In the summer, a Swedish delegation traveled to Berlin to exchange ideas on topics including project management and science communication in the context of digitalization research.

It was very encouraging that events at the ECDF could be held on-site again in 2022 after the number of new Covid-19 cases remained stable. In addition to the IoT Summer School, highlights included the Long Night of Science and the "Hello Diversity!" event.

The ECDF Gender & Diversity Network was also created in 2022 and aims to contribute to more diversity in digitalization research. We are also strengthening the visibility of interdisciplinary research at the ECDF with the newly established ECDF Paper Series.

In this annual report, we now present current research projects, people, international collaborative projects, and events from the year 2022.

Have fun reading!

Odej Kao
Chair of the ECDF Executive Board
Berlin, March 31, 2023

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EINSTEIN CENTER DIGITAL FUTURE

As a cross-university nucleus, the Einstein Center Digital Future (ECDF) researches and promotes digital structures in science, business, and society. The center for digitalization research is based on a large public-private partnership (PPP) with partners from business, science, and politics. Under the leadership of Technische Universität Berlin (TU Berlin), the institutions that submitted the application are Charité – Universitätsmedizin Berlin, Freie Universität Berlin (FU Berlin), Humboldt-Universität zu Berlin (HU Berlin), and Berlin University of the Arts (UdK Berlin). Numerous respected non-university research institutions (BIH, DLR, FOKUS, HHI, IZM, MDC, PTB, ZIB), Berliner Hochschule für Technik (BHT), the University of Applied Sciences (HTW Berlin) as well as the Federal Ministry of Education and Research and the Federal Ministry of Labour and Social Affairs are also involved in the Center. In addition, more than 30 companies participate in the initiative. Prof. Dr. Odej Kao (TU Berlin) was elected Speaker of the Executive Board for the first funding period.

The ECDF is a program of the Einstein Foundation Berlin (ESB). Its goal is to promote science and research in Berlin at a top international level and to permanently establish Berlin as an attractive location for science.

The first funding phase of the Center for Digitalization Research will run for six years (2017¬–2023). In September 2016, the ECDF had been approved by the ESB after an in-depth evaluation. In July 2022, after a successful evaluation by an international panel of experts, the ESB Executive Board decided that the ECDF will be funded for five more years until March 31, 2028. In the second funding period, research will focus on the areas of "Integrated Health," "Transforming Communities," and "Sustainable Cities."

Funding is provided through a PPP model that is unique in Germany and includes contributions from the private sector, the participating non-university research institutions and federal ministries, and the state of Berlin.

In the first five years, the ECDF professors have already raised an additional 25,000,000 Euros in third-party funding for additional research projects.

The ECDF has acted as an important driver and impetus for digitalization research in Berlin since it was founded. Beginning with its inauguration, 45 ECDF professors have been appointed at the participating universities and Charité – Universitätsmedizin Berlin. The professorships are deliberately designed to be interdisciplinary and involve research at the intersection of different fields.

Instead of new individual initiatives, the ECDF networks digitalization research in Berlin and tests new forms of collaboration while focusing on innovative interdisciplinary cutting-edge research and excellently trained young scientific talent. The professors play a significant role in strengthening digitalization research in Berlin and make a valuable contribution to innovative topics such as smart housing, smart cities, smart mobility, digital education, personalized medicine, digital diagnostics, the Internet of Things, or wearable technologies. The topics of water and wastewater systems 4.0, the digitalization of the working world, and open science also play an important role in the ECDF's portfolio.

Other actors have now seen that the ECDF's offer of an interplay among science, business, politics, and society is a recipe for success: In October 2020, the Digital Futures research center was inaugurated in Stockholm, Sweden. The establishment of the center was inspired by the ECDF, and today the research institutions cooperate closely with each other.

The Robert Koch Forum, located in the heart of Berlin, is also known as the House of Digitalization. With an attractive event area, co-working spaces, social space, Demo Area, and Micro Factory, it offers scholars space to develop their ideas for researching, designing, and implementing digitalization.

SUCCESSFUL EVALUATION: ANOTHER FIVE YEARS OF DIGITALIZATION RESEARCH AT THE ECDF

The Einstein Center Digital Future will be funded for another five years. That was decided by the Einstein Foundation Berlin's Executive Board after a successful evaluation by an international panel of experts. The international reviewers attested to the ECDF's excellent research and were particularly impressed by the unique public-private partnership model and the inter-university and interdisciplinary work.

In a digital walk-through in February 2022, professors and board members presented research at the ECDF and shared their visions for the next generation. Principal investigators, university presidents, donors, and partners reported on structures and cooperation. In their review, the experts emphasized the exceptional breadth and depth of the research activities conducted and the high quality of the professors appointed. In projects such as "SimRa –¬¬ Safety in Cycling," citizens can use a smartphone app to record near misses on the road while cycling; other ECDF projects include research into the large-scale use of quantum internet through technology in space or how computer-assisted treatment planning can help in reconstructing complex facial defects.

The experts highlighted the PPP model as particularly important: public institutions and private sector companies cooperate to jointly tackle urban and regional development tasks. At the ECDF, Berlin's universities, colleges, and the Charité – Universitätsmedizin Berlin work together with industrial partners.

In the experts' opinion, the funds thus made available make it possible to recruit a considerable number of young, highly qualified scholars and to conduct innovative research.

"The ECDF is a blueprint for how substantial and sustainable research collaboration on digital transformation should be conducted. The scientific and research landscape benefits when collaboration takes place across institutions, disciplines, and other boundaries," emphasized Prof. Martin Rennert, Chairman of the Executive Board of the Einstein Foundation Berlin. Other actors were also convinced that this interaction, as found at the ECDF, is a recipe for success: In October 2020, the Digital Futures research center was inaugurated in Stockholm, Sweden. The establishment of the center was inspired by the ECDF, and today the research institutions cooperate closely with each other.

"We are very proud that we were able to infect the reviewers with our enthusiasm for digitalization research. The feedback shows a great appreciation of our work so far and at the same time shows that the experts have recognized our potential for the coming years. The Covid-19 pandemic in particular has accelerated the digital transformation. So there is still work to be done and we are pleased to be able to help shape this change until at least April 2028," said Prof. Dr. Odej Kao, Chairman of the ECDF Executive Board.

/ 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

RESEARCH AT THE ECDF

Inter- and transdisciplinary work is what distinguishes the ECDF scholars. A wide variety of disciplines united by digitalization research come together here. Since its opening in April 2017, the ECDF has been the center for digitalization research in Berlin, providing a holistic view of social change and the associated discourses.

In 2022, numerous new interdisciplinary projects started at the ECDF: ECDF Professor Adrian Paschke is part of the consortium for the first German quantum cloud for industrial users, a development project of the German Federal Ministry for Economic Affairs and Climate Action (BMWK). Beginning in the spring of 2022, laypeople will be able to explore quantum physics and, with a little skill, solve the Quantum Escape Challenge, an escape room at the ECDF.

In 2022, two new ECDF professors accepted an appointment at their respective universities: Prof. Dr. Hanna G. Zimmermann has been a professor of "Applied Visual System Research" at Charité – Universitätsmedizin Berlin since June 2022.

Prof. Dr. Heinz Pampel took up the ECDF professorship "Information Management" at HU Berlin in December 2022. He succeeds Prof. Dr. Rebecca D. Frank, who was appointed to the University of Tennessee-Knoxville, USA, as of August 1, 2022. Frank will remain with the ECDF as an Associate Member.

Prof. Dr. Björn Globisch has also taken the next career step and is now part of the TOPTICA EAGLEYARD research and development team, which he will also lead from January 2024. Jochen Rabe was professor for "Urban Resilience and Digitalization" from 2016 to 2022, and since spring 2022 he has been Managing Director at KWB Kompetenzzentrum Wasser Berlin and also an Associate Member of the ECDF. Thus, 35 professors are currently (as of December 31, 2022) conducting research at the ECDF, nine of them women and 26 men. A total of 45 professors have been appointed since the ECDF opened.

The following pages provide the status of the appointment procedures in the order the professors started their work until the end of 2022, portray the professors appointed in 2022, and provide an insight into joint projects.

OVERVIEW OF APPOINTMENT PROCEDURES

Appointed professors

Name	Designation	Institution	Start of professorship
Prof. Dr. Florian Tschorsch	Distributed Security Infrastructures	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	April 01, 2017
Prof. Dr. Tilman Santarius	Socio-Ecological Transformation and Sustainable Digitalization	TU Berlin, Faculty I – Humanities and Educational Sciences	December 15, 2017
Prof. Dr. David Bermbach	Mobile Cloud Computing	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	December 20, 2017
Prof. Dr. Stefan Kirchner	Sociology of Working Worlds' Digitalization	TU Berlin, Faculty VI – Planning Building Environment	April 01, 2018
Prof. Dr. Jan Christoph Nordholz	Secure and Trustworthy Network-Attached System Architectures	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	April 01, 2018
Prof. Dr. Dr. Felix Balzer	E-Health and Shared Decision Allocation	Charité – Universitätsmedizin Berlin	April 01, 2018
Prof. Dr. Timm Teubner	Trust in Digital Services	TU Berlin, Faculty VII – Economics and Management	April 01, 2018
Prof. Dr. Helena Mihaljević	Data Science and Analytics	HTW Berlin	July 01, 2018
Prof. Dr. Max von Grafenstein, LLM	Digital Self-Determination	UdK Berlin	August 01, 2018
Prof. Dr. Berit Greinke	Wearable Computing	UdK Berlin, Institute of Product and Process Design	August 01, 2018
Prof. Dr. Daniel D. Hromada	Digital Education	UdK Berlin, College of Architecture, Media and Design	August 01, 2018

Name	Designation	Institution	Start of professorship
Prof. Dr. Felix Biessmann	Data Science	BHT (formerly Beuth Hochschule für Technik Berlin)	September 17, 2018
Prof. Dr. Andrea Cominola	Smart Water Networks	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	October 01, 2018
Prof. Dr. Elisabeth Mayweg	Digital Knowledge Management in Higher Education	HU Berlin, Faculty of Humanities and Social Sciences	October 01, 2018
Prof. Dr. Tilo Schwalger	Data Assimilation in Neuroscience	TU Berlin, Faculty II – Mathematics and Natural Sciences	October 01, 2018
Prof. Dr. Sangyoung Park	Smart Mobility Systems	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	October 16, 2018
Prof. Dr. Michael Gensch	Terahertz and Laser Spectroscopy	TU Berlin, Faculty II – Mathematics and Natural Sciences	January 01, 2019
Prof. Dr. Tobias Schäffter	Biomedical Imaging	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	January 01, 2019
Prof. Dr. Leonid Goubergrits	Cardiovascular Modelling and Simulation	Charité – Universitätsmedizin Berlin	February 01, 2019
Prof. Dr. Philipp Staab	Sociology of the Future of Work	HU Berlin, Faculty of Humanities and Social Sciences	February 01, 2019
Prof. Dr. Anastasia Danilov	Organizational Economics – Future of Work	HU Berlin, Faculty of Economics and Business Administration	April 01, 2019

Name	Designation	Institution	Start of professorship
Prof. Dr. Janik Wolters	Physical Foundations of IT Security	TU Berlin, Faculty II – Mathematics and Natural Sciences	July 01, 2019
Prof. Dr. Michelle Christensen	Open Science	TU Berlin, Faculty I – Humanities and Educational Sciences	August 01, 2019
Prof. Dr. Florian Conradi	Open and Secure IoT Ecosystem	FU Berlin, Department of Mathematics and Computer Science	August 22, 2019
Prof. Dr. Emmanuel Baccelli	Robotic Interactive Perception	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	September 01, 2019
Prof. Dr. Guillermo Gallego	Traffic and Mobility Management	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	September 01, 2019
Prof. Dr. Michael Ortgiese	Semantic Data Intelligence	FU Berlin, Department of Mathematics and Computer Science	October 17, 2019
Prof. Dr. Adrian Paschke	Digital Networking of Buildings, Energy Supply Systems and Users	TU Berlin, Faculty III – Process Sciences	December 18, 2019
Prof. Dr. Joachim Seifert	Digital Networking of Buildings, Energy Supply Systems and Users	TU Berlin, Faculty III – Process Sciences	December 19, 2019
Prof. Dr. Rita Streblow	Digitale Vernetzung von Gebäuden, Energiever-sorgungsanlagen und Nutzenden	TU Berlin, Fakultät III – Prozesswissenschaften	19.12.2019
Prof. Dr. Tabea Viktoria Flügge	Digital Technologies for the Reconstruction of Complex Facial Defects	Charité – Universitätsmedizin Berlin	March 01, 2020

Name	Designation	Institution	Start of professorship
Prof. Dr. Lydia Kaiser	Digital Engineering 4.0	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	March 01, 2021
Prof. Dr. Andreas Schwitalla	Digital Implantology	Charité – Universitätsmedizin Berlin	December 01, 2021
Prof. Dr. Hanna G. Zimmermann	Applied Visual Systems Research	Charité – Universitätsmedizin Berlin	June 01, 2022
Prof. Dr. Heinz Pampel	Information Management	HU Berlin, Berlin School of Library and Information Science	December 01, 2022

PROF. DR. HANNA G. ZIMMERMANN

Applied Visual Systems Research

Prof. Dr. Hanna G. Zimmermann has been Junior Professor of "Applied Visual System Research" at the ECDF and Charité – Universitätsmedizin Berlin since June 2022. Her research focuses on changes in the retina of the eye that result from diseases such as multiple sclerosis, Alzheimer's, strokes, and cardiovascular disease. Her Interdisciplinary Retina Research group uses innovative digital technologies to apply images of the retina to improve medical care.

The retina is part of the central nervous system and has the same nerve cells as the brain. When nerve fibers are lost in diseases such as multiple sclerosis (MS), this also affects the retina. Minimal changes in the thickness of the nerve layers arise. Unlike the brain, however, the retina is not enclosed by bone and is therefore accessible to high-resolution optical examination methods. Retinal examination is much easier and less expensive to perform than MRI of the brain – currently the standard examination for multiple sclerosis. With the help of digital imaging, the subtle changes in the retina that result from MS can be made measurable.

Zimmermann and her team are relying here on artificial intelligence, or more precisely on deep learning. This machine learning method allows for accurate measurement of changes in retinal layer thicknesses, for example. Deep learning can also draw information from the retinal images about the course of the disease itself:

"Right now, we see three main uses: diagnosis, risk assessment, and monitoring of disease progression, which includes checking response to a drug," the

junior professor said of the goals of her research. For example, Zimmermann and her team were able to show that patients with MS who have a thinner retinal ganglion cell layer have a higher probability of another disease flare-up in the near future. If necessary, more effective therapy can then be initiated as a preventive measure.

Together with researchers around the world, Zimmermann is working to make retinal examination standard in the diagnosis of MS. Zimmermann sees great potential in retinal examinations not only for nerve diseases, but also for diseases in which a malfunction of the blood vessels plays a role. It can be used to identify blood vessels at the back of the eye particularly well. Scientists can use digital methods to measure changes in the vessels' diameter, density, or course. Certain changes, for example in the event of a heart attack or stroke, can provide indications of how likely another such event is. Patients at high risk can then be examined more frequently as a preventive measure. Currently, Zimmermann and her team are investigating changes in blood vessels in individuals suffering from post-Covid syndrome. The coronavirus can cause damage to blood vessels. These are probably partly responsible for symptoms like constant exhaustion. The retinal examination will also be used in therapy research for this disease, which is currently making life difficult for millions of people.

"In the long term, we would like to see retinal exams become a routine procedure that may even be performed in the primary care physician's office. In this
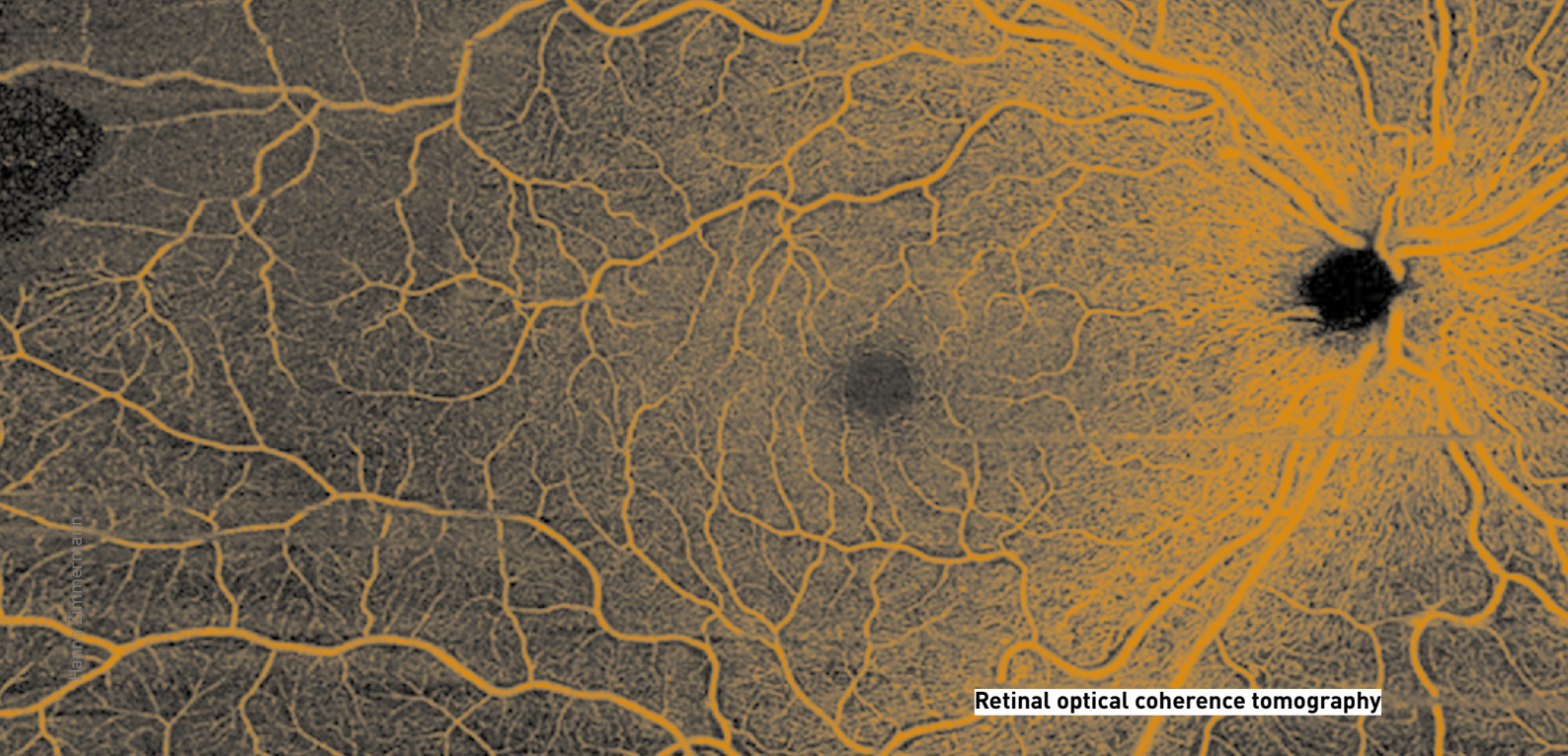
Retinal optical coherence tomography

way, various risk factors for neurological or vascular diseases can be identified and these diseases can then potentially be treated earlier and better," said Zimmermann. She works with retinal images from equipment that is already widely used in many clinics and ophthalmologists' offices – but currently mostly to study eye diseases such as age-related macular degeneration.

Its use in neurological diseases such as MS is not yet routinely established. Retinal examination is not only easier and less expensive, it also produces an image with a much higher resolution than a CAT scan of the brain, for example.

However, images alone are limited in deriving individualized information for diagnosis, risk assessment, and monitoring of disease progression. Here, Zimmermann still sees a lot of potential for the use of digital technologies and artificial intelligence, especially innovative machine learning methods such as deep learning. This is because, in addition to nerve structures, it can also be used to examine pathological changes in the blood vessels on the retina. Thus, risk factors for neurological and vascular diseases could already be identified during routine retinal examinations in the future.

Working across disciplines is essential to extract meaningful information from images using innovative

digital methods such as deep learning: Zimmermann's team includes scientists and doctoral students with medical, natural scientific, and IT backgrounds, as well as optometrists. They also have ongoing contact with ophthalmologists. However, this interdisciplinarity is not a foregone conclusion: "It's important to me that we all think outside the box of our science. As a data scientist, it is essential to know where the images you are working with come from: What kind of complaints do the patients have? What happens in the body during this process and what may be causing the retinal changes we find? At the same time, it also helps physicians to understand the concept behind an analytical method so they understand its potential and also its limitations," said Zimmermann.

Zimmermann also wants to focus on digital tools in teaching: "In medicine, it is indispensable that you can confidently use computers and are knowledgeable about data processing programs. This knowledge must be part of medical training. I especially want to get young women excited about digital methods, because they will benefit greatly from them in the course of their careers," Zimmermann stated.

Zimmermann studied physical engineering/medical physics at the Berliner Hochschule für Technik (formerly Beuth Hochschule für Technik Berlin) and subsequently earned a doctorate in medical sciences.

PROF. DR. HEINZ PAMPEL

Information Management at Humboldt-Universität zu Berlin

Prof. Dr. Heinz Pampel has been a professor for "Information Management" at the ECDF and the Berlin School of Library and Information Science at HU Berlin since December 1, 2022. One of his research focuses is Open Science, which describes the cultural change towards more transparency and accessibility of science and information. He is particularly concerned with information infrastructures in science in the context of the digital transformation, with a special focus on the perspectives of libraries and computing centers: "Information infrastructures are in a permanent state of flux and will play a key role if we are to make the cultural shift towards Open Science. Information infrastructures such as open access repositories and publication infrastructures form the basis for openly and confidently managing knowledge that addresses pressing societal issues," Pampel said.

"Currently, monopolization processes in publishing are continually advancing, and scientific publishers are becoming business analytics companies. The German Research Foundation (DFG) warns of the danger of data tracking by these companies – so I see it as an important point of my professorship to promote discussions about scientific publishing being oriented on the public good," said the professor. The goal is to strengthen the digital sovereignty of science. This includes discussing the question of which infrastructure stores scientific data and who controls them: "Is the infrastructure located and operated in publicly funded institutions like libraries, or are they platforms of commercial providers?"

Pampel sees the sustainability of digital infrastructures as the greatest challenge. Due to fast-moving technological change, maintaining existing infrastructures is costly; in addition, new infrastructure is also constantly being created for the accessibility and reusability of data. Experts refer to this phenomenon as "invisible infrastructures": "Infrastructures are often taken for granted – until they don't work or disappear altogether," Pampel said. The importance of sustained availability and access to research data was demonstrated by the Covid-19 pandemic, during which lay people increasingly demanded access to scientific data.

Pampel studied library and media management at the Hochschule der Medien in Stuttgart. From 2007 until starting his ECDF professorship, he worked in the Helmholtz Open Science Office of the Helmholtz Association, first as an Open Science Officer, and most recently as Deputy Head. He received his doctorate in 2021 on the topic of open access. Pampel will remain with the Open Science Office as a scientific consultant: "It is very important to me that I continue to be close to the practice. That is what my work in the Helmholtz Association makes possible. At the same time, with the ECDF professorship, I can contribute my practical experience of the last few years even more to research and teaching. I look forward to my time at the ECDF and the exciting interdisciplinary collaboration with new colleagues."

Alumni

Name	Denomination	Dienstzeit	Neue Position
Dr. Sebastian Köhler	Methods for Digital Phenotyping	June 01, 2018–Oct 31, 2019	Information Architect, Ada Health
Prof. Dr. Daniel Fürstenau	Digital Transformation and IT Infrastructures	Dec 01, 2017–Sept 30, 2020	Professor at Copenhagen Business School, Denmark
Prof. Sergio Lucia	Internet of Things for Smart Buildings	May 01, 2017–Sept 30, 2020	W2 Professor of Process Automation Systems, TU Dortmund University
Prof. Dr. Setareh Maghsudi	Control of Convergent Access Networks (CCAN)	Aug 01, 2017–Sept 30, 2020	W2 Professor of "Decision Making," University of Tübingen
Prof. Dr. Christian Meske	Digital Transformation and Strategic Information Management	Oct 16, 2017–Aug 30, 2021	W2 Professor of "Socio-technical System Design and Artificial Intelligence" at Ruhr-Universität Bochum (RUB)
Prof. Jussi Ängeslevä	Internet of Things	Apr 01, 2020–Sept 30,2021	Berlin University of the Arts
Prof. Dr. Anna Almosova	Digital Currencies / Crypto Currencies	Oct 16, 2019–Feb 14, 2022	Software Engineer at Google
Jochen Raabe	Urban Resilience and Digitalization	Oct 01, 2016–Mar 31, 2022	Managing Director of the Competence Center Water Berlin
Prof. Dr. Björn Globisch	Terahertz Sensor Technology	Oct 01, 2019–June 30, 2022	Development Engineer eagleyard Photonics GmbH
Prof.ⁱⁿ Dr. Rebecca Frank	Information Management	Oct 01, 2019–July 31, 2022	Professor at the School of Information Sciences at the University of Tennessee, Knoxville, USA

PROFESSORSHIPS

50

45
*10 Alumni

42
*5 Alumni

41
*2 Alumni

32

18

2

2017   2018   2019   2020   2021   2022   2023
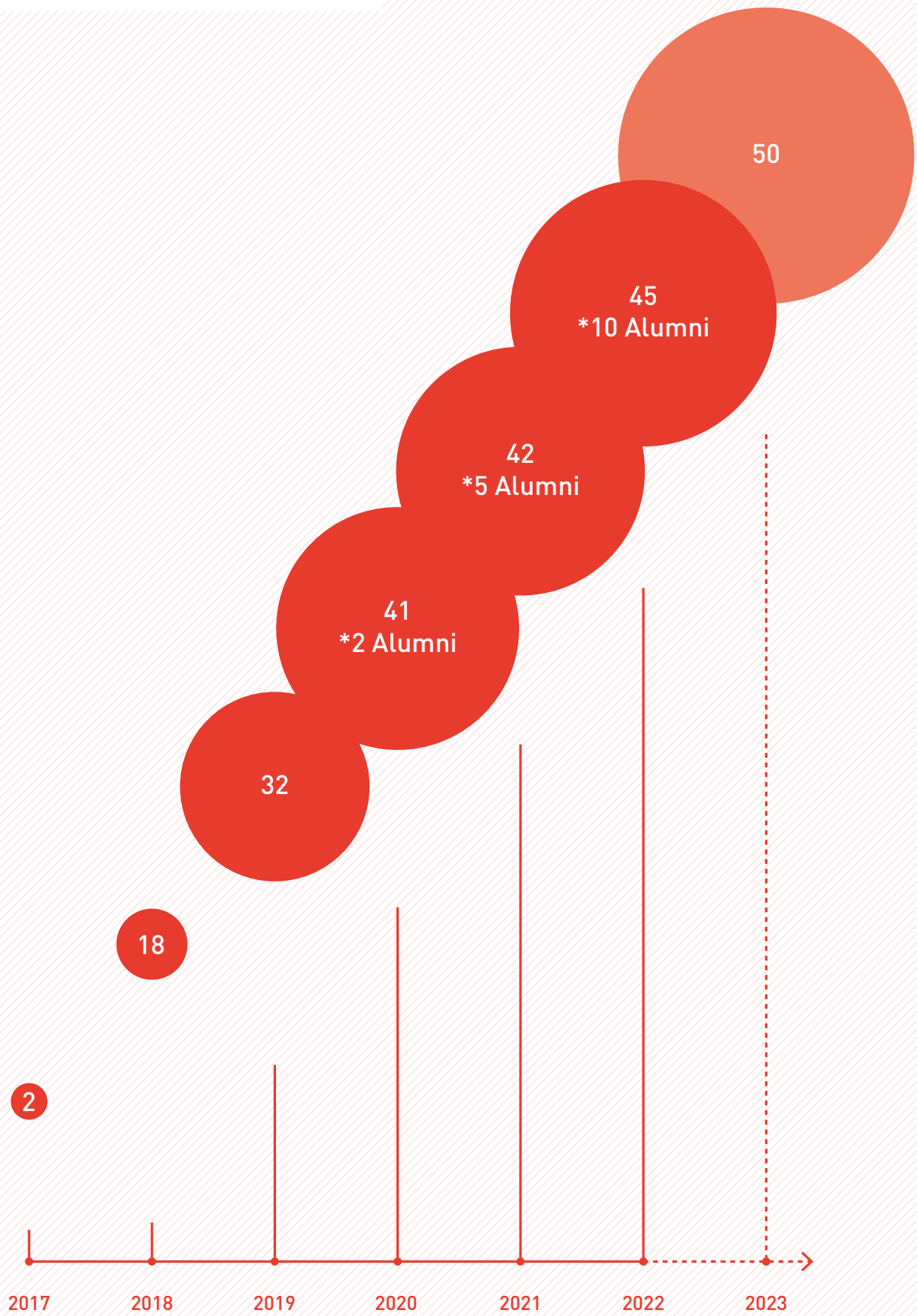
ALUMNI

Since its launch in 2017, the ECDF has aimed to support outstanding young scholars who conduct research in the field of digitalization, providing resources and assistance at the beginning of their academic career and in their professional development. The research center acts as a sponsor and door opener for "its" young researchers. These talented scholars inevitably arouse the interest of other institutions and organizations.

In 2022, Prof. Dr. Rebecca D. Frank, Prof. Dr. Björn Globisch, and Prof. Jochen Rabe left the ECDF.

ECDF/PR/Felix Noak

REBECCA D. FRANK APPOINTED AT US UNIVERSITY

After three years as ECDF Professor of Information Management at the Berlin School of Library and Information Science at HU Berlin and at the ECDF, Prof. Rebecca D. Frank accepted an appointment at the University of Tennessee, Knoxville. Frank became an assistant professor there in the School of Information Sciences on August 1, 2022.

As a tenure-track assistant professor, Rebecca Frank will be part of a world-class library and information science program. She will continue the research she started at the ECDF, examining the social construction of risk in the testing and certification of trusted digital repositories. She also conducts research in the areas of open data, digital preservation, digital curation, and data reuse with a focus on social and ethical barriers that limit or prevent the preservation, sharing, and reuse of digital information.

Frank will teach undergraduate and graduate students in information science, including as part of the new interdisciplinary Data Science program and the new Research Data Management certificate program: "I am very excited about this new professional role, where I can build on the successes I have had here at the ECDF and at the Berlin School of Library and Information Science at HU Berlin," said Frank. She stated: "The opportunities created by the ECDF have allowed me to build a strong research portfolio and engage in valuable collaboration with colleagues here in Berlin and internationally. I am incredibly grateful to my wonderful colleagues, the other ECDF professors, and the ECDF staff who work tirelessly to create all these opportunities. I look forward to staying connected to the ECDF as an Associate Member and continuing the projects I started with ECDF colleagues as I take the next step in my career." Among the projects she has started is the research project "Citizen-based Monitoring in the Era of Deepfakes," on which she is working together with Felix Biessmann, ECDF Professor of Data Science, and Alex Glaser, Professor at Princeton University and Associate Member at the ECDF.

Frank holds a PhD from the University of Michigan School of Information, a master's with a specialization in information preservation, and a BA in Organizational Research from the University of Michigan. Her work was supported by the Einstein Center Digital Future, InfraLab Berlin, the National Science Foundation (USA), and the Australian Academy of Science.

DR. BJÖRN GLOBISCH WECHSELT IN DIE INDUSTRIE

From 2019 to 2022, Globisch was ECDF Professor of "Terahertz Sensor Technology" at the Fraunhofer Heinrich Hertz Institute (HHI) and at TU Berlin. Globisch will join TOPTICA EAGLEYARD's research and development team in January 2023, and from January 2024 he will lead the team.

"After ten years in research on terahertz sensor technology, I am looking forward to advancing photonic integration in the industrial sector, making the technological progress of recent years globally useful in the long term," said Björn Globisch. Anyone who has passed through a body scanner at airport security has experienced terahertz sensor technology for themselves.

The focus of Globisch's research has always been application-oriented; during his time at the ECDF, for example, he worked on the transmission of large amounts of data using terahertz frequencies. "Our data rates continue to rise due to increasing digitalization. This begs the question: What comes after 5G?" said Globisch. "Terahertz waves can be used to transmit significantly higher data rates than even 5G. In the laboratory, transmission links with a length of 100 to 500 m are already working," he reported. TOPTICA EAGLEYARD is a world leader in high power gallium arsenide laser diodes. The products used worldwide are used in industry, medicine, science, and aviation, among other areas.

Before moving into the private sector, however, Globisch was honored for his postdoctoral scientific achievements: He received the Karl Scheel Prize of the Physikalische Gesellschaft zu Berlin in 2022. The prize of 5,000 Euros is regularly awarded to a member for an outstanding scientific achievement made in the years immediately following the doctorate.

ECDF/PR/Felix Noak

JOCHEN RABE BECOMES MANAGING DIRECTOR AT KWB

Jochen Rabe is currently Managing Director at KWB Kompetenzzentrum Wasser Berlin and held the professorship of Urban Resilience and Digitalization at the ECDF and TU Berlin from 2016 to 2022. With 20 years of practical professional experience as an urban developer in Germany and abroad and activities in both the private sector and academia, Professor Rabe is researching the rapid digitalization of our cities in the context of resilience and investigating the extent to which digitalization processes can strengthen the renewal forces of our cities or pose risks.

Born in Hamburg, he studied at the universities of Oxford and Cambridge and at the Hochschule für bildende Künste in Hamburg. It was particularly in his previous work on various research and implementation projects with the multinational and interdisciplinary consulting and engineering firms Buro Happold and Arup in England and Germany that Jochen Rabe focused on developing systemic solutions to complex urban problems. Jochen Rabe advises the German Federal Ministry of Housing, Urban Development and Building (BMWSB), the German capital Berlin and numerous other municipalities and companies on smart city issues.

Since taking over KWB, Rabe has also been cooperating with professors from the ECDF: for example, he continues to lead the ECDF project "BBBlockchain" with Prof. Florian Tschorsch, the IDE3A project with Prof. Andrea Cominola and since June 2022 the Berlin Smart City project "Data Governance" for the Berlin Senate Chancellery within the BMWSB program "Model Projects Smart Cities." Rabe also coordinates the "Smart Water" project, another one of Berlin's five smart city innovation and research projects.

As Professor of Urban Resilience and Digitalization, his research focused on the digital transformation of cities. "Urban development is per se a cross-cutting topic and my goal is to research both how rapid digitalization is changing our cities and which digital strategies and technologies could strengthen urban resilience," said Rabe when starting his professorship in 2016. In the face of global challenges such as climate change, increasing urbanization, the automatization of labor, and the digitalization of urban systems, urban spaces are faced with major changes that raise economic, social, and technical questions. "When we say resilience, here we mean the ability of a city to respond to the above challenges, but also to enable necessary transformative processes. In short, I am investigating how spatial and infrastructure planning must respond to these societal challenges and what role digitalization can play here," said Rabe.

Rabe has continued to pursue these research questions at KWB since 2020. Inter- and transdisciplinary work is part of his everyday life. Accordingly, as an Associate Member and Managing Director of KWB, he looks forward to continuing his close collaboration with the ECDF in the future.

RESEARCH PROJECTS

Whether in our own homes, at work, or at the doctor's office – digitalization is everywhere and has greatly 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 wake of the war of aggression on Ukraine, for example, ECDF Professor Rita Streblow's team is looking at possible measures to save energy; Prof. Dr. Timm Teubner is shedding light on how Data Science can contribute to more sustainable tourism; the digital health projects DIGIOP, KIP SDM, and PROKIP are concerned with digital health applications and artificial intelligence in care. Below we present a selection of research projects, collaboration projects, and initiatives that ECDF professors worked on during 2022.

MAKING TOURISM MORE SUSTAINABLE IN THE AGE OF BIG DATA: HOW ONLINE PLATFORMS AND DATA SCIENCE CAN HELP

Whether it happens in 2023 or later, tourism is likely to return to pre-pandemic levels – and with it the emissions it generates. Unconventional sources of information such as data from the online tourism platform TripAdvisor and machine learning approaches can fill data gaps and help make global tourism more sustainable. This is the conclusion reached by Dr. Timm Teubner, ECDF Professor of Trust in Digital Services at TU Berlin, Dr. Fabian Braesemann (University of Oxford), and Felix J. Hoffman (AI Consultant at Deloitte).

Pandemic-related travel restrictions have been lifted, and tourism is recovering faster than expected: "This is good news for Airbnb owners, travel bloggers, and less-developed economies for which tourism means economic growth. In many cases, however, this economic progress comes at the price of serious environmental consequences," explained Teubner. Although global tourism is still below pre-pandemic levels, the rapid growth has surprised industry experts and raised expectations for recovery. In June 2022, about half of the experts expected a return to pre-pandemic levels in 2023.

Prior to the pandemic, tourism and related activities were responsible for an estimated eight percent of global greenhouse gas emissions. Even though the sector itself will be strongly affected by the changes in the global climate, these emissions are likely to increase over the next ten years.

In order to achieve the sector's climate targets despite rising demand, policymakers need to develop effective measures: a trade-off between economic benefits and environmental costs. These measures, in turn, depend on timely and accurate data, some of which could be obtained in unconventional ways.

In their study, "Measuring Sustainable Tourism with Online Platform Data," the researchers note that tourism platform data can indeed serve as a valuable source of information on the level of sustainable tourism in different countries. The study focuses on Europe, the largest tourism market in the world. Using a dataset of more than 65,000 listings from TripAdvisor.com and applying a range of statistical learning techniques, Teubner and colleagues conclude that the data can be a good indicator of sustainable tourism. "The data shows, for example, that accommodations that have a sustainability seal on the platform have greater user engagement and more quality features," Teubner said.

The study is part of the Social Data Science Collaboration between researchers and students from Oxford and Berlin, which has been running since the beginning of 2020.

COST-EFFECTIVE MEASURES TO REDUCE ENERGY CONSUMPTION IN PRIVATE HOUSEHOLDS

Adobe Stock/Lichtspruch

Simple actions with a great effect: In a joint study by researchers from Aachen and Berlin, including ECDF Professor Rita Streblow (TU Berlin), the scientists evaluated energy efficiency measures that are easy to implement and cost-effective. The paper provides concrete recommendations on how private households can significantly reduce their consumption of space heating and hot water through simple technical measures and small adjustments to their habits. At the same time, according to the scientists, these measures have minimal effects on comfort.

Around 70 percent of the energy consumed by private households is used for heating rooms and hot water. Almost every second home in Germany is heated with natural gas – here, consumption can be significantly reduced without any economic disadvantages. Some of the measures described can be implemented without any additional investments, while others require only low or moderate expenditures on technical equipment or insulating materials. The low amount of investment required means that the measures can be implemented quickly. They can also be implemented largely without needing any specialized skills. Structural measures requiring craftsmanship skills have been marked as such.

The results of the scientific calculations impressively document the possible reductions in consumption: This is possible with little effort for up to 49 percent of the requirements for heating rooms; for the energy requirement for heating drinking water, savings of as much as 69 to 81 percent can be achieved if the occupants have previously been less economical in their use of drinking water. The savings are lower where energy has already been used very sparingly in the past. "The typical temperature of rooms in homes is 21°C, so even with light clothing it is comfortably warm. Adjusting the clothes we wear is a simple thing to change: People who dress warmer still feel comfortable at lower temperatures like 19°C and save energy at the same time," explained Prof. Dr. Rita Streblow.

In addition, short questionnaires were distributed to the participants during the 11th project leaders' meeting "Energiewendebauen" (building for an energy transition) in order to identify short-term measures to increase energy efficiency in the operation of buildings and neighborhoods. The results were summarized by nine experts, supplemented with explanations and further procedures, and published in a white paper by Prof. Dr. Rita Streblow and Prof. Dr. Dirk Müller. In this way, a total of 110 suggestions were compiled that can help to reduce energy and thus gas consumption in buildings and neighborhoods.

DIGIOP

Digital health applications and interoperability

The project led by ECDF Associate Professor Dr. Daniel Fürstenau (Charité – Universitätsmedizin Berlin), "DIGIOP – Making digital-supported care processes possible: Implementing interoperability between DiGA, assistive devices and ePA in a future-open way" addressed unresolved aspects around the topic of digital health applications (DiGAs) and interoperability from November 2021 to April 2022. Previous projects have already shed light on essential aspects of the DiGA topic, but important questions related to interoperability are still open. To ensure there is an interoperable telematics infrastructure in healthcare in the future, the specific requirements and special features for newly emerging DiGAs must be taken into account.

Within the project "DIGIOP," the regulatory and technical prerequisites of the patient-centered and digitally-supported medical care of tomorrow were discussed and outlined. The focus was on DiGAs and connecting them efficiently to existing and future digital care services (e.g., electronic patient records, electronic prescriptions). The aim of the project was to reflect on the status quo, to discuss potentials for the future of digital care, and to derive from this which technical and regulatory requirements are best suited to achieving the legislative goal of user-friendly, future-oriented, and patient-centered digital care. During the kick-off workshop in November 2021, the current situation regarding DiGAs was reviewed, and the main issues discussed were which questions should be addressed when imple-

menting or further developing the existing regulatory framework.

"The aim is to maintain an open view of the future to ensure the project facilitates the implementation of legal interoperability requirements for DiGA manufacturers. Only in this way will DiGAs not stand in isolation from other care services in the future, but be able to connect to existing and new care chains," said Fürstenau.

The project included eight online stakeholder community workshops from telematics, the DiGA industry, academia, patient advocacy groups, regulatory authorities, and care providers, and officially concluded with the final event on April 28, 2022, at the Einstein Center Digital Future with a live broadcast (https://easylivestream.com/diga/) of a professional expert panel. A report has been submitted to the Federal Ministry of Health, whose key recommendations are as follows:

// Eliminate the digital coordination vacuum – establishing DiGAs as integral components in care processes
// Establish the ePA (electronic health record) as an open-future hub for care provision
// Lift DiGA data out of silos – enabling data-based health services research and real-world evidence
// Ensure consistent user-friendliness and patient-centered interoperability are the top priority

KIP SDM

Artificial Intelligence in Nursing: Fall/Delirium/Medication

Every year, there are almost five million registered fall incidents in Germany. More than 35 percent of people over age 65 fall at least once a year (Kaeding 2019). The annual cost of treating the consequences of falls is more than 500 million Euros. And yet, up to 30 percent of all falls are preventable (Hshieh et al. 2018). Systems using artificial intelligence (AI) analyze risk factors, predict individual fall risks, and could digitally support fall prevention for caregivers.

The "KIP SDM" project started in August 2022 and aims to make the data relevant for a risk assessment digitally available – for the staff on site and according to established care standards. "Fall prevention should be seen as just one example from a field of similar nursing problems such as pressure ulcers, urinary incontinence, delirium, etc.," said ECDF Associate Prof. Dr. Daniel Fürstenau (Charité – Universitätsmedizin Berlin). Among others, Prof. Dr. Felix Biessmann (BHT) and Prof. Dr. Max von Grafenstein (UdK Berlin) are involved in the project on behalf of the ECDF. With the help of the data integration and data analysis methods developed in the project, as well as the AI application based on them, alternative, relevant questions, data, and outcomes could also be evaluated.

Technical development must consider methods to address the core problem of how to more quickly share data and models between AI researchers and caregivers. First, generative models are trained using federated learning between participating institutions. In this process, the anonymity of the data is guaranteed with the help of differential privacy and continuously undergoes empirical testing. The data or generative model can then be made available to AI developers for model development or to caregivers as a dashboard. The developed AI models can then be returned to the data repository as a "Docker environment Kubernetes pod" to be trained on the real data with federated learning and then used in the final step in nursing homes for fall risk prediction.

Since the start of the project in the summer of 2022, a number of highlights have already been recorded, such as the presentation to external stakeholders from the nursing care sector, the processing and systematization of data from both hospitals involved, initial modeling of AI models, and progress in strategic networking. The researchers involved meet weekly at the ECDF, and all major events within the project, such as the meeting of the Scientific Advisory Board, also take place at the ECDF.

PROKIP

Process Development and Support for Artificial Intelligence Use in Nursing

The overall goal of the "ProKIP" project, which started in November 2021 and involves ECDF professors Felix Biessmann (BHT) and Max von Grafenstein (UdK Berlin) as well as ECDF Associate Daniel Fürstenau (Charité – Universitätsmedizin Berlin), among others, is to support the integration of artificial intelligence (AI) solutions into nursing practice. To this end, the project is designing a participatory and interdisciplinary iterative monitoring and networking process for collaborative projects of the funding program "Making repositories and AI systems usable in everyday nursing care." In addition, success factors for research and development and the use of AI in nursing are explored in order to contribute to the scientific and practical foundation of the topic of AI in nursing care.

The use of AI, that is, algorithms that learn based on data to enable intelligent, goal-oriented actions, is a promising solution to the myriad challenges in the nursing context. "AI solutions based on machine learning can support nursing-clinical and case-based decision-making, identify patterns and risks – such as in the care process or health status – through algorithm-guided data analysis, and make administrative processes more efficient," stated Prof. Dr. Felix Biessmann. Despite increasing scientific findings and publications on the use of AI in care, there is still a lack of knowledge on the practical relevance and suitability of AI systems there – especially with regard to setting-specific requirements or needs in hospitals, outpatient and inpatient long-term care, rehabilitation facilities, and prevention.

The results of the exploratory project "AI in nursing care" carried out in 2020 show that there are a variety of challenges for the implementation of research projects in the topic area. However, there are also opportunities that can contribute to successful project outcomes, but whose interaction and interplay have not yet been conclusively investigated.

The project provides innovative support to existing funding line projects in the form of labs and methods, tools, frameworks, and theories developed and offered in the labs. It also develops theory-based explanations and implementation frameworks for AI projects in nursing care. A key milestone is the creation of a scientifically based AI readiness assessment.

ProKIP began in mid-2022 with a kick-off for all project partner organizations – goals were mapped and the initial work in the individual, interdisciplinary labs got the ball rolling. A key highlight was the end-of-year meeting, which took place at the ECDF on December 5–6, 2022 – all people involved traveled to Berlin to reflect together on the work done so far and to discuss the vision, goals, milestones, and suggestions for improvement. In addition, initial surveys and qualitative data were collected, which promoted initial findings in the area of data governance strategies when building research platforms.

Detected Leaks 2019
True Leaks 2019
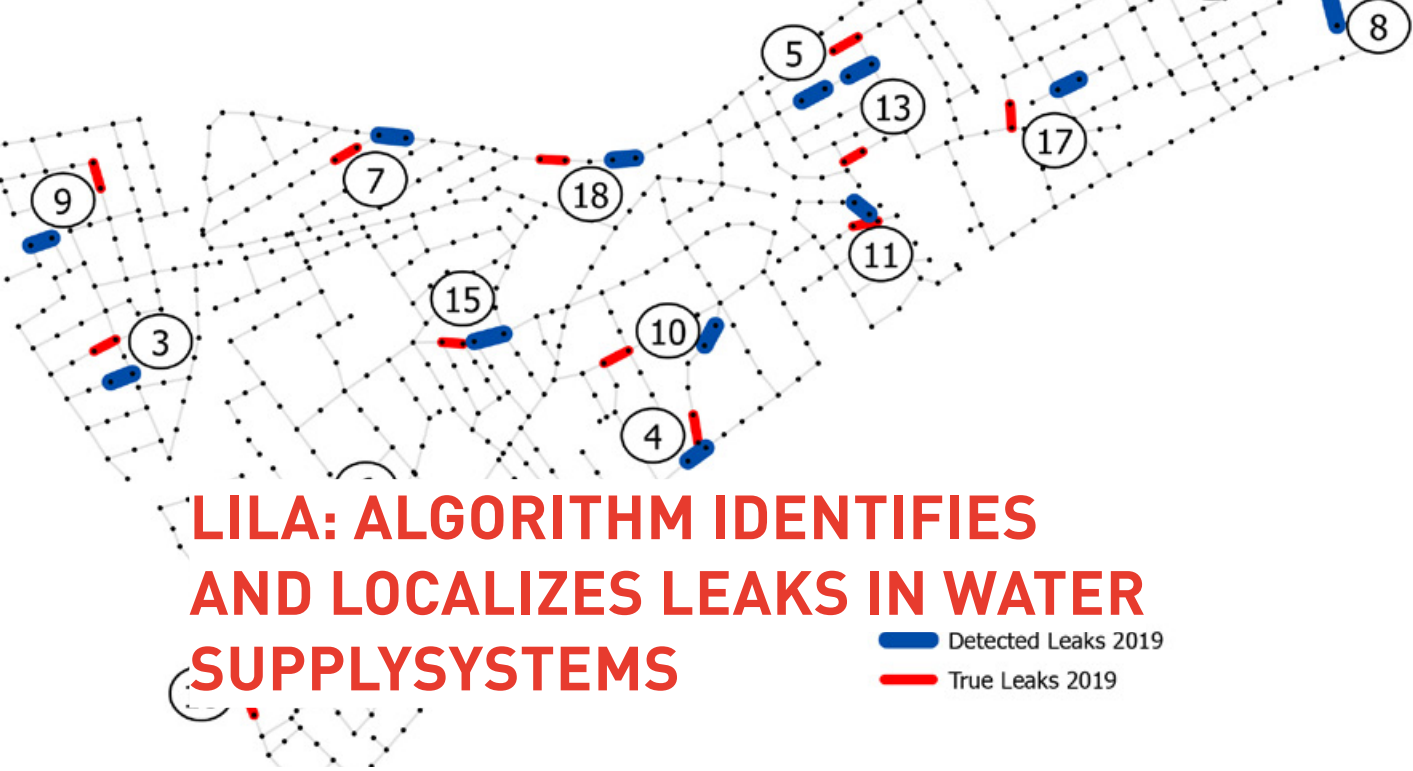
LILA: ALGORITHM IDENTIFIES AND LOCALIZES LEAKS IN WATER SUPPLYSYSTEMS

Open the tap and out comes water: Drinking water is the most important staple food. Water supply networks ensure that consumers are continuously supplied with water. Mostly caused by aging and wear, leaks in water supply systems degrade infrastructure and result in water losses of about 39 billion US dollars per year worldwide. In their new research project "LILA (Leakage Identification and Localization Algorithm)," Ivo Daniel, Research Associate at the ECDF and at the Department of Smart Water Networks at TU Berlin, Prof. Dr. Andrea Cominola, ECDF Professor of Smart Water Networks at TU Berlin, and their colleagues developed the use of a sequential, pressure-based algorithm to identify and localize these leaks.

"In the worst case, no water reaches the consumers at all," said Daniel. Rapid identification and localization of a leak site is therefore crucial to ensure basic supply, but also to minimize or completely avoid consequential damage. Unlike above-ground infrastructure such as roads, water distribution systems are underground. This makes it much more difficult to identify damage – not least because the purity of drinking water is a top priority: "The use of equipment such as cameras in the supply pipes is out of the question," Daniel stated. While pipe bursts are easy to spot because of the sudden change, gradual losses are harder to find.

As part of an international competition, Daniel and his team developed the LILA algorithm to identify and localize leaks in the first step. Colleagues from North Carolina State University then turned their attention to pinpointing the precise location within the supply system. Using the reference data set that formed the basis of the competition, the scholars developed the algorithm that calculates and compares pressure losses based on water pressure measurements. "The pressure drop is not the same everywhere, so this helps identify which sensor in the water supply system is closest to the leak," Daniel said. LILA can identify all seepage losses contained in the data set and locate them within 374 m from their actual location. Abrupt leaks are detected immediately or within two hours. A little more time is needed for leakage that increases slowly.

"In the utility network model, water loss due to leakage was about 20 percent per year. This means that 20 percent of the water pumped into the system is lost before it reaches the consumer. With our algorithm, we were able to reduce that to 0.01 percent," Daniel said. In addition to higher revenues, timely repair has other benefits, such as lower energy demand and reduced environmental impact.
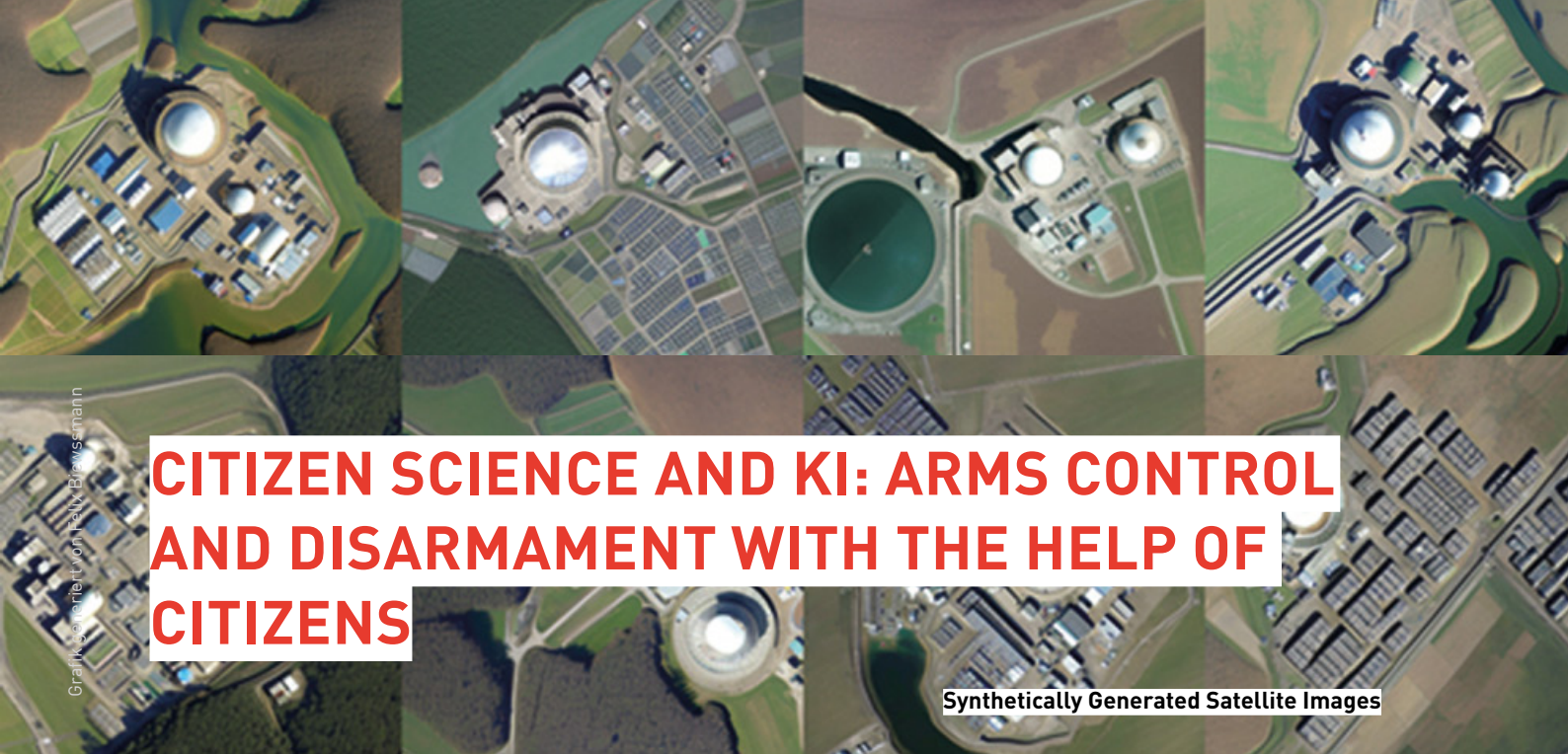
CITIZEN SCIENCE AND KI: ARMS CONTROL AND DISARMAMENT WITH THE HELP OF CITIZENS

Synthetically Generated Satellite Images

How can citizens contribute to the verification of peace and security with the help of democratized AI? This is what ECDF Professor Dr. Felix Biessmann (BHT) and the two Associate Members Prof. Dr. Rebecca D. Frank (University of Tennessee, Knoxville) and Prof. Dr. Alexander Glaser (Princeton University) and their teams are investigating in the project "Citizen-based Monitoring for Peace & Security in the Era of Synthetic Media and Deepfakes."

Open, high-resolution satellite imagery is now widely available through services such as Google Earth. Satellite constellations can record virtually any location on Earth several times a day, making it increasingly difficult to conceal relevant activity. In this context, the professors' project emphasizes the importance of AI and the asso- ciated ambivalences of digitalization. Synthetic media and satellite imagery are of particular interest for two reasons: First, artificially generated imagery can greatly improve the training of change detection algorithms, since a key dilemma of traditional methods is that there are relatively few examples of relevant assets – and correspondingly few satellite images. In addition, synthetic data can be used to investigate scenarios under controlled conditions, e.g., for their potential for open science verification approa- ches when real data is not available for technical, legal, or financial reasons. "The images shown here were gene- rated using Deep Learning techniques, that is, they are not real images. StableDiffusion, a large text-to-image model,

was further trained on images of a nuclear power plant using the DreamBooth method. Specifically, this means: Simple text inputs such as 'an aerial view of a nuclear power plant' and keywords such as 'by sea' or 'in summer/ winter' can be used to automatically generate and modify images," said Vy Nguyen, a machine learning researcher in Felix Biessmann's group. Deep learning methods thus make it possible to generate photorealistic images. The goal is to generate images in different contexts and from different subjects with relatively little effort. These images can then be used to train algorithms or develop and inves- tigate concrete surveillance scenarios.

However, the simpler handling of increasingly complex AI models also entails risks: When seemingly authentic digital content can be generated at will, the question arises of how laypeople are to judge whether the images are real or synthetic. Special attention is therefore paid to the dangers of disinformation and deepfakes, that is, synthetic image forgeries by AI. "An important research question addressed by the project is: How easy is it to create authentic-looking images? This raises broader ethical questions related to spatiotemporally high-reso- lution satellite imagery, as well as potential safeguards that could make Citizen Science a viable and robust tool to support peace and security," said Glaser, who has been co-director of the Program on Science and Global Security at Princeton University since 2016.
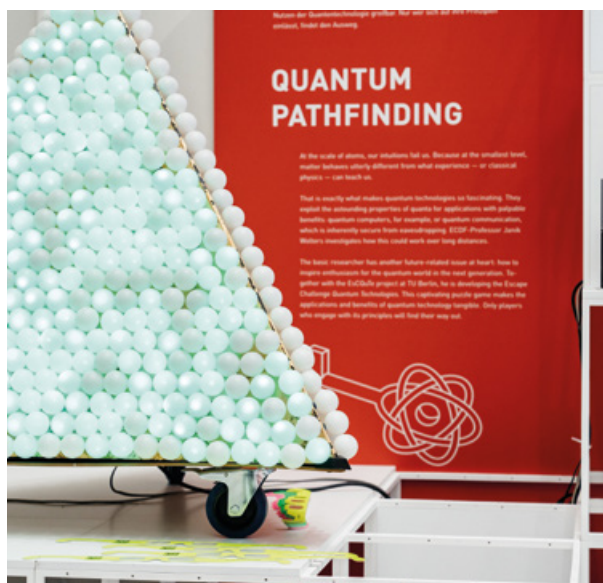
ESCAPE ROOM: QUANTUM PHYSICS AT THE ECDF

Quantum technologies will fundamentally change our world, but for the layperson their significance is difficult to grasp. Quantum physics at your fingertips – that's what the research project "Escape Challenge Quantum Technologies (EsCQuTe)" wants to make possible. ECDF Professor Janik Wolters is also involved in the project. At the beginning of 2022, the team moved its Escape Room into the rooms of the ECDF, where it can be used by individual visitors and school classes by arrangement.

In the Escape Room, visitors immerse themselves in a world in which second-generation quantum technologies are already being used. As usual in Escape Rooms, the visitors solve puzzles together in a playful way in order to "escape" the room. Sounds complicated? "Specialized knowledge in physics is not required," explained Janik Wolters, who has held the ECDF Professorship for Physical Foundations of IT Security at the German Aerospace Center (DLR) and TU Berlin since 2019. "The rules of quantum theory are very well described mathematically, but to the layperson they often remain mysterious. We want to change that with our Escape Room," said Wolters.

While quantum technologies seem inscrutable to many people, their influence will only grow in the future: Quantum computers could one day crack all the encryption methods in use today and thus reveal secret documents. At the same time, they enable absolutely tap-proof communication. Quantum computers also allow for more complex simulations that can be used in vaccine and climate research. The playful approach to complex scientific topics is not new; similar projects already exist in the USA and also in Frankfurt am Main. "In the field of quantum technologies, however, we are the first," stated Wolters.

After initial user testing, the team adapted some puzzles and went on tour: At the end of May, the entire Escape Room was packed into boxes and taken to the Freiland Festival in Alt Tellin, Mecklenburg-Western Pomerania; then it was off to the Quantum Systems 2022 Congress of the German Federal Ministry of Education and Research (BMBF). On July 2, it was back at the ECDF for the Long Night of the Sciences, which could finally take place on site again. Here it also became clear once again how flexibly the Escape Room can be used: The duration of the game was adjusted by additional instructions so that as many visitors as possible could participate.

The "EsCQuTe" project is being funded by the BMBF with 180,000 Euros over one and a half years. 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 Department of Work, Technology and Participation at TU Berlin.

FIRST GERMAN QUANTUM CLOUD FOR INDUSTRIAL USE

The German Federal Ministry of Economics and Climate Protection (BMWK) commissioned a consortium of leading German technology companies and research institutions to set up the first German quantum cloud for industrial users. Also part of the consortium is ECDF Professor Dr. Adrian Paschke, Professor of Semantic Data Intelligence at FU Berlin and the Fraunhofer Institute for Open Communication Systems (FOKUS).

"Quantum applications in the cloud can be great drivers of innovation. With the project 'SeQuenC,' the BMWK sets a new milestone on the way to a German quantum cloud and we are very pleased that we will support the research project with our quantum AI tools and our knowledge from the PlanQK quantum AI platform. For the success of quantum computing as a key technology, in the future it will be of central importance worldwide to develop innovative and economically attractive quantum applications as cloud-enabled solutions," said Paschke.

The goal of the project is to develop a platform including tools and services for the commercial exploitation and integration of quantum software in the cloud. This will enable the creation of a holistic ecosystem for the application of quantum computing. The basis for a German quantum cloud will be designed and implemented.

The quantum cloud will create a platform for quantum applications for the German industrial landscape, strengthen digital sovereignty in the field of quantum computing, and position Germany as a pioneer in the industrialization of this key technology. The research and development project is part of the BMWK's "Digital Technologies for Business" funding program and is scheduled to run for three years. During this time, selected test users (known as associated partners) will be given access to the quantum cloud in order to test initial applications on the platform.

NIKOLAUS BRADE

INTERWOVEN SOUND SPACES

Making music together in different places – the new artistic project "Interwoven Sound Spaces" explores possibilities of telematic music performances for the field of new music. New, remote technologies enable tangible interaction among musicians who are spatially in different locations. The result is a new kind of musical experience for the audience and the artists of the ensemble.

The feeling of being there is central to making music together at a distance: For this experience, textile wearables, small networked computers that can be worn on the body, were combined with interaction design, interactive machine learning, and spatial sounds: "We want to connect new music ensembles in different places in Europe. At the same time, we are exploring new ways of connecting musicians in live chamber music performances through technologies that bridge distance while providing new creative space for compositions," stated ECDF Professor Dr. Berit Greinke, who is leading the project together with her colleague Dr. Federico Visi.

The project provides composers and musicians with the tools – e.g., wearables for six musicians and the network infrastructure – and at the same time explores the role and dynamics of socio-cultural spaces that are

characteristic of a live music performance. In addition to the music, the culture of dress, the communication among musicians, and the interaction among listeners also contribute decisively to the fascination and success of live performances. These considerations also found a place in the project: "The interactive development and close collaboration among musicians, composers, researchers, venues, and developers were essential for the project. For the audience to also feel included, it is necessary to create a sense of co-presence and enable communication despite the spatial separation – networked technologies make this possible as well," said Greinke.

In collaboration with four contemporary composers and two professional music ensembles (KNM in Berlin and Norbotten NEO in Pitea, Sweden), the results of the project were performed in December at Konzertsaal Berlin and Studio Acusticum in Pitea. The performance was accompanied by an exhibition in the concert hall. The project focused on developing the technical design and the artistic results. The data collected in the form of videos, interviews, and technical reports is currently being reviewed for the possibility of acadmic publication.

unsplash

"AI-SKILLS" PROJECT: AI CERTIFICATE PROGRAM FOR STUDENTS

Use of artificial intelligence (AI) is no longer limited to technical areas. In the project "AI-SKILLS" by ECDF Professor Elisabeth Mayweg, students from all disciplines will each be able to deal with AI methods and AI technologies as they are most useful in the students' particular subjects.

The project is quite hands-on: "It follows the 'learning AI by doing AI' approach. We want students to apply AI in a structured and methodologically reflective manner and relate it to their own, subject-specific issues," stated Mayweg. The goal is to develop an AI certificate program as part of the curriculum in all departments where students learn and directly apply key technologies and methods. "An important aspect includes discussing legal and ethical issues in addition to methodological, technical, and informational basics," the ECDF professor said. In this way, students' AI skills in the breadth of subjects is to be strengthened in a sustainable and future-oriented manner.

At HU Berlin, there are already well-established university didactic and technical support structures such as

the bologna.lab, a teaching and learning lab, and the computer and media service, which is used to bring AI-interested instructors and students together. The project focuses on machine learning and symbolic AI methods. A JupyterHub with powerful hardware is available to instructors and students; computational essays, a combination of code, images, and explanatory text, are introduced as a form of examination. "In this way, we want to ensure that the focus is on the concrete application of AI methods and not just their description. For us, new skills and reflected application by the students are central," said Mayweg, who is a subproject leader in the "AI-SKILLS" project.

The teaching and learning materials are made available according to open science principles and are continuously evaluated and further developed, taking into account the needs of students and instructors. This aims to help the project be sustainably implemented and have a lasting impact. "AI-SKILLS" is funded by the BMBF for the project duration from December 2021 to November 2025.

PRESENTATION OF THE "DIGITAL RESET" REPORT

In the run-up to this year's "Bits & Bäume" (bits & trees) conference on digitalization and sustainability, the report "Digital Reset: Redirecting Technologies for the Deep Sustainability Transformation" was published. The report shows that digitalization in its current and common form exacerbates rather than solves many of the pressing social and environmental crises, and highlights the policy measures that can be used to shape digitalization processes in such a way that they contribute to a profound sustainability transformation.

The study was conducted as part of the project "Digitalization for Sustainability – Science in Dialogue" (D4S), a two-year scientific dialogue among 15 European experts. The presentation of the report took place at the ECDF on September 30, 2022, with the first authors, including ECDF Professor Tilman Santarius, and other members of the expert panel.

Digital technologies are often seen as the solution to the problems of our time – the hope is that they can solve pandemics, the climate crisis, and economic problems or at least mitigate their consequences. The report

shows that digitalization in its current and common form exacerbates rather than solves many of the problems at hand. Instead, a profound sustainability transformation is needed that fundamentally reshapes the economy and all its sectors. Time is of the essence: "Every year we experience an even hotter year than the year before; at the same time, biodiversity is declining and society is becoming more polarized. These problems necessitate a realignment," Santarius said in his opening statement.

The report presents how digitalization can support the quest for such a profound sustainability transformation. It addresses the sectors of agriculture, mobility, energy, consumption, industry, and buildings, and presents concrete policy measures that can balance the risks and opportunities of digital technologies for transformation. In addition, the report provides a blueprint for the European Union on how to reimagine the governance of digital services, data, artificial intelligence, and business models so that digitalization helps achieve carbon neutrality, resource autonomy, and economic resilience.

dribbble.com/arashmanoo@ehri

ECDF LAUNCHES WORKING PAPER ON DIGITALIZATION

Whether it's the transformation of the world of work, cryptocurrencies, or electronic textiles – digitalization is affecting almost all areas of our society. The ECDF Working Paper Series is intended to reflect this diversity: The open publication series features 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.

"The goal of the series is to identify interdisciplinary perspectives and approaches to cross-disciplinary research problems and to promote strategies for solutions that have a view to all of society. The series is therefore aimed not only at scholars but also at political decision-makers, companies, NGOs, and the interested public," stated Tilman Santarius, ECDF

Professor of Social-Ecological Transformation and Sustainable Digitalization at TU Berlin and co-initiator of the paper series.

In the first paper of the series, ECDF Professor Philipp Staab, Dominik Pietrón, and Florian Hofmann focus on the design of digital markets. The authors argue for a sustainable circular economy that serves both the public and sustainability goals. Other papers in the series focus on design in the context of digitalization and the climate crisis, the digitalization of industrial agriculture, and how digital innovations can contribute to economies that are resilient and not dependent on growth. In total, four papers by international scholars and ECDF members were published in the series in 2022, and more will follow in 2023.

AWARDS

ECDF PROFESSORS RECEIVE RECOGNITION FOR RESEARCH

//PROF. DR. LYDIA KAISER WINS FTAFELICITAS AWARD IN THE "ROLE MODEL" CATEGORY

Striking a balance career and family – this is a very personal topic for ECDF Professor Lydia Kaiser. For her commitment in the field, the ECDF Professor of Digital Engineering 4.0. won this year's FTAfelicitas Award from Femtec.Alumnae e.V. in the "role model" category. The annual prize is intended to accelerate the advancement of women in STEM professions and send a signal that women and technology go very well together.

"We need many role models because as individuals we encompass many roles." KAISER

"I am very happy about the award because the topic is personally close to my heart. I hope that I and all the other nominated and awarded women encourage many other girls and women to follow a similar path. Women and technology have never been mutually exclusive," said Kaiser.

The prize is awarded in three categories: to people who make a special contribution to networks for women in STEM professions and in leadership positions in general; to people who promote women – especially in STEM professions – and support them in their individual career planning; and to people who act as role models for men and women and inspire them to change existing patterns.

In 2022, Kaiser won in the third category, "role models," following in the footsteps of Mai Thi Nguyen-Kim, science journalist and founder of maiLab, among others. "Role models show us possible paths. We are often faced with decisions and feel insecure if we take a new, seemingly unusual path. Role models can inspire, motivate, or set an example. Therefore, my invitation is: Get out to the stations in life where you felt uncertain and inspire the next generation. We need many role models because as individuals we encompass many roles. That's why I think it's great that associations like Femtec.Alumnae e.V. have made it their mission to raise awareness and visibility," said Kaiser, who completed her doctorate in engineering.

She also takes this approach herself in relation to her dual role as scholar and mother: "I'm a mother of three, and until a few years ago, balancing a professorship and my children was unimaginable to me. But it worked! I would like us to change the way we work so that women after me no longer have to ask themselves the question of whether a professorship and a family are compatible. With this dual role, I also want to be a role model for other women in science and encourage them to do the same," Kaiser said.

In addition to Lydia Kaiser, Fränzi Kühne, Chief Digital Officer of edding AG and author, and Tuesday Porter, Supervisory Board member and Head of Group Representative Office TÜV NORD GROUP, were also honored this year. Kaiser will be part of the seven-member jury for the FTAfelicitas Prize 2023 and will award this year's prize winners.

//MORE SAFETY IN BICYCLE TRAFFIC: SIMRA WINS GERMAN BICYCLE AWARD

With the help of the SimRa app (Safety in Cycling), cyclists can record their journeys. The acceleration sensors of the smartphone are used to detect dangerous situations. For more than four years, rides have been recorded via the app in a data-protection-compliant manner; in 2022, the ECDF project won the German Bicycle Award.

"We were very happy to be nominated together with such great projects. And of course we are absolutely thrilled to have won!" said David Bermbach, head of the project and professor at the ECDF and TU Berlin. While accidents are statistically recorded, finding data on near misses is difficult. Bermbach and his team want to use SimRa to make road traffic safer, and to do so they are relying on citizen science: "With our app, laypeople, in this case all cyclists, can systematically collect data. Subsequently, this data will be made available to research and transportation planning to identify locations where hazardous situations are more likely to occur." This concept has already been working in Berlin since 2019 and has since been expanded to many other regions in Germany. In the course of this expansion, the project has also started to work closely with other bicycle projects, for example the OpenBikeSensor from Stuttgart, as well as other universities, municipalities, and interest groups.

SimRa also has an important side effect in mind: "By making cycling safer, it also makes it more attractive, reducing CO2 emissions. In this way, we can contribute to greater sustainability in road traffic," said Bermbach. In addition, the project is also committed to Open Science, which means that all collected data as well as the source code of the SimRa app are openly available and can also be used for other projects.

The German Bicycle Award is a nationwide competition to promote cycling in Germany and was presented for the 22nd time in 2022. SimRa shares first place with the "Open-BikeSensor" project in the Service & Communication category. The two awards in the categories Infrastructure and Service & Communication honor projects and measures that help to improve conditions for cycling in everyday life, leisure, or tourism.

//WIWO RANKING: PROF. TIMM TEUBNER ONCE AGAIN AMONG TOP BUSINESS RESEARCHERS

In WirtschaftsWoche's Business Administration Researcher Ranking 2022, ECDF Professor Timm Teubner once again performed well: In the ranking of young researchers, Teubner made it into the "Top 40 under 40."

Every two years, WirtschaftsWoche honors the scholars with the strongest research in business administration and economics. This year Teubner made the list for the second time: "I am very happy about my good placement in the ranking. This will hopefully make my research more visible outside of academia," Teubner said.

Weighting is based on the quality and reputation of the journals: Each publication in one of 22 top international journals earns a full point, after which the scoring scheme goes down to 0.025 points. The current

ranking refers to publications of the past five years from German-language chairs and Fraunhofer and Max Planck Institutes. The ranking is compiled by the KOF Research Institute at ETH Zurich together with the Düsseldorf Institute for Competition Economics on behalf of WirtschaftsWoche, and the bibliometric web portal Forschungsmonitoring serves as the data source.

As part of his professorship "Trust in Digital Services," Teubner is working on fake reviews in online commerce, among other topics: "Many merchants have strong incentives to acquire and use fake reviews because of the significant economic impact of (positive) reviews. At the same time, however, large platform operators such as Amazon or Google have very little interest in completely preventing fake reviews. From a research and consumer protection perspective, detecting fake reviews is therefore essential," Teubner said. Since it is generally impossible to tell whether a review is honest or purchased, the metadata structure of the reviews, products, and reviewers plays an important role in detection.

ECDF/PR/Felix Noak

INTERNATIONAL ACTIVITIES

Digital transformation affects business, science, and society worldwide. As a result, researchers around the world are facing the challenges of digital transformation. Global networking and international cooperation with these researchers is of particular importance to the ECDF. The professors maintain active dialogues with universities and companies in the USA, Australia, Canada, Italy, and Norway, to name but a few. International activities range from conference participation and guest stays at universities to joint publications and research projects with partners from all over the world. Contributions to international conferences, workshops, professional meetings, or symposia are an important aspect of the academic and scientific work of ECDF professors. These events provide them with good opportunities to share their research findings and are ideal venues for discussions and networking.

Below we present a selection of the ECDF's activities in 2022.

//SWEDEN

The Digital Futures research center in Stockholm, Sweden, at KTH Royal Institute of Technology, aims to solve societal challenges through digital transformation. The establishment of the center was inspired by the ECDF. The research institutions in Berlin and Stockholm cooperate closely with each other. A delegation from Sweden visited the ECDF in the summer of 2022. The participants gave each other insights into the activities of the respective centers and conducted workshops to discuss topics related to project management, science communication, and stakeholder management.

//TOGO

Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi organized an interdisciplinary field trip with students to Togo in April and May 2022. Students from TU Berlin and UdK Berlin visited Lomé and Aného in Togo as part of a DAAD-funded student exchange program. The field trip was part of the collaboration with Prof. Mathilde ter Heijne (Performance Art & Media, UdK Berlin), Sénamé Koffi Agbodjinou (Architect & Anthropologist, Woelabs Lomé), and the University of Lomé (Programs of Postcolonial Studies, Stage Design and Theater).

//LATIN AMERICA, ASIA, AND AFRICA

In May 2022, Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi organized the international conference "Hackers, Makers, Thinkers – Collective Experiments in Social Fermenting" at Berlin Open Lab (TU Berlin / UdK Berlin) in close collaboration with Art Laboratory Berlin.

The symposium explored the different open source practices and cultures in Europe, Latin America, Asia, and Africa, inviting experts from Lomé (Togo), Yogyakarta (Indonesia), and Mexico City (Mexico), among others.

They presented artistic experiments – from farming to coding – as tools of empowerment and knowledge acquisition. During the conference, researchers, designers, artists, and activists critically explored topics such as indigenous (agrarian) culture and social fermentation, cosmologies and biopolitics, and pre-colonial coding practices as philosophies and forms of embodiment and data processing.

//JAPAN

Prof. Dr. Guillermo Gallego was involved in preparing an application for the extension of the DAAD exchange program with Japan in 2022. It is a cooperative project between TU Berlin and Keio University, Japan. A visiting doctoral student, Shintaro Shiba, has been conducting research in Prof. Guillermo Gallego's team since October 2021. "Shintaro Shiba will be in my lab until he receives his doctorate in September 2023. His research stay has been very successful. In cooperation with other students from my lab, he has written five papers so far," reported Prof. Dr. Guillermo Gallego.

//USA

After his stay at the ECDF in summer 2020, Prof. Alex Glaser will continue to cooperate closely with the ECDF professors as an Associate Member. Prof. Dr. Guillermo visited him in September 2022 as part of a stay as a visiting scholar at Princeton University, USA. Currently, the two scholars are writing a proposal to research the use of event cameras in remote inspection of nuclear facilities, among other applications.

//UNITED KINGDOM

Prof. Dr. Guillermo Gallego has established a collaborative project with biology professors Alex Kacelnik and Tom Hart (University of Oxford) as part of the Oxford Berlin Research Partnership (OXBER) and the Cluster of Excellence "Science of Intelligence (SCIoI)." The project aims to study the behavior of penguins in Antarctica during the breeding season. The ECDF professor's lab provides a novel remote sensing technology (event cameras) to study penguin behavior with higher temporal frequency and lower energy and bandwidth requirements than previous methods. The team began analyzing data collected in 2022 and is preparing two publications for 2023.

//NETHERLANDS

In April 2022, Prof. Dr. Leonid Goubergrits was a speaker at the 17th "International Symposium on Biomechanics in Vascular Biology and Cardiovascular Disease" in Rotterdam, the Netherlands. There he gave a lecture on "Deep Learning-Based Assessment of the Aortic Valve Stenosis Hemodynamics," among other topics.

//ITALY

Prof. Dr. Andrea Cominola is co-author of a report for the Italian Ministry of Infrastructure and Sustainable Mobility. As a member of a commission of experts, he worked on the report on "Climate Change, Infrastructure and Mobility." This initiative was led by Prof. Carlo Carraro (Vice-Chair – IPCC Working Group III, et al.). The report was published in early 2022 and subsequently discussed publicly with the Italian Minister of Infrastructure and Sustainable Mobility.

SCIENTIFIC EXPERTISE

ECDF professors are considered important contacts for governments, associations, and non-governmental organizations at the federal and state levels on topics related to digital transformation. For example, Prof. Dr. Lydia Kaiser is a member of the Digital Council of the Federal Ministry of Defense. In 2022, the following activity was added:

//FLOOD DISASTER AHR VALLEY: PROF. DR. LARS GERHOLD AS EXPERT IN THE COMMITTEE ON INTERNAL AFFAIRS

Almost exactly one year after the flood disaster on the river Ahr in North Rhine-Westphalia and Rhineland-Palatinate, the event as well as the future of civil protection and disaster relief were the subject of a hearing of the Committee on Internal Affairs in the German Bundestag. Prof. Dr. Lars Gerhold, head of the WG Interdisciplinary Security Research and the affiliated Public Safety Research Forum as well as Principal Investigator at the ECDF, was one of the ten experts invited to speak on the topic.

In his statement, Gerhold emphasized above all the role of science and research and the importance of transferring academic findings to policy and practice. For Gerhold, two points in particular are especially important from a scientific perspective for the future of civil protection: One is the consideration of existing research findings. These are already available on a wide range of issues but are not finding their way into policy.

Therefore, it is necessary to establish a scientific transfer office that is financed over a long period of time and that can work, plan, and accompany the transfer of the results with an eye to the future. Gerhold refers to this as catalytic science: "Communication about the findings of this research and the innovations it produces must be accompanied by a reduction in complexity even though this may mean detailed knowledge and precise accuracy are sacrificed. To deal with this successfully, the catalytic science approach should be strengthened: There is a need for a transfer office that systematically processes knowledge from inter- and transdisciplinary security research and presents the relevant information in an easily accessible and comprehensible form to enable a dialogue and trusting communication between science and politics."

In addition, a position for strategic foresight should be created. It could, for example, be affiliated with the Joint Competence Center for Civil Protection (GeKoB) of the Federal Office of Civil Protection and Disaster Assistance (BBK), in order to be able to expand situation-oriented work to include an overarching and long-term perspective. Central questions to be dealt with in such a body are those concerning orientation and action knowledge, whereby primarily social change processes should be included and the focus should not only be on technical solutions.

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/ ASSOCIATED MEMBERS

OVERVIEW OF ASSOCIATED MEMBERS

Since it was founded, the ECDF has shown great interest in looking beyond its own scientific horizons and incorporating external expertise into its digitalization research. An effective means to this end is appointing distinguished (inter)national scientists and researchers as Associated Members. They add valuable research aspects to the ECDF portfolio.

Name	Research area	Institution	Associated since
Prof. Dr. Peter Hildebrand	Biophysical Spectroscopy, Imaging, Computer Simulation	Leipzig University	May 2018
Prof. Brian Kobilka	G-Protein Coupled Receptors	Stanford University, USA	May 2018
Prof. Dr. Dr. Ayad Al-Ani	Change Management and Consulting	Stellenbosch University, School of Public Leadership, South Africa	February 2019
Dr. Julius Emmrich	Neurology and Neuroscience	Charité – Universitätsmedizin Berlin	August 2019
Dr. Samuel Knauss	Neurology and Neuroscience	Charité – Universitätsmedizin Berlin	August 2019
Prof. Dr. Janina Sundermeier	Business Administration, Digital Entrepreneurship, and Diversity	FU Berlin	November 2019
Prof. Dr. Meike Hopp	Digital Provenance Research	TU Berlin	December 2019
Prof. Dr. Silvia Polla	Archaeoinformatics	FU Berlin	June 2020
Prof. Dr. Juliane Siegeris	Software Engineering	HTW Berlin	July 2021
Prof. Dr. Alex Glaser	Digital Peace Research	Princeton University, USA	July 2022
Dr. Thomas Ramge	Sociology of Technology	ECDF	April 2022
Prof. Daniela Rosner, PhD	Human Centered Design & Engineering	University of Washington	June 2022

Privat

PROF. DANIELA ROSNER, PHD

Human Centered Design & Engineering

Daniela Rosner has been an Associate Professor of Human Centered Design & Engineering (HCDE) at the University of Washington and an Associate Member of the ECDF since 2022. She holds a bachelor's degree in graphic design from the Rhode Island School of Design and a master's degree in computer science from the University of Chicago. She received her Ph.D. from the University of California, Berkeley in 2012.

Rosner's work lies at the intersection of design theory and science and technology studies, where she explores the social, political, and material circumstances of technology development: "One focus of my research is material extinction in computing. Many textile techniques are not considered part of computer science. For example, early forms of computer memory, known as core memory, were developed using processes similar to weaving and embroidery. This was used on NASA's first mission to the moon and back and allowed the rocket to be controlled. Textile art is critical to the development of core memory, but has never been recognized as such because the people who do the work are marked as 'other,'" she stated.

One of her recent projects explores discourses of bias and trust in AI research, illuminating how technologists embed their own assumptions and stereotypes in AI, particularly cultural biases and their interaction with material biases.

"I am passionate about redefining design to challenge the prevailing paradigms within the field, but also to change the practice of design itself," Rosner stated. For her, this includes questioning what is commonly considered "design" to include narratives that have long been silenced. Another focus is to inspire and encourage the next generation of designers, engineers, and researchers to think critically about the social, political, and material implications of technology.

Rosner is already familiar with the Berlin science scene: Prior to joining the ECDF, she was a visiting professor at HU Berlin and worked as an artist-in-residence at the Max Planck Institute for the History of Science, where she further developed a course on design methods based on her book Critical Fabulations, which explores the unintended consequences of material choices in technological developments: "Reworking the Methods and Margins of Design." "I am especially looking forward to continuing my work with ECDF Professor Berit Greinke and starting more interdisciplinary projects with new colleagues at the ECDF," Rosner added.

Privat

DR. THOMAS RAMGE

Science journalist and non-fiction author

Dr. Thomas Ramge is a science journalist and non-fiction author. He has been an Associate Member at the ECDF since April 2022. Ramge researches and writes on the interactions between technology, business, and society.

Ramge earned his doctorate in sociology of technology, looking more specifically at AI-assisted decision support at the Hochschule für Bildende Künste Braunschweig. In his research, he is primarily concerned with questions such as: How can machine learning and the wealth of data help us humans make more informed decisions? What kind of decisions can and should humans delegate completely to IT systems and which ones always need a "human-in-the-loop"? "As part of my Associate Membership at the ECDF, I want to create transfer knowledge that helps decision makers use smart machines in smart ways for decision-making. In this way, I would like to narrow the scientific gaps between data use, visualization, and decisions," stated Ramge, who was born in Hesse.

Since January 2021, he has hosted the SPRIND podcast for the Federal Agency for Disruptive Innovation. The disruptive innovations the podcast is about are products, services, and systems that make life tangibly and sustainably better and that can serve as answers to the social, environmental, and economic challenges of our time. That sounds abstract, but we can find disruptive innovations everywhere:

"With the real Internet smartphone, brought into the world by Steve Jobs in 2007, we carry a disruptive innovation in our pockets and can't keep our hands off it. What will come next? No one can know, because unpredictability is in the nature of disruptive innovation," Ramge said. In the podcast, Ramge regularly asks experts such as Prof. Dr. Ursula Müller-Werdan, gerontologist at the Charité – Universitätsmedizin Berlin, whether eternal life is conceivable, or Frank Wernecke, founder of DroneMasters, when we'll have flying taxi cabs.

Ramge began his journalistic career at SWR, ARD, and Deutsche Welle. Later, he wrote primarily for the business magazine brand eins and for a number of English-language publications, such as "The Economist," "Harvard Business Review," and "MIT Sloan Management Review." As an author, Thomas Ramge has published around 20 non-fiction books, including "Mensch und Maschine," "Augmented Intelligence," "Reinventing Capitalism in the Age of Big Data" and "Access Rules" (together with Viktor Mayer-Schönberger), and "Sprunginnovation" (together with Rafael Laguna de la Vera). He is an Alumni Senior Research Fellow at the Weizenbaum Institute for the Networked Society and the Center for Advanced Internet Studies (CAIS).

/ TEACHING AND YOUNG SCHOLAR DEVELOPMENT

/ JOINT TEACHING / IDE3A / HEIBRIDS

TEACHING AND YOUNG SCHOLAR DEVELOPMENT

From day one, the ECDF has played an important role as a driving force in Berlin's scientific landscape with more than 1,000 professors and over 120,000 students. As a platform for systematic, research-led knowledge exchange, the ECDF has forged new links that are also reflected in joint teaching and support for young researchers – including the HEIBRiDS graduate program, joint teaching opportunities, and events.

Thus, the additional ECDF professorships also strengthen teaching capacities at Berlin's universities and other higher education institutions. Through the ECDF, students can be offered research-oriented and relevant teaching that expands the spectrum in degree programs to include innovative topics in digitalization. These include advanced research areas such as blockchain technologies, mobile cloud computing, quantum computing, data science, and online platforms. Lectures, seminars, and exercises teach important learning contents such as programming with Java, anonymity and privacy on the Internet, advanced protocols of Internet communication, or "Data Science and Artificial Intelligence for Urban Water Management."

In order to get young people interested in quantum technology, Prof. Dr. Janik Wolters has developed the "Escape Challenge Quantum Technology" together with the "EsCQuTe" project at TU Berlin. The gripping puzzle game – similar to an escape room – makes the application and benefits of quantum technology tangible. The Escape Room is located in the ECDF in the Robert Koch Forum and was presented to the public at the Long Night of the Sciences (LNDW) 2022, among other events.

"LNDW was a fitting occasion for us to open the doors of our Escape Room at the ECDF, along with many other exciting projects. After a short time, all our slots were fully booked, so we had our hands full. We adjusted the playing time of the Escape Room for the LNDW a bit by adding additional hints, so that we could complete a run-through including briefing and debriefing within one hour," said the initiators.

In 2022, joint courses were also successfully offered and conducted by ECDF professors at universities, other higher education institutions, and the Charité – Universitätsmedizin Berlin. Among them, for example, were the courses "Smart Sensing" and "Smart Cities" as well as the "2022 Smart City Hackathon," which Prof. Dr. Andrea Cominola organized and conducted in collaboration with other ECDF professors and researchers involved in the "ide3a" project. These include Prof. Dr. Odej Kao, Prof. Dr. Paul Thamsen, Prof. Dr. Sangyoung Park, and Prof. Jochen Rabe. The second edition of the "Critical Infrastructure and Digitalization" course in the ide3a project was offered mainly in digital form, including an on-site workshop at the ECDF and a field trip in Berlin. Students from TU Berlin and other partner universities of the ide3a network (Norwegian University of Science and Technology, Politecnico di Milano, Cracow University of Technology, Dublin City University, and Hasso Plattner Institute) participated in the course. "Twenty-four students successfully completed the course. Student engagement has increased compared to 2021 and feedback after the course has been very positive," reported Prof. Dr. Andrea Cominola.

HEIBRIDS

**HELMHOLTZ EINSTEIN INTERNATIONAL
BERLIN RESEARCH SCHOOL IN DATA SCIENCE**

Founded in 2018, the Helmholtz Einstein International Berlin Research School in Data Science – HEIBRiDS for short – is an interdisciplinary program from the ECDF and the Helmholtz Association that trains young scholars at the interface of data science and other academic disciplines. The goal is to train a generation of researchers who are exceptional data scientists and who understand the demands and challenges of disciplines in which data science is a necessity.

A supervisory committee and a combination of a core training program and individually selectable courses form the basis of the HEIBRiDS curriculum. Doctoral students develop advanced programming skills and experience with data management systems that complement applied knowledge in their field.

In the first round of recruitment, which took place in spring 2018, 13 doctoral students were selected to start their projects in fall 2018. Two students in this first cohort very successfully completed the HEIBRiDS program in 2022, received doctoral degrees, and entered academic or private-sector careers. Additional recruitment rounds in spring 2019 and the beginning of 2020 allowed a total of 13 outstanding candidates to start in the HEIBRiDS program. With the latest round of applications, seven prospective doctoral students were recruited. They began work on their projects in the fall of 2022.

//EVALUATION OF HEIBRIDS IN OCTOBER 2022

On October 13-14, 2022, the Helmholtz Einstein International Berlin Research School in Data Science was evaluated by an international jury.

"The interdisciplinary profile of HEIBRiDS uniquely prepares students for important tasks in industry and science." Quote from the Evaluation Report

The jury reached the decision that HEIBRiDS is on a good track in terms of its main objectives. The curriculum and structure of the training program were praised. Students' needs are being addressed while providing flexibility, the panel noted. The jury's report states that the program's cross-cutting theme generates data science synergies among research fields and promotes the exchange of technology and expertise. Data-driven research within participating institutions is networked. The report emphasized that the interdisciplinary profile of HEIBRiDS uniquely prepares students for important tasks in industry and academia. In particular, the jury appreciated that the students form a close-knit community, even though they work physically distant from each other at their respective institutes.

The report notes that the Research School is achieving its key recruitment goals at both the national and international levels and is attracting high-quality talent. The panel strongly recommended that the Research School in Data Science be continued.

USING LIGHT TO ACHIEVE MORE ENERGY EFFICIENCY IN MACHINE LEARNING: ELIZABETH ROBERTSON DEVELOPS PHOTONIC PROCESSORS

Elizabeth Robertson is a 2020 HEIBRiDS doctoral student working on the topic of "Building a Photonic Processor for Energy-Efficient AI." Her supervisors are ECDF Professors Prof. Dr. Janik Wolters from the German Aerospace Center (DLR) and Prof. Dr. Guillermo Gallego from TU Berlin. At the DLR, she works at the Institute for Optical Sensor Systems. In an interview with the scientific coordinator of the HEIBRiDS graduate program, Dr. Sandra Pravica, she takes stock of her ongoing dissertation.

The title of your project sounds as if you are developing the computer of the future. Could you briefly explain the advantages of a photonic processor over a classical computer architecture?
I'd be happy to. We try to use light for our computing processes. There is an operation that is important for artificial intelligence and especially for machine learning that is called convolution. It is used in what are known as "Convolutional Neural Networks," and is relevant for image processing. It is also currently becoming the industry standard. In processing, the operation of convolution alone usually takes 80 percent of the total computing time. This is a serious limitation. We are interested in finding alternative computing methods that speed up the process. With the help of optics, we can theoretically achieve this with less energy input by using lenses. This allows the convolution to be performed with no or very little energy input.

So photonic processors are not only more energy efficient, but also faster than conventional computer architectures?
Exactly. The good thing about light is that it is the fastest thing we have. It can also be modulated and adjusted extremely quickly. Very fast computers currently operate at speeds or frequencies of about one gigahertz. With light we can reach speeds up to femtoseconds and sometimes attoseconds, at least for lasers.

That sounds unimaginably fast. What difficulties does this pose?
We are definitely able to run our computers faster on this basis. The main problem is that our optical processors are still dependent on electronics. That's where our limitations are at the moment, especially in supplying the systems with information. It's all about how electronics can keep up with light, so to speak.

Why is this approach called "post-digital"?
When we work with light, we don't have to adhere to the digital paradigm. The light, or the amplitude of the light, is continuous.

The idea of analog computing is based on this. When Alan Turing invented the computer, he imagined something that worked with ones and zeros. Since the advent of vacuum tubes and transistors, research and development has focused on digital data processing based on this concept. The idea of the analogue computer working with a continuous spectrum of numerical values was initially explored, but then dropped because ones and zeros are, or at least initially were, more resis-

tant to noise. Now we basically want to go back to the analogue idea.

Your research is particularly relevant where large amounts of computation must be performed, but energy and time are limited in many cases, for example in security systems, drones, or satellites. Can you imagine photonic processors having an impact on daily life as well?

I find that rather hard to imagine, since not everyone needs access to a supercomputer in their daily lives – at least not yet. In everyday life, digital systems actually work very well. However, if we want to know where we as humans come from or who we are, then machine learning with photonic processors can be very useful. Take, for example, "remote sensing," the remote detection of objects using data streaming from a satellite. For this, it is essential that we can work with high-resolution image data. Basically, there are two options: We can transfer the image from the satellite to Earth and then try to apply some kind of machine learning to it. Unfortunately, this is slow and almost impossible for high-resolution images because of the stringent power consumption restrictions on satellites. Or one could perform energy-saving machine learning directly on board and only need to send the results back to Earth. For the prospects of science and knowledge about our planet, this definitely takes us a step further.

Do you have a degree in computer science or physics?

In fact, I have both. I completed my bachelor's and master's degrees at the University of Durham. There is a general degree in science there where you can put together subjects that you like. I started with math, physics, and computer science and then stopped math. I stayed with computer science and physics. In this respect, I have been interested in both areas for quite some time.

Do disciplinary boundaries or differences matter at all in your field?

Yes, definitely. I often find myself explaining the principles of machine learning to my physics colleagues. My professor jokingly calls me the machine learning expert of our group. I mainly work with physicists specialized in single photon sources. They conduct research on quantum mechanics and deal, for example, with creating reliable quanta. I, on the other hand, spend time on machine learning questions: How can we apply it to different physics projects? What kind of processes do we want to make faster? I also think about applications for my colleagues' projects. For example, some of them are working on a quantum memory that can hold light for a very short time. I spend some of my time optimizing these storage processes. My interdisciplinary perspective is an advantage, and I feel very valued with it as a graduate student in the research group.

What has been the biggest challenge as a HEIBRiDS PhD so far – be it personal or professional?

I started in 2020, which was during the Covid-19 pandemic. This was difficult because our optical neural networks are physical laser experiments performed in the laboratory. It was only after about eight months that I had access to the laboratory. This set me back a bit in my ability to build experiments. It wasn't until I got into the lab that I was able to really move things forward. My project is not just about theory; you also have to know how to place a laser on a table, for example, and have it shine properly on the devices that do the optical processing. After all, I develop hardware.

I really like that hands-on element of not only sitting at the computer, but also screwing on and aligning lasers, operating equipment, and communicating with everyone. I would also say that it is not standard to work with experiments in the context of HEIBRiDS. While many doctoral students have a data set to which they apply different methods, I have a physical experiment. In some of my cases, my data set is messy because the experiment itself is noisy and does things it shouldn't.

Why would you recommend that potential applicants do their doctorate at the HEIBRiDS graduate program?

I find the framework that HEIBRiDS provides very useful. Our bi-weekly meetings help me reflect and refocus. We always start with an open round – everyone reports what they have been working on for the past two weeks. That makes me reflect and I can see what should go differently in the coming weeks. The other doctoral students are extremely important. The opportunity to present and discuss your work in front of these smart people is very valuable. Because of the good compensation, the positions are attractive for excellent talents. The requirements are correspondingly high, but this means that you end up with very good candidates.

What are your plans after your doctorate?

I've been asking myself that a lot lately. I would like to stay in academia and take a postdoc position after my doctorate. I really like the scientific work, the flat hierarchies, and the way we work with the professors as a team, for example when publishing an article. On the other hand, I find the working conditions in academia before you get a permanent position problematic. There's the heavy workload that makes it hard to imagine raising a family. Working precariously on temporary contracts is also difficult. Once you have a permanent position, you are more flexible. If I were offered a stable industry job that challenged me in a similar way to scientific work, then that would also be an option for me. However, if the work-life balance for professors were to improve, I would choose the academic path.

**HEIBRIDS PHD SEMINAR
OCTOBER 19, 2022**

OVERVIEW OF DOCTORAL PROJECTS

Name of the doctoral candidate	Working title of the 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) and Guillermo Gallego (ECDF, TU)	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 (TU)	2022
Viktoriia Huryn	Multi-Resolution Models for Single-Cell Genomics Data	Uwe Ohler (MDC) and Markus Schuelke-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, TU), and Frederich 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 TU)	2020

Name of the doctoral candidate	Working title of the doctorate	Supervisors	Cohort
Oleksii Martynchuk	Identification of Rock Falls in Mars Reconnaissance Orbiter Images Using Machine Learning	Jürgen Oberst (DLR) and Odej Kao (ECDF TU)	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 TU)	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 TU) 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 Behaviours for Flood Risk Assessment in Coupled Human-Environment Systems	Andrea Cominola (ECDF TU) 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

/ NETWORK

/ WEIZENBAUM INSTITUTE / ALEXANDER VON HUMBOLDT INSTITUTE FOR INTERNET AND SOCIETY (HIIG) / INSTITUTE MINES-TÉLÉCOM ATLANTIQUE / DIGITAL URBAN CENTER FOR AGING AND HEALTH (DUCAH) / GENDER & DIVERSITY NETWORK

ECDF/PR/Felix Noak

THE ECDF'S SCIENTIFIC NETWORK

The founding of the ECDF was also linked to the idea that a critical mass of experts in the field of digital transformation would come together and, by linking up with the existing research centers, strengthen Berlin as a digital location – thus attracting further digitalization projects. This expectation has been fulfilled, as the national centers on key aspects

– Big Data, machine learning and artificial intelligence, the impact of the Internet on society, and technology – have been assigned to Berlin. In the following, examples of highlight projects now established in Berlin with which the ECDF maintains close collaborations are presented.

ECDF/PR/Felix Noak

FUTURE-IOT SUMMER SCHOOL: INTERNET OF THINGS MEETS AUTONOMY

The Internet of Things (IoT) connects everyday objects – smartphones with Bluetooth speakers and smartwatches – but also networks medical devices with each other and is also used in logistics, for example. The Future-IoT Summer School brought together (PhD) students, experts, and companies to spend a week listening to exciting lectures, exploring the city, and working on challenges around the topic of IoT, because the Internet of Things has already become part of our everyday lives.

The fifth edition of the Summer School was dedicated to the topic "IoT meets Autonomy": Many of the computer systems around us operate autonomously, simply running without any human intervention at all. They adapt to their environment or evolve with machine learning; however, implementing such features is often challenging: "The challenges are not only technical, but also ethical, social, and legal, so we are dedicating this edition of the Summer School to the theme of 'autonomy.' In the challenges, participants will explore different forms of autonomy using the IoT as a use case. The topics covered include data analysis, machine learning, IoT protocols, and cybersecurity," stated Prof. Dr. Marc-Oliver Pahl, initiator and director of the Summer School and professor of Cybersecurity at the IMT Atlantique in France.

In the Summer School, the focus was primarily on the Internet of Things in Industry (IIoT). ECDF Board member Dr. Jochen Schiller, Professor for Computer Science at FU Berlin, welcomed participants to the ECDF: "Much more than any of the computers we

interact with and see every day, the small computers on the Internet of Things will help shape our lives in the future. These billions of networked things must not only be controlled individually, but also operated reliably, robustly, and securely in their entirety. I therefore very much welcome the PhD School's 'IoT meets Autonomy' initiative, which brings young PhD students closer to things in the Internet of Things in a variety of hands-on ways and sheds light on their fascinating possibilities, as well as their limitations, particularly with regard to their (semi-)autonomous operation, from many different angles," said Schiller.

After the introductory keynote on "IoT meets AI," Prof. Dr. Falko Dressler, Chair of Telecommunications Networks at the Faculty of Electrical Engineering and Computer Science at TU Berlin and Principal Investigator at the ECDF, introduced cyber-physical systems; this was followed by contributions such as those from Airbus on autonomy and innovation as a pathfinder for the aviation industry, Siemens on autonomy and Industry 4.0, and Amazon Web Services on AI and the "Smart Territory Framework," which allows smart environments to be built with multiple sensors. In some of the challenges, the participants worked on real problems of the industrial partners: "During the week, the participants had the chance to gain insight into many different aspects of the Internet of Things: From device manufacturing to communication protocols and semantics to application management," stated Dr. Fabian Rhein, Manager Siemens Research and Innovation Ecosystems of Munich and Karlsruhe.

"During the week, the participants had the chance to gain insight into many different aspects of the Internet of Things: From device manufacturing to communication protocols and semantics to application management."
RHEIN

In the challenges, participants linked driving and grasping robots together, programmed clocks, LED tubes, and volume controls to blink simultaneously, and linked smart-home devices together to automatically set the optimal room temperature. Dr. Ana Maria Drăgulinescu, postdoc at the Universitatea Politehnica din București, attended the Summer School for the second time: "I participated in the Summer School on 'IoT meets AI' in Munich. The work at that time was great fun and also helped me a lot with my doctoral thesis. I'm excited to be back this year and work with my team on another challenge."

At the end of the week, the interdisciplinary jury was impressed by all the projects and chose the team

"Streams for Memes" as the winner of the Summer School. The team, consisting of students Samia Boutalbi, Lucas Camino, Vittorio Ferrentino, Catherine Sai, and Charles Thonier under the supervision of Prof. Dr. Marc-Oliver Pahl (IMT Atlantique), Lars Wüstrich (TUM), and Guillaume Neau (AWS), worked in their challenge to make it so that memes, i.e., images with text, are created from a livestream on the basis of predefined keywords – automatically when the word is mentioned.

As the School Series is a Franco-German cooperation, the next edition will take place in France in late summer 2023.

ECDF/PR/Felix Noak

ECDF & ELSEVIER: CONVERSATIONS ON SCIENCE IN THE DIGITAL FUTURE

Together with partner Elsevier, the ECDF launched a series of panel discussions in November 2022 that will focus on a wide variety of aspects of digitalization and its impact on the scientific enterprise. The event kicked off with the topic of data use in the research sector, which was discussed by Prof. Dr. Max von Grafenstein, Professor of Digital Self-Determination at the ECDF and UdK Berlin, Dr. IJsbrand Jan Aalbersberg, Senior VP of Research Integrity at Elsevier, and Prof. Dr. Wolfram Horstmann, Chairman of the Committee on Academic Library and Information Systems (AWBI) of the DFG. The event was moderated by journalist Katharina Heckendorf.

It is impossible to imagine the scientific publication process without data on research and scholars. The DFG's Committee on Academic Library and Information Systems issued a discussion paper in October 2021 that takes a critical look at the dangers that arise when such data and analyses end up in the hands of commercial vendors such as publishers and analytics companies. How can scholars, academic institutions, and publishers strike the right balance between protecting individual privacy, academic freedom, and the use of innovative digital technologies?

"Whatever we do with the data, we need to make sure we are using the data to advance research and help scientists publish and advance their careers. To me, that means that everything we do in terms of supporting rese-arch-based organizations has to be fair and that we really work toward diversity and inclusion," Aalbersberg said in his opening statement. For him, this also includes not collecting more data from users than is actually neces-

sary for this support. Since 2016, Elsevier no longer calls itself just a publisher, but also an information analytics company. According to Aalbersberg, this is also because academic institutions' expectations of publishers like Elsevier have changed: "Institutions want analytical infor-mation, they want to know how their academic institution compares to other academic institutions. To do that, we need to provide some analytical tools to make compari-sons."

For Wolfram Horstmann, one of the authors of the DFG paper, collecting such data can be detrimental to scho-lars: The usage data collected could be used to create a personal profile or steer researchers toward a journal from the same publisher or away from a particular topic. He finds the collection of behavioral data is particularly problematic: "What's being read, what's being clicked on, what's being zoomed in on, that's very specific data about the behavior of using the platforms. The reason researchers feel uncomfortable sharing this very data is that they are not quality controlled and are generally not relevant to the scientific information system." One of his biggest concerns is researcher usage data: Informa-tion that is not made public could be used to influence behavior.

Max von Grafenstein is particularly concerned that users could lose control over their usage data and how it is used. Usage data and personal profiles might be collected for one purpose, but later used for a comple-tely different one, often by a different actor. He draws a comparison to the case of Facebook's sale of usage data to Cambridge Analytica and that company's involvement

in political micro-targeting. What should be avoided is a power imbalance between publishers and individual scientists that would force the latter to disclose their personal data in order to publish scientific work. Von Grafenstein sees the danger that publishers become so powerful that they shape the way knowledge is produced because they decide which recommendations scientists receive. This would then lead to a weakening of the role of universities and libraries in the research ecosystem.

Aalbersberg agreed that literature recommendations need to balance helping beneficiaries with their research without steering them in a particular direction. This is currently done by making it transparent that recommendations are based on what has interested other users in the past. In addition, tracking could enable publishers to subsequently inform users about withdrawn articles, provided permission has been granted. Aalbersberg added: "It's our duty as publishers to use modern technology to advance science and healthcare, and that's exactly what we are expected to do. But we need to be aware of how we're doing it, and also ensure that users know how we're doing it, and that they can turn it off."

The last point is particularly important for Max von Grafenstein: It is critical that tracking can be turned off, especially for researchers in authoritarian regimes where the data collected could easily fall into the wrong hands.

All three experts agree that the General Data Protection Regulation rightly requires companies to ensure that

the benefits of data collection clearly outweigh the risks. Aalbersberg emphasized that Elsevier complies with current legislation. For Horstmann, however, this is not always sufficient, as interpretation is in a gray area in many scenarios, not just in the case of researchers' data: "Just because something is GDPR-compliant doesn't necessarily mean it meets all the ethical standards that science specifically would require of a system. While the task of industry is to make a profit, the task of science is to serve a universal purpose and to impart knowledge. These two interests are not necessarily always free of conflict, and that conflict of interest needs to be discussed."

In terms of governance, Horstmann suggested a scientific certification body run by academia or jointly by academia and publishers. Moreover, disclosing algorithms used for rankings, for example, would lead to immense gains in trust and transparency, he added. For von Grafenstein, the question is more fundamental: "We should talk about the functions that different actors should actually perform in the interest of society," he said. In his opinion, academic publishers today perform many of the functions of university libraries by helping users navigate and search for information. This trend presents a potential conflict of interest if not stopped.

In 2023, further events in the series will follow.

NETWORKING EVENT "TRANSFORMING COMMUNITIES"

The ECDF hosted the networking event "Transforming Communities" in cooperation with the German Research Center for Artificial Intelligence (DFKI) and the Berlin Open Lab (BOL) on May 23, 2022. The event was aimed at the ECDF's partner network and was a welcome opportunity to identify further cooperation potentials in personal exchange, after the networking activities in the two previous years had been mostly limited to the virtual space due to lockdown. The thematic focus on "Transforming Communities" also heralded the start of a new exchange format with ECDF network partners, based on the ECDF Industry Forum, which aims to increase the visibility of the focus areas of the ECDF Next Generation.

After the welcome by ECDF Bboard member Prof. Dr. Gesche Joost and the presentation of the ECDF-New Generation by ECDF Professor Michelle Christensen, researchers from the ECDF and DFKI presented their work in the field of digitalization research to the approximately 60 participants. The ECDF was represented by numerous researchers who, with the help of specially created installations and exhibits, presented to visitors in a kind of World Café the projects SimRa – Safety in

Cycling, BBBlockchain, Soundfolds, the Critical Maker Lab, and mTOMADY.

The participants were able to get a detailed picture of the interdisciplinary projects in personal discussions with the researchers. Afterwards, conversations continued over snacks and drinks in the courtyard of the BOL in fortunately sunny weather. Numerous points of contact were found for the continuation of existing projects and the initiation of new joint projects with current and new partners. "Since its founding, the ECDF has been a place of exchange between science, society, and industry. After two years of pandemic, it was important for us to get back together with our partners in person. That was inspiring!" summed up Gesche Joost.

After the successful start and positive feedback from the ECDF partners, the next networking events are already being planned with a view to the other topics of the ECDF New Generation "Integrated Health" and "Sustainable Cities."

LIVING LONGER BETTER – DIGITAL URBAN CENTER FOR AGING AND HEALTH (DUCAH)

At the Digital Urban Center for Aging and Health (DUCAH), scientists conduct research at the intersection of digitalization, urbanization, and health in urban neighborhoods, nursing care facilities, and hospitals. Together with the Foundation for Internet and Society and the Alexander von Humboldt Institute for Internet and Society (HIIG), the ECDF is one of the founding initiators of the interdisciplinary research center constituted in 2020. It sees itself as an accelerator for economic and technical, urban and social innovation in favor of preventive health and dignified aging. DUCAH was (co-) initiated by ECDF-PI Prof. Thomas Schildhauer and ECDF professors Felix Balzer and Tabea Flügge (both Charité – Universitätsmedizin Berlin). Together with the other participating ECDF professors Felix Biessmann (BHT), Leonid Goubergrits (Charité – Universitätsmedizin Berlin), Max von Grafenstein, Berit Greinke (both UdK Berlin), Philipp Staab (HU Berlin), Rita Streblow, and Florian Tschorsch (both TU Berlin) as well as the Associate ECDF Professor Daniel Fürstenau (Charité – Universitätsmedizin Berlin), they are significantly advancing DUCAH research.

With its interdisciplinary focus, the center aims to ensure that diverse perspectives are heard. How can companies successfully collaborate with other health-care stakeholders to develop new approaches for improved healthcare solutions? Do new technologies help older people in such a way that they can cope with their everyday lives in an empowered way? How can individual data control and user sovereignty be comprehensively ensured so that, for example, data donations can be used for medical research?

The goal of DUCAH is to support caregivers, relatives, and physicians with digital technologies in a humane, ethical, and sustainable way. Scientific analyses and their practical transfer are to lead to prototypes, which will continue to receive scientific support.

One example is the ComfortCube, which captures the various dimensions of interior room quality: It objectively measures temperature, air quality, noise level, and light. In addition, it asks for the subjective feelings of the residents via an on-screen menu. The uncomplicated data collection allows a comparison of the hard parameters with their individual perception – and thus the improvement of well-being. "The ComfortCube developed by Heinz Trox Wissenschafts gGmbH helps us at DUCAH to harmonize indoor comfort with energy-efficient facility concepts. For example, the elderly and those in need of care are at greater risk of hypo- and hyperthermia and are particularly sensitive to the thermal boundary conditions and extreme environmental conditions such as cold spells and heat waves," said Prof. Dr. Rita Streblow. Other planned research projects will focus, for example, on the use of AI in care, wearables in heart failure, and platforms in nursing care.

PROGRAMMED DISCRIMINATION?! HIIG, WEIZENBAUM, AND THE ECDF TOGETHER AT BERLIN SCIENCE WEEK

What does it mean when artificial intelligence increasingly determines our liberties and what consequences does the pre-programmed bias of algorithmic systems have for those affected? These questions were explored by the ECDF, the Alexander von Humboldt Institute for Internet and Society, and the Weizenbaum Institute for the Networked Society as part of Berlin Science Week.

"Artificial intelligence is only as good as the data on which it is based." BUOLAMWINI

About 200 viewers started the evening with the documentary film "Coded Bias" in the cinema Filmkunst 66. The documentary film deals with the problem of algorithmic discrimination and surveillance: "Artificial intelligence is only as good as the data on which it is based. And when that data comes from people who are unconsciously biased, it's reflected in the results," stated Joy Buolamwini, professor of Artificial Intelligence at MIT and the documentary's protagonist.

Buolamwini notes that facial recognition technology is unable to recognize her face as a black woman. This leads her to recognize that many algorithms may contain racial or sexist biases and thus contribute to discrimination. The film goes on to examine various examples of the use of algorithms, such as in lending, policing, and education. It becomes clear that algorithmic decisions are often difficult to understand and can have unintended consequences. The film therefore argues for a critical examination of the technology and for stronger regulation of algorithmic decisions to avoid discrimination and surveillance.

Following the screening, Helena Mihaljević (ECDF), Dr. Bianca Herlo (Weizenbaum Institute), Sarah Ciston (HIIG), and Sana Ahmad (Weizenbaum Institute) discussed the documentary from the perspective of the different disciplines of their respective research.

ECDF/PR/Felix Noak

ECDF GENDER & DIVERSITY NETWORK

In 2022, the Gender & Diversity Network was established at the ECDF. It originated from the ECDF's "Women in STEAM" initiative. Launched by ECDF professors and members Helena Mihaljević, Michelle Christensen, Christine Kurmeyer, Florian Conradi, Tabea Flügge, and Elisabeth Mayweg, the network aims to advance both more diverse and gender-equitable perspectives in digitalization research and diversity in research communities. The relevance of the topics of gender and diversity for specific aspects of digital transformation and its effects should also be made clear. "With the network, we also want to make it clear that all research topics have a gender and diversity aspect," said Dr. Christine Kurmeyer, one of the initiators of the network and a board member of the ECDF.

More than almost any other term, "digitalization" is associated with contradictory expectations and forecasts for social developments and for our lives and work. Science must therefore ask itself how it can contribute with its research to an inclusive digital society and thus to more equal opportunities, diversity, and digital empowerment – this was the starting point of the initiators. The ECDF aims to initiate a meaningful public debate on this topic, which will contribute to more diversity in information and communication technology research in Berlin and internationally.

"We want to understand diversity in a comprehensive, intersectional, and transdisciplinary sense," stated Prof. Dr. Michelle Christensen.

With this motivation, the network has proclaimed two promotional activities: The Gender & Diversity Project Funding Program and the ECDF Award for "Digitalization and Diversity." The first activity, the funding program, is designed to provide quick and straightforward support with a maximum of 2,000 Euros for smaller projects that aim to promote critical debate on diversity in the context of digitalization and advance inclusion and diversity in digitalization research and practice. Activities of ECDF-affiliated researchers, be they ECDF Professors, PIs, or Associate Members of the ECDF, as well as their staff and students, are eligible for funding. The second activity, the ECDF Award for "Digitalization and Diversity," is presented once a year to the best work dealing with gender and diversity issues in the context of digitalization. "Innovative exhibitions can be submitted, but also classic papers," stated Dr. Sandra Pravica, Scientific Coordinator of the network at the ECDF. ECDF professors as well as their doctoral students and postdocs can apply for the prize, which is endowed with 1,000 Euros.

HELLO DIVERSITY! – DIGITAL INNOVATIONS AND GENDER DIVERSITY

ogether with Franziska Schmitt (University of Flensburg) and Prof. Pauline Weritz (University of Twente), Prof. Janina Sundermeier (Associate Member of the ECDF, FU Berlin) hosted another event from the "Hello Diversity!" series at the ECDF on November 24/25, 2022. Under the title "Hello Diversity! Eventually Walk the Talk," the scholars organized a live podcast recording including a get-together afterwards as well as a digital "paper-a-thon." "The goal of the event was to create conversational bridges between academia and practice in order to identify challenges related to gender diversity in the field of digital innovation in joint discussions and to lay the foundation for interdisciplinary research projects," said Prof. Janina Sundermeier.

In preparation for the event, the initiators spoke with a total of 15 female founders, scientists, and experts for digital innovations about topics such as "Unconscious Biases," "Technical Confidence," "Digital Recruiting," and "Conversational AI" as part of an episode of the "Hello Diversity!" podcast produced especially for the event. The podcast recordings aimed to have guests share their experiences with gender diversity in digital innovation and highlight current challenges in dealing with it. Episode #12 was recorded as a live podcast at the event at the ECDF with an audience and includes an exciting conversation between renowned Prof. Maura McAdam (Dublin University) and Emilia Theye (founder of AI startup clear&me). Afterwards, a lively discussion ensued in

the audience and the evening ended with many satisfied participants.

The podcast recordings served primarily as inspiration for the paper-a-thon held the following day, which was attended by around 30 scholars from various nations and disciplines. The day began with a keynote address by Prof. McAdam and introduced the group sessions, in which teams of three to five remotely connected scholars developed research projects on issues around gender equality in digital innovation processes and outcomes. Various design thinking methods were used to guide participants through the day in a structured way and to foster creative processes and to jointly develop research questions, theoretical backgrounds, and exciting methodologies. At the end of the intensive day, each team presented an extended abstract of the project and defined objectives for further development and presentation of the project at international conferences.

The summary of the academic framing and findings of this event are scheduled to be published in early April 2023 in the internationally renowned journal "Communications of the Association of Information Systems" under the title "Hello Diversity! DiGiTal Ideation Hackathon: Fostering Gender Equality in Digital Innovation." The event was made possible by financial support from the Margherita von Brentano Center for Gender Studies at FU Berlin.

/ ROBERT KOCH FORUM

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

ROBERT KOCH FORUM
An interdisciplinary research and meeting place

//ECDF MICRO FACTORY

The Micro Factory is a workshop for building prototypes and models and plays an important role in developing ideas and solutions outside of traditional research structures. Here, scholars find support when they want to try out ideas and concepts or want to find a way to present their research in a visual and interactive way. The prototyping method has exciting approaches for this purpose – whether with paper, cardboard, digital mock-ups, or 3D printing. Prototyping provides researchers with early visual and haptic models from which initial results, challenges, or change requests can be derived. Physical computing is also used in the Micro Factory. Sensors and microcontrollers like "Arduino" are used to control electromechanical devices such as LEDs, motors, or other hardware. These systems are interesting for research projects in the fields of design, medicine, and architecture.

The Micro Factory is headed by industrial designer Friedrich Schmidgall, who supports and advises scientists and students – from the initial idea to conception and implementati

He offers workshops on "3D Printing," "Basics of Electronics," and "Arduino Microcontroller." The target audience is ECDF professors, research assistants, doctoral candidates, and students.

In 2022, Micro Factory introduced new workshops that focus on using prototyping tools such as 3D printers, laser cutters, and CNC mills. The collaboration with ECDF Professors Michelle Christensen and Florian

Conradi from the Berlin Open Lab plays an increasingly important role in this process.

Open Lab students are using the Micro Factory more and more to create particularly sophisticated prototypes for their design projects.

//DEMO AREA

The Demo Area was set up at the ECDF to allow visitors to experience the latest technology trends and research approaches. In this ever-changing space, prototypes and research results from various ECDF members (research institutions, industrial partners involved in joint projects, start-ups) are presented. The diversity of the exhibits illustrates the ECDF's interdisciplinary approach. The Demo Area functions as an exhibition space that simultaneously provides a constant source of new questions on the most diverse aspects of society, coexistence, culture, health as well as new forms of knowledge generation in a digital future. The Demo Area regularly attracts student groups, delegations, and international visitors. It is also a permanent fixture for guests at ECDF events.

Current exhibits include:

SIMRA – SAFETY IN BICYCLE TRAFFIC – A citizen science project by Prof. Dr. David Bermbach that collects and analyzes cycling data to identify locations where cyclists are often at risk.

In the Demo Area, the data recorded by an app is visualized. Visitors can see the first results on an animated 3D city model.

BBBLOCKCHAIN – An online participation platform based on blockchain technology. The project of Prof. Dr. Florian Tschorsch and Prof. Jochen Rabe explores new possibilities for digital citizen participation in urban development.

CONDUCTOR SUIT AND ELECTRONIC TEXTILES PROTOTYPES – With interactive prototypes, ECDF professors Berit Greinke, Emmanuel Baccelli, and Felix Biessmann explore 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.

DIGITAL TECHNOLOGIES FOR THE RECONSTRUCTION OF COMPLEX FACIAL DEFECTS – How are digital technologies used in medical practice?

This exhibit demonstrates the process of obtaining and processing patient data, which is then used to print 3D anatomical models. The project is led by Prof. Dr. Tabea Flügge.

FUTURE SECURITY LAB

Transferring innovations and findings from civil safety research

Civil safety research is at the heart of the activities of the Public Safety Research Forum and the Future Security Lab. Questions concerning safety in the public space are in the foreground and focus especially on civil protection and disaster control. The Public Safety Research Forum provides a dialogue space to discuss, elaborate, and explain issues within this field and to stimulate knowledge transfer.

The ECDF's Future Security Lab is a mainstay of these activities. It is a space of experimentation and communication. Using narrative scenarios and interactive elements, visitors are introduced to findings from civil safety research.

What seems abstract at first glance becomes very concrete when you look closer. For example, how can people be evacuated during a flood and what are alternative escape routes if central roads are flooded? How can firefighters find each other and rescue people more easily in heavily smoke-filled rooms? Or how can crisis managers coordinate all the volunteers in a targeted manner during disasters?

A workshop often complements a visit to the Future Security Lab. In addition to the immersive experience in the space of the Future Security Lab, this also creates

a space for dialogue and discussion with visitors from politics, administration, science, authorities, and organizations with public safety tasks.

Concrete opportunities and challenges around civil safety become tangible through discussion and interaction in the Future Security Lab.

Last year's activities focused on workshops with experts, for example from the Federal Academy for Security Policy (BAKS) or local authorities. In addition, numerous background discussions with politicians and an international workshop took place on the occasion of the implementation of a scenario for blood supply in crisis situations as part of critical infrastructure. Activities also focused on the further conceptual development of the Future Security Lab and the Public Safetyy Research Forum.

The Public Safety Research Forum under the scientific direction of Prof. Dr. Lars Gerhold and Prof. Dr.-Ing. Jochen Schiller is responsible for the concept and content. Gerhold is also a Principal Investigator of the ECDF, and Schiller is a member of the ECDF Executive Board.

/ 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/Felix Noak

EVENTS

Due to the Covid-19 pandemic, the 2022 event year also initially started with predominantly online events. However, after more than two years of restrictions, the situation with regard to on-site events increasingly improved in the spring and, fortunately, various events were again held in the building. Whether is was workshops, conferences, hackathons, seminars, lectures, or summer schools – at the latest toward the end of the summer, the number and density of events were back to pre-Covid levels. Established events were supplemented with new formats. For example, in addition to "in-house" events such as "One Space – Four Perspectives" or the renewed participation in the Long Night of the Sciences as a "House of Digitalization," events were also held on the premises of TU Berlin ("Bits & Bäume" conference) or even in the cinema Filmkunst 66 (Berlin Science Week). All these events are united by one essential characteristic: They are initiated by ECDF professors as well as by our partners and contribute decisively to the participatory design of digitalization research at the ECDF and to disseminating this research to the outside world. In addition to an overview, you will find a selection of reports on our event highlights for 2022 below.

"AMBIVALENCE OF THE DIGITAL" WITH BREAD FOR THE WORLD AND DIAKONIE HAMBURG

Online

January 12, 2022 // Presentation
Prof. Dr. Tilman Santarius

SUSTAINABLE AI LAB – HOW SUSTAINABLE IS ARTIFICIAL INTELLIGENCE BY ALGORITHM WATCH

Online

February 22, 2022 // Panel
Prof. Dr. Felix Biessmann

WOMEN'S EMPOWERMENT: FTAFELICITAS AWARD

On-site, Essen Zeche-Zollverein, broadcast via livestream

March 25, 2022 // Award
Prof. Dr.-Ing Lydia Kaiser

OPENING OF THE SPRING SUSTAINABILITY DAYS AT KIT 2022, KEYNOTE: "CLIMATE CHANGE 4.0 - DIGITALIZATION AND SOCIO-ECOLOGICAL TRANSFORMATION"

Online

March 28, 2022 // Presentation
Prof. Dr. Tilman Santarius

"THE GERMAN CULTURAL THEFT IN THE OCCUPIED TERRITORIES: WHY ATTEMPTS AT CATEGORIZATION AND QUANTIFICATION FAIL," LECTURE SERIES "HISTORICAL JUDGMENT"

On-Site German Historical Museum Berlin, broadcast via livestream

March 31, 2022 // Presentation
Prof. Dr. Meike Hopp

EVENTS 2022

#D21 TALK – EXPERT CONVENTION DIGITAL SOCIETY

Online

February 23, 2022 // Presentation
Prof. Dr. Tilman Santarius

"A LOVELY LITTLE MIND" FRANZ VON LENBACH'S PORTRAIT OF KATIA PRINGSHEIM, PRESENTATION OF THE PAINTING AND LECTURE

On-Site at Thomas Mann House Munich, broadcast via livestream

March 18, 2022 // Presentation
Prof.Dr. Meike Hopp

SMART WATER – SUSTAINABLE WATER VISIONS ROUNDTABLE

Online

March 22, 2022 // Workshop
Prof. Dr. Andrea Cominola

PLATFORM STRATEGIES AND DIGITAL TRANSFORMATION, SPEECH TO THE PARLIAMENT OF THE REPUBLIC OF SOUTH AFRICA

On-Site, Parliament of the Republic of South Africa, broadcast via livestream

March 29, 2022 // Presentation
Prof. Dr. Dr. Ayad Al-Ani

VISIT OF THE NEW PRESIDENT OF THE ISRAEL ACADEMY OF SCIENCES AND HUMANITIES, DAVID HAREL, TOGETHER WITH LUCIAN BRUJAN, PRESIDENT OF THE LEOPOLDINA

Visit from international delegation in the ECDF

March 29, 2022
Prof. Dr. Odej Kao

VISIT TO BERLINER SPARKASSE, INTERNAL WORKSHOP ON THE TOPIC OF BLOCKCHAIN

Visits from national group in the ECDF

April 01, 2022 // Workshop
Tim Kawalun

WOMAN IN DATA SCIENCE CONFERENCE, KEYNOTE: "WHAT QUESTIONS SHOULD WE ASK? FEMINIST PERSPECTIVES IN DATA & INFORMATION SCIENCE"

Online

April 05, 2022 // Presentation
Prof. Dr. Rebecca Frank

VISIT OF REPRESENTATIVES FROM "YOUNG INDUSTRY" AUSTRIA

Visit from international delegation in the ECDF

April 7, 2022
Tim Kawalun

INTERACTIVE PANEL DISCUSSION: "DIGITAL HEALTH APPLICATIONS & SHAPING INTEROPERABILITY OPEN TO THE FUTURE"

Hybrid – Livestream from the ECDF
April 28, 2022 // Panel
Prof. Daniel Fürstenau

ONE SPACE – FOUR PERSPECTIVES: SMART WATER ANALYSIS – EARLY DETECTION OF COVID & CO. IN THE

Livestream from the ECDF
May 5, 2022 // Panel
Prof. Dr. Andrea Cominola

"MEDICINE FOR ALL?"

MS Wissenschaft
May 5, 2022 // Panel
Dr. med. Samuel Knauss

DRAFTS – EXHIBITION 2022

Designtransfer - Gallery of the College of Architecture, Media and Design of the Berlin
May 12-22, 2022 // Exhibit
Prof. Dr. Berit Greinke

"MENA GOT (IT) TALENTS"

ECDF
May 13, 2022 // Panel
Prof. Dr. Dr. Ayad Al-Ani

VISIT: CULTURALVISTAS, 30 STUDENTS FROM MOREHOUSE COLLEGE

Visit from international delegation in the ECDF
May 19, 2022
Prof. Dr.-ing. Daniel Bermbach

"TRANSFORMING COMMUNITIES"

Berlin Open Lab – Berlin University of the Arts
May 23, 2022 // Networking
Prof. Dr. Gesche Joost,
Prof. Dr. Michelle Christensen

EGU GENERAL ASSEMBLY – LECTURE: "DISCOVERING HETEROGENEOUS WATER DEMAND RESPONSES UNDER NON-STATIONARY HYDROCLIMATIC, SOCIAL, AND ECONOMIC STRESSORS. A 20-YEAR ANALYSIS IN COSTA MESA (CALIFORNIA)"

Austria Center Vienna
May 23-27, 2022 // Presentation
Prof. Dr. Andrea Cominola

GUEST TALK: "DATEN SOUVEREIGNTY – FUNDAMENTAL CONCERNS AND CHALLENGES"

Hybrid – Broadcast from the Henry Ford Building of Freie Universität
May 24, 2022 // Presentation
Prof. Dr. Martin Gersch

"WHAT'S THE DEAL? – ON THE SUBJECT OF THE DEAL IN DATA PROTECTION," STIFTUNG DATENSCHUTZ (FOUNDATION FOR DATA PROTECTION)

AudiMax – European School of Management and Technology
May 25, 2022 // Presentation
Prof. Dr. Maximilian von Grafenstein

ECCC SYMPOSIUM – EINSTEIN CENTER CLIMATE CHANGE AND PUBLIC POLICY OF HUMAN SETTLEMENTS

ECDF
June 2, 2022 // Symposium
Prof. Dr. Helena Mihaljević,
Prof. Dr. Philipp Staab

HUMANS.MACHINES. ALGORITHMS

Online
June 8, 2022 // Symposium
Prof. Dr. Gesche Joost

DIGITAL AUTONOMY – SMART WEARABLES – GESELLSCHAFT FÜR INFORMATIK

Hybrid – Broadcast from the ECDF
June 8, 2022 // Symposium
Prof. Dr. Florian Conradi,
Prof. Dr. Gesche Joost,
Prof. Dr. Michelle Christensen

ECDF GENDER&DIVERSITY NETWORK

ECDF
June 8, 2022 // Networking
Prof. Dr. Florian Conradi,
Prof. Dr. Michelle Christensen,
Prof. Dr. Gesche Joost

CID (CRITICAL INFRASTRUCTURE DIGITALISATION) COURSE, IDE3A – GUEST LECTURE

Online
June 14, 2022 // Presentation
Prof. Dr. David Bermbach

"SUSTAINABLE DIGITALIZATION"

FU/Hybrid

June 17, 2022 // Presentation
Prof. Dr. Tilman Santarius

REBOUND RISKS AND SUFFI-CIENCY OPPORTUNITIES OF DIGITALIZATION, FINAL CONFERENCE OF THE JUNIOR RESEARCH GROUP "DIGITIZA-TION AND SOCIO-ECOLOGICAL TRANSFORMATION"

Spreespeicher Berlin

June 20, 2022 // Conference
Prof. Dr. Tilman Santarius

VISIT PROF. RAYMOND NG, UNIVERSITY OF BRITISH COLUMBIA

Visit from international delegation in the ECDF

June 20, 2022
Prof. Johann-Christoph Freytag PhD,
Prof. Dr. Andrea Cominola

LUNCHTALK #11: GREEN CONSUMPTION ASSISTANT

Online

June 22, 2022 // Presentation
Prof. Tilman Santarius,
Prof. Dr. Felix Biessmann

CORNELSEN IMPULSE: "MAKING SCHOOL FIT FOR THE FUTURE"

Hybrid – Broadcast from the ECDF

June 24, 2022 // Presentation

SUMMER SCHOOL: "PHILO-SOPHY OF MATHEMATICS"

Heinrich Heine University Düsseldorf

August 22-26, 2022 // Teaching
Prof. Dr. Helena Mihaljević

LAUNCH: „SUSTAIN MAGAZIN"

Online

June 28, 2022
Prof. Dr. Felix Biessmann,
Prof. Dr. Tilman Santarius

ZEIT EVENT, KEYNOTE: "DIE ZEIT FEMALE LEADERSHIP IN DIGITALIZATION AND

Online

June 28, 2022 // Presentation
Prof. Dr. Dr. Ayad Al-Ani

LONG NIGHT OF SCIENCE 2022

ECDF

July 2, 2022 // Ausstellung

VISIT BY YOUNG TALENTS FROM STATE CHANCELLERY AND MINISTRY OF THE STATE OF

Online

July 5, 2022
Prof. Dr. Philipp Staab

ACADEMICS IN THE PUBLIC SPHERE NAVIGATING THE POLI-TICAL SESSION: "LIVING AND WORKING WITH AI"

Berlin-Brandenburg Academic of Sciences and Humanities

July 7-8, 2022 // Conference
Prof. Dr. Michelle Christensen

IBIO NEURO ASSEMBLY LECTURE: "KEY PRINCIPLES THAT LEAD TO COGNITIVE PERFORMANCE VARIABILITY IN PERSONALIZED VIRTUAL BRAINS"

Online

July 14, 2022 // Presentation
Prof. Dr. med. Petra Ritter

5TH FUTURE-IOT PHD SCHOOL "IOT MEETS AUTONOMY"

ECDF

August 29 - September 02, 2022
Prof. Dr. Emmanuel Baccelli

FIRST ALUMNI MEETING OF THE DATA SCIENCE PROGRAM

ECDF

September 13, 2022 // Networking
Prof. Dr. Felix Biessmann

THE USE OF DIGITAL TECHNO-LOGIES IN HR – OPPORTUNITIES AND BARRIERS FOR DIVERSITY AND GENDER EQUALITY, BY THE HARRIET-TAYLOR-MILL INSTI-TUTE OF THE BERLIN SCHOOL OF ECONOMICS AND LAW

PRESENTATIONS: "DISCRIMINA-TION IN THE MIRROR OF HR 4.0 – A LEGAL RESEARCH PERSPEC-TIVE"; "DIVERSITY MONITORING – BUT HOW? BETWEEN DISCRI-MINATION AND DATA PROTEC-TION"

Online

September 14, 2022 // Conference
Prof. Dr. Max von Grafenstein,
Prof. Dr. Helena Mihaljević

PRESENTATION PROF. DR. ANDREA COMINOLA AT THE WORLD WATER CONGRESS

Copenhagen

September 14, 2022 // Presentation
Prof. Dr. Andrea Cominola

FUTURE WORKSHOP OF THE JUNGE OHREN (YOUNG EARS) NETWORK: "MUSIC EDUCATION OF THE

ECDF

September 19, 2022 // Workshop

QURATOR CONFERENCE 2022

Berlin, Fraunhofer FOKUS, Natural History Museum and Online Session

September 15, 2022 // Conference
Prof. Dr. Adrian Paschke

"BIM IN EXISTING BUILDINGS – CHALLENGES IN RENOVATIONS"

Online

September 19, 2022 // Workshop
Prof. Dr. Rita Streblow

"NETWORKED CLINICS AND ALGORITHMS – A VISION FOR GOOD WORK?" – DISCUSSION AT LABOR.A DIGITAL

Cafe Kiew

September 21, 2022 // Panel
Prof. Dr. Philipp Staab,
Prof. Dr. Christian Meske

"HOW THE HUMAN PROJECT IS ENABLING CLINICAL RESEARCH FOR DEMENTIA"

Online

September 26, 2022 // Webinar
Prof. Dr. Petra Ritter

MENA DIGITAL SUMMER SCHOOL

Hybrid, ECDF

September 26-28, 2022
Prof. Dr. Ayad Al-Ani

"DE NOVO DRUG DESIGN WITH MACHINE INTELLIGENCE" ERNST SCHERING PRIZE

ECDF

September 29, 2022 // Lecture
Prof. Dr. Gisbert Schneider

PRESENTATION OF THE REPORT "DIGITAL RESET"

On-Site at the ECDF, broadcast via livestream

Sep. 30, 2022 // Presentation
Prof. Dr. Tilman Santarius

"DE NOVO DRUG DESIGN WITH MACHINE INTELLIGENCE" ERNST SCHERING PRIZE

ECDF

September 29, 2022 // Lecture
Prof. Dr. Gisbert Schneider

DIGITALIZATION AND SUSTAINABILITY: BITS&BÄUME CONFERENCE 2022

Technische Universität Berlin

Sep. 30 - Oct. 02, 2022 // Conference
Prof. Dr. Tilman Santarius

"THE RISE OF INTELLECTUAL MONOPOLY CAPITALISM"

ECDF

October 4, 2022 // Presentation
Prof. Dr. Philipp Staab

"WÆ - WOMXN FROM ARTS TO ENGINEERING" – WORKSHOP: "WITH DIVERSITY TO BETTER SYSTEMS – A SYSTEMS ENGINEERING PERSPECTIVE"

Online, broadcast of the panel discussion from the Futurium

October 6-7, 2022 // Workshop
Prof. Dr. Ing. Lydia Kaiser

FIRST SEMESTER WELCOME AT TU BERLIN: MY PROF IS A DJ

Audimax of the main building of TU Berlin

October 10, 2022
Prof. Dr. Ing. Lydia Kaiser

"HATE SPEECH ON THE NET – CAPTURING DIGITAL ANTISEMITISM" KEYNOTE BY PROF. GABRIEL WEIMANN: "NEW TRENDS IN ONLINE ANTISEMITISM"

Hybrid – Broadcast from the ECDF

October 19, 2022 // Conference
Prof. Dr. Helena Mihaljević

NETWORK MEETING IDE3A

ECDF

October 24, 2022 // Conference
Prof. Dr. Andrea Cominola

GET-TOGETHER EXECUTIVE BOARD BERLINER SPARKASSE, PRESENTATIONS

ECDF

October 25, 2022
Prof. Dr. Daniel Fürstenau,
Prof. Dr. Martin Gersch,
Prof. Dr.-Ing. Jochen Schiller

BERLIN SCIENCE WEEK, FILM SCREENING AND DISCUSSION: "PROGRAMMED DISCRIMINATION?! THE (UN)FAIR GAME IN THE USE OF ALGORITHMS AND ARTIFICIAL INTELLIGENCE"

Filmkunst 66

November 2, 2022 // Screening, discussion

Prof. Dr. Helena Mihaljević

BERLIN SCIENCE WEEK, PANEL DISCUSSION: "AI-ENABLED AUTOMATION – HOW INTELLIGENT MACHINES SUPPORT HUMANS"

On-Site at ECDF, Broadcast from ECDF

November 7, 2022 // Panel

Prof.in Dr. -ing.in Lydia Kaiser

2ND BFR (FEDERAL INSTITUTE FOR RISK ASSESSMENT) KNOWLEDGE DIALOGUE BERLIN SCIENCE WEEK: "WHY TRUST IS ESSENTIAL, NOT ONLY IN TIMES OF CRISIS"

Magnus-Haus Berlin

November 8, 2022 // Panel

Prof. Dr. Timm Teubner

WIKIMEDIA, STUDY PRESENTATION, AND PANEL DISCUSSION: "OPEN AND FAIR – WILL THE NATIONAL EDUCATION PLATFORM MAKE GOOD ON ITS PROMISE?"

On-Site at ECDF, Broadcast from ECDF

November 08, 2022 // Panel

CORNELSEN IDEAS, DISCUSSION: "HOW WELL DO OUR CHILDREN READ? PERSPECTIVES FOR MORE READING COMPETENCE ON THE NATIONWIDE READING DAY"

Hybrid, Broadcast from ECDF
November 18, 2022 // Panel

BLUE PLANET BERLIN WATER DIALOGUES – ARTIFICIAL INTELLIGENCE: RESHAPING THE WATER INDUSTRY

Online

November 22, 2022 // Conference

Prof. Dr. Andrea Cominola

THE ECDF AND ELSEVIER CONVERSATIONS ON SCIENCE IN THE DIGITAL FUTURE. KICK-OFF PANEL: "DATA PRIVACY IN THE DIGITAL ERA"

On-Site at ECDF, Broadcast from ECDF

November 18, 2022 // Panel

Prof. Dr. Max von Grafenstein

HELLO DIVERSITY! LIVE PODCAST AND PAPERTHON EVENT

Live podcast at ECDF, digital paperthon

November 18, 2022 // Podcast

Prof. Dr. Janina Sundermeier

IDE3A SMART CITY HACKATHON

ECDF

Nov. 30 - Dec. 02, 2022 // Hackathon

Prof. Dr. Andrea Cominola

REGMED FORUM: "WILL KI CHANGE REGENERATIVE MEDICINE?"

Berlin Institute for Medical Systems Biology, Max Delbrück Center

December 1, 2022 // Presentation

Prof. Dr. Tabea Flügge

DIGITAL SUMMIT OF THE FEDERAL GOVERNMENT 2022 – PANEL "DATA.POWER.CREATIVITY!? DATA AS A BENEFIT OR CHALLENGE FOR DEMOCRACY"

STATION Berlin

Dec. 8-9, 2022 // Presentation

Prof. Dr. Michelle Christensen

PANEL DISCUSSION: "HUMANS AND MACHINES: COMPETITION FOR THE JOBS OF THE FUTURE?"

ECDF

December 9, 2022 // Panel

Prof. Dr. Philipp Staab

DISCUSSION: SPEAKER SERIES: "DIGITALISATION AND THE GREEN TRANSITION," "THE INTERPLAY BETWEEN DIGITALISATION AND THE GREEN RANSITION"

Online

December 9, 2022 // Panel

Prof. Dr. Tilman Santarius

PRESENTATION

Introduction to the lecture series "Ambivalence of the Digital"

January 12, 2022
Online

In eight varied modules, the event series "Ambivalence of the Digital" offered insights into different manifestations of our digital world. Organized by the Hamburg Diakonie and Bread for the World, the focus was on the social and ecological consequences of digitalization. In addition, the evenings also addressed related issues of digital justice. ECDF Professor Dr. Tilman Santarius kicked off the lecture series "Ambivalence of the Digital" with Bread for the World and Diakonie Hamburg. Based on the book of the same name "Smarte grüne Welt? Digitalisierung zwischen Überwachung, Konsum und Nachhaltigkeit" (Smart Green World? Digitalization between Surveillance, Consumption, and Sustainability), Tilman Santarius, as co-author, introduced the various conflicts inherent in digitalization. With this, the lecture series got off to a successful start.

WEBINAR

Sustainable AI Lab – How sustainable is artificial intelligence?

February 22, 2022
Online

Artificial intelligence can contribute greatly to a greener economy in a number of ways. But how sustainable is the technology itself? In December 2021, AlgorithmWatch presented the results of the project "Sustain – The Sustainability Index for Artificial Intelligence." "Sustain" was the first comprehensive proposal on how to evaluate the sustainability of artificial intelligence. It resulted in more than 50 indicators for assessing the social, environmental, and economic sustainability of AI systems. But unanswered questions also remained: How can the indicators be applied in practice and what needs for action arise (including political actions)? Experts from science and development, politics and businesses discussed this in the webinar on February 22, 2022. Participants in the discussion included Maik Außendorf (Member of the Bundestag, Bündnis 90/Die Grünen), Michaela Regneri (Otto GmbH & Co. KG), and ECDF Professor Dr. Felix Biessmann (BHT).

CONFERENCE

Smart Water – Sustainable Water Visions Roundtable

March 22, 2022
Online

On March 22, 2022, Resideo and the Italian university POLI.design invited participants to the second edition of "Smart Water. Sustainable Water Visions." International guests and experts came together for a topic well-suited to International Water Day. The digital event focused on improving the use of water in the residential sector.

With the title "Smart Water. Sustainable Water Visions," the roundtable conference focused on the issue of sustainability in the management of water resources. Among the international experts was ECDF Professor Dr. Andrea Cominola, Professor for "Smart Water Networks" at TU Berlin. He spoke about the adoption of digital technologies in the water sector and how they can improve water supply and demand management. The event was held online in English at 3:30 p.m. on March 22. Journalist and author Fabio Deotto moderated the event.

PANEL

Digital health applications & shaping interoperability open to the future

April 28, 2022
Online

The Institute of Medical Informatics at Charité – Universitätsmedizin Berlin invited participants to the digital event "DiGA & Interoperability open to the future" on April 28, 2022.

An interactive online format was used to present key findings from a study on the future of patient-centered, digital care delivery with Digital Health Applications (DiGa) and their data. In a high-profile panel, Prof. Dr. Daniel Fürstenau, Associate Member at the ECDF and researcher at Charité – Universitätsmedizin Berlin, and other prominent guests ventured a look into an interoperably designed future. Participants also had the opportunity to actively engage via online polls and Q&A sessions. The event officially concluded the project "DiGIOP - Making digital-supported care processes possible: Implementing interoperability between DiGA, assistive devices and ePA open to the future" and gave an outlook on where the vision of DiGA interfaces can lead and in which format interested parties can contribute in the future.

Foto: ECDF/PR/Felix Noak

ONE ROOM – FOUR PERSPECTIVES #3 "SMART WATER ANALYSIS – EARLY DETECTION"

May 5, 2022
ECDF/Online

The SARS-CoV-2 virus will continue to be with us for the time being. How can rising incidences be quickly detected in the future? One approach is wastewater analysis, which offers many opportunities for early detection, especially with respect to infectious diseases such as coronavirus. At the same time, the analysis allows further conclusions to be drawn about the inhabitants of the respective environment. How do SARS-CoV-2, other viruses, and other substances get into wastewater? What are the methods of early detection? What role do data protection aspects play in this? On May 5, 2022, moderator Katja Weber talked about this interplay of opportunities and risks in the third edition of our event format "One Room – Four Perspectives" with experts from the perspectives of science, business, politics, and society.

Dr. Bernd Gawlik, Portfolio Leader for Water Quality at the European Commission's Science and Knowledge Service, highlighted Spain, particularly Catalonia, as a good example of regional cooperation in wastewater analysis. "Spain, along with Germany, was one of the first countries where the omicron variant could be detected based on the analysis of wastewater data, even before it was possible to prove it clinically," Gawlik said. In Berlin, too, the detection of coronavirus variants by taking samples from sewage treatment plants is "not witchcraft," as Dr. Frederik Zietzschmann, head of the sewage treatment plant analysis and organic trace substance

analysis department in the laboratory of Berliner Wasserbetriebe, emphasized. "It's a question of will," but one must already plan for a greater financial and logistical effort for evaluation, not least because of the "dirty sample matrix," Zietzschmann added.

When asked what data is of interest for wastewater analysis, Prof. Dr. Andrea Cominola stated: "We're most interested in data on infrastructure, external interference factors, and data from households." Although the term "data evaluation" also inevitably raises the question of data protection in the context of wastewater analysis, Frederick Richter, Chairman of the Foundation for Data Protection, said that "as long as the information cannot be traced back to individual persons," data protection would not be a problem here.

All panelists agreed that, in addition to further exploring technical and digital possibilities for (waste)water analysis, it is above all important to create awareness for the limited resource of water. Cominola concluded by noting that people only ever address water as an issue when it becomes scarce. However, the issue needs to become permanently visible. As a step in this direction, he suggested that each individual take a critical look at everyday water consumption.

WEBINAR

Deploying AI with confidence

May 17, 2022
Online

In the webinar "Deploying AI with confidence," experts discussed the extent to which science is helping to increase confidence in artificial intelligence. AI in healthcare, prevention, diagnosis, and treatment selection were among the issues discussed. ECDF Professor Dr. Tobias Schäffter (TU Berlin) gave the keynote address on "Accurate Data for better AI." In particular, he explored the role of data quality when it comes to trust in AI and how to support medical device approval. Furthermore, Prof. Dr. Stefanie Remmele, Head of the Medical Technology Research Group, Landshut University of Applied Sciences, gave insights into a current research project called "Benchmarking on Synthetic Data." Julia Moosbauer, co-founder and COO of deepc, data scientist, and mathematician, bridged the gap between science and practice and shared her experiences with regard to the "safe use of AI tools in radiology" with the participants.

CONFERENCE

ECCC Symposium

June 02, 2022
ECDF

In early June, a high-profile symposium on climate research was held at the ECDF. As part of the current preparatory module for a future Einstein Center Climate Change and Public Policy of Human Settlements (ECCC), scholars from the Berlin-Brandenburg metropolitan region discussed pressing issues of urban climate transformation with leading international experts. These included ECDF Professors Prof. Dr. Helena Mihaljević, Prof. Dr. Philipp Staab, and ECDF Board member Prof. Dr. Gesche Joost. The symposium focused on six key topics: Urban Climate Policy; Data Use and Artificial Intelligence for Climate Strategies; Design Aspects and Behavioral Incentives; Public Health; and Mobility. The keynotes were given by Prof. Dr. Felix Creutzig and Prof. Robert Socolow. By giving short inputs, the scholars presented their current research projects and research topics in thematic clusters, which were then discussed in interdisciplinary panels.

PRESENTATION

InviDas Think Tank "Digital Autonomy + Smart Wearables"

June 08, 2022
ECDF

On June 8, 2022, the Aachen discussion platform Denk-fabrEthik and the joint project InviDas invited guests to the ECDF. Issues of regulation, education, and digital self-determination in the context of smart wearables were addressed from the perspectives of techno-logy ethics, data protection, and design research. In her presentation, ethics professor Dr. Susanne Nagel addressed the issue of responsibility when wearing smart wearables. Responsibility would require know-ledge and control, conditions that are not often fulfilled in the case of highly complex self-learning algorithms. In a subsequent presentation, Dr. Rebecca Caldwell focused on the interface between technology, politics, law, and business, which is particularly relevant for manufacturers of smart wearables. ECDF Professors Dr. Michelle Christensen and Dr. Florian Conradi discussed the possibility of fair and ethical devices. They presented their often surprising results. The event concluded with a discussion in which ECDF Board member Dr. Gesche Joost also participated.

NETWORKING

Networking Meeting ECDF Gender & Diversity

June 13, 2022
ECDF

Digital transformation and its impacts require diverse and gender-equitable perspectives. This is why sensi-tivity is needed, especially in the area of gender and diversity. In addition, the ECDF Gender & Diversity Network was created in 2022 and aims to contribute to more diversity in digitalization research.

A kick-off meeting was held at the ECDF on June 13, 2022, to launch the project. The President of TU Berlin, Prof. Dr. Geraldine Rauch, opened the afternoon with a welcome address. The project is bearing fruit: the network promotes research, projects, and activities that focus on equality, diversity, and empowerment in the context of digitalization. In addition to project funding, the network also announces a prize for the best work that combines various forms of diversity as well as digitalization.

ECDF/PR/Felix Noak

LONG NIGHT OF DIGITALIZATION RESEARCH

July 02, 2022
ECDF

How can water consumption be reduced with digital solutions? How can heart disease be better detected using digital technologies? These and other questions were explored by around 400 visitors to the ECDF on July 2, 2022. For the Long Night of Science (LNDW), universities, colleges, and research institutions throughout Berlin – including the ECDF – opened their doors to show visitors their research. From late afternoon until midnight, guests were able to learn about twelve projects from the field of digitalization research and try them out for themselves.

At the House of Digitalization, ECDF Professor Leonid Goubergrits showed how models developed by engineers help medical professionals detect and treat heart disease. ECDF Professor Andrea Cominola and his team used a computer game to demonstrate how even small-scale measures such as rain gardens and green roofs can be important in preventing urban flooding. "It was great to see the ECDF come back to life and open to visitors after the last few years of Covid restrictions. In our 'Intelligent Water Networks' group, we've done a lot of exciting research on topics like water use and sustai-

nability, and even created a digital game about green infrastructure and flooding in cities.

We were very happy to present our results to the broad public in Berlin and the reactions were great!" reported Andrea Cominola, Professor of Smart Water Networks at the ECDF and TU Berlin.

One of the highlights at the LNDW in the House of Digitalization was the Escape Room on the topic of quantum technologies by Prof. Dr. Janik Wolters. The "Live Escape Game" challenges players to collaboratively solve exciting puzzles. "LNDW was a great opportunity for me and my team to bring the future possibilities of quantum technologies to the Berlin audience in a fun way," Wolters reported.

The Long Night of Science has been held annually since 2001 (with the exception of 2020 and 2021). This year, more than 1,400 program items awaited visitors between 5 p.m. and midnight, including experiments, lectures, science shows, and guided tours. With 12,700 visitors, TU Berlin was the most popular LNDW institution.

DISCUSSION

Opportunities and barriers: Digital technologies in HR

September 14, 2022
Online

On September 14, 2022, numerous experts addressed the opportunities and problems of using digital technologies in the HR sector. With the digitalization of the working world, various types of technologies are finding their way into companies and HR processes. This promises more efficiency; on the other hand, some concrete examples show that more technology reproduces or even reinforces existing inequalities. Providers, on the other hand, emphasize the opportunities, stating that their technologies can lead to more diversity and gender equality. In their presentations, ECDF Professors Dr. Max von Grafenstein and Dr. Helena Mihaljević discussed conflicts between discrimination education and data protection. In order to be able to make statements about the inclusion and exclusion potential of technology, in-depth analyses are required. Personal data required from applicants and employees are subject to a high level of protection, both ethically and legally. In practice, there is currently great uncertainty as to whether and in what form corresponding data can be collected and made accessible for research.

CONFERENCE

Qurator Conference 2022

September 19-23, 2022
Berlin, Fraunhofer FOKUS, Natural History Museum, hybrid

The third Qurator Conference provided a forum for the use of digital curation technologies in application areas such as media, journalism, logistics, cultural heritage, healthcare and life sciences, energy, and industry from September 19 to 23, 2022. Of particular importance were papers that demonstrated the applied use of digital curation technologies and tools in domain-specific use cases, bridging the traditional boundaries between disciplines such as artificial intelligence and semantic web, data analytics and machine learning, information/content and knowledge management systems, information retrieval, knowledge discovery, and computational linguistics. The program focused on advanced AI solutions for digital communications. During the conference, the results of the Qurator project were presented. ECDF Professor Dr. Adrian Paschke closed the conference with an academic workshop on "Applied Use of Digital Curation Technologies and Tools."

SUMMER SCHOOL

LECTURE

MENA Digital Summer School

Lecture: Ernst Schering Prize

September 26-28, 2023
Online/ECDF

September 29, 2022
ECDF

A first step! In the build-up to the "MENA Digital School," which aims to provide an open discussion platform for digitalization in the Arab region, the "MENA Digital Summer School" went live in September 2022 for 25 scholarship holders with the support of the NRW State Chancellery. The concept of Prof. Dr. Ayad Al-Ani, Associate Member at the ECDF, and Daniel Gerlach was supported by the German Federal Foreign Office. As a hybrid seminar on digital transformation, the MENA Summer School was aimed at innovators from the MENA region in the field of digital transformation. The courses included basic modules on data management, machine learning, strategic planning, and digitalization issues in the MENA region. Part of the curriculum included collaborative workshops and field trips to digital leaders from business, academia, and media in Germany. The aim of the Summer School was to foster leadership skills among young professionals and to address Digital Transformation as a common challenge for societies in Europe and the MENA region. Part of the Summer School took place on site at the ECDF.

Prof. Dr. Gisbert Schneider received this year's Ernst Schering Prize. In cooperation with the ECDF, the Ernst Schering Foundation presented a scientific lecture on the occasion of the award ceremony. On September 29, 2022, Prof. Gisbert Schneider gave the lecture on "De novo drug design with machine intelligence" at the ECDF. Schneider discussed the possibilities of applying machine learning and artificial intelligence to drug development. In doing so, he presented knowledge-based and data-driven methods for de novo generation of molecules and prediction of pharmacological activities. Since the Ernst Schering Foundation established the prize in 1991, it has been considered one of the most prestigious science awards in Germany. The foundation aims to recognize new models and knowledge gains that contribute to advances in biomedicine. The goal is also to recognize scientists who engage in socially relevant debates or launch targeted initiatives that can support future generations of scientists.

FOR SUSTAINABLE DIGITALIZATION: 2,500 PARTICIPANTS AT THE "BITS & BÄUME" CONFERENCE

September 28 until October 2, 2022
TU Berlin

More than 2,500 participants came to Berlin in September 2022 for the "Bits & Bäume" conference on digitalization and sustainability. At the invitation of 13 organizations from the fields of environmental protection, climate protection, nature conservation, digital policy, development cooperation, and science, scientists, activists and politicians met to discuss political demands and approaches for sustainable digitalization. One of the initiators of the conference is ECDF Professor Tilman Santarius.

With more than 60 demands for a just and democratic digitalization that respects planetary boundaries, the organizers presented a counter-proposal to the German government's digital strategy. In the development of political framework conditions for sustainable digitalization, environmental and network policy actors must be much more closely involved in ongoing strategy processes.

Numerous contributions at the conference were devoted to current topics such as the energy transition and the discussion about heating. Among other things, digital tools were presented to decarbonize and democratize the energy system, as well as digital methods for significant savings in heating energy.

"The idea that more digitalization will automatically alleviate social problems such as the climate or justice crisis is increasingly turning out to be an illusion.

In order to develop smart ideas for solving societal crises, environmental and network policy must be thought together much more than they have been so far," said ECDF Professor Tilman Santarius (TU Berlin). "The German government's new digital strategy does not aim to systematically use digital technologies to achieve socio-ecological goals. So the 'Bits & Bäume' conference came just in time: 2,500 people have shown in countless events that this is definitely possible!"

The "Bits & Bäume" movement networks activists in numerous locations in Germany. Numerous regional initiatives, which network self-organized active and interested people locally and organize events, prove that the idea of "Bits & Bäume" has arrived in the middle of society. Consideration is currently being given to setting up a coordination office so that the movement can continue to grow and become more established. This office would be able to better support regional initiatives and organizations in the network and promote the integration of their goals into political processes.

"Bits & Bäume" is the largest Germany-wide civil society alliance at the interface between digitalization and sustainability.

CONFERENCE

Conference Hate Speech on the Net – Recording Digital Anti-Semitism

October 19, 2022
ECDF

The conference put on by the Center for Research on Antisemitism at the TU Berlin dealt with current forms of anti-Semitism in social media. Qualitative and quantitative experts from the fields of linguistics, image and extremism research, communication sciences, and data science had their say. The interactions and links between anti-Semitism and digital structures and new technologies were a particular focus. Simone Rafael, head of digital issues at the Amadeu Antonio Foundation, moderated the session. ECDF Professor Dr. Helena Mihaljević presented her research findings on the potential of using Perspective API. The automated Google service for detecting anti-Semitic content in texts is often used in moderating online spaces, but also in research. Prof. Dr. Helena Mihaljević found that misclassification of coded anti-Semitism occurs repeatedly. This leads to problems in automated content moderation in particular.

PANEL

"Open and fair – Will the national education platform deliver on its promise?"

November 8, 2022
ECDF

The National Education Platform (NBP), a project of the German government to network the existing digital education landscape via a common infrastructure, cost 630 million Euros. Researchers commissioned by Wikimedia Deutschland have investigated whether it really delivers what it promises. On November 8, 2022, politicians, experts, and stakeholders in the field of education policy discussed the results of the study at the ECDF. Saskia Esken, chair of the SPD; Marina Weisband, participation educator and psychologist; Dr. Johanna Börsch-Supan, head of department "General and Vocational Education; Lifelong Learning," Federal Ministry of Education and Research; Oliver Sachsze, secretary general of the federal conference of school students; and Christian Humborg, executive director of Wikimedia Deutschland e. V. held a discussion under the guiding question: "Open and fair – Will the national education platform deliver on its promise?". Vera Linzs moderated the discussion, which was streamed live.

HACKATHON

ide3a Smart City Hackathon 2022

November 30-December 2, 2022
ECDF

From November 30 to December 2, 2022, the "ide3a Smart City Hackathon 2022" took place for the third time and marked the end of the Smart Sensing and Smart Cities Schools held online this winter semester. The two Winter Schools focused on the digitalization of critical urban infrastructures in the areas of water, mobility, and IT. During the hackathon, the 50 students from TU Berlin (TUB), Norwegian University of Science and Techno-logy (NTNU), and Politecnico di Milano (PoliMi), solved one of four challenges together. This year's challenges included installing blue-green infrastructure, protecting smart meter data, robust edge computing, and moni-toring urban mobility. In addition to creating projects in multidisciplinary teams, the Winter School also featured a social program. At the end of the hackathon, the groups presented their projects. The team "404" won with their project dealing with the installation of blue and green infrastructure.

PANEL

Humans and Machines: Competition for the jobs of the future?

December 9, 2022
ECDF

On December 9, 2022, Dr. Philipp Staab, ECDF Professor of Sociology of the Future of Work at HU Berlin, Chris-tian Wolf MdA, spokesperson for digitalization, energy, tourism, and businesses of the parliamentary group of the Free Democrats in the Berlin House of Representa-tives, Prof. Dr. Rahel Jaeggi, HU Berlin, Paul Jürgensen, Policy Officer of the Progressive Center of the Friedrich Naumann Foundation, and Prof. Dr. Aaron Benanav, Professor of Sociology at Syracuse University, USA, on the relationship between humans and machines in the labor market. The focus was on the possibility of coope-ration between the two, rather than competition or fear. Responses to structural change in the sense of a demo-cratic organization of the economy under new conditions of automation were highlighted as new opportunities.

/ SCIENCE COMMUNICATION

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

SCIENCE COMMUNICATION

The digital transformation affects science and business as well as politics and society. Insights from digitalization research can help make good decisions and meet the challenges of the (digital) future. In doing so, the ECDF would like to involve people from different backgrounds in the discourse.

Science communication therefore has a particular responsibility. Since its inauguration, the ECDF has developed various channels and formats to provide insights into ECDF activities and to promote intensive exchange with various stakeholders.

//ONLINE COMMUNICATION

As a center of digitalization research, online communication plays a significant role in the ECDF's science communication portfolio. For this purpose, we use various channels to reach the specific target groups. All information about projects, events, publications, and other activities that are for partners and the public are published on our website www. digital-future.berlin and simultaneously posted via the social media platforms Twitter (@ECDigitalFuture) and LinkedIn. The ECDF's now established hashtag for online posts is #digitalfuture. Our other virtual communication channels include the regular newsletter, internal email distribution lists, and the instant messaging provider Slack.

//WEBSITE

Since its relaunch in 2019, the website www.digital-future.berlin has established itself as an important communication tool for the ECDF. In order to reach target groups from different language areas, the content is published in German and English. The website informs about the ECDF, the professors, strategic partnerships, cooperation, research projects, etc.. In addition, it offers a low-threshold possibility of contact for partners and interested citizens. On the home page, under "News," we provide information on research projects, new professorships, awards, initiatives, and reports on events, among other things. Here, users can also find announcements of events.

For reasons of transparency, the website also contains documents such as bylaws, rules, guidelines, and statements as well as the ECDF's annual report. Recent Twitter posts from @ECDigitalFuture are automatically embedded on the home page. Under the category "When I look into the digital future, …", actors from science, society, business, and politics share their views on the digital transformation. All events, press materials, and press releases since the opening of the ECDF are available in an archive.

//TWITTER

On the ECDF Twitter channel, we present scientific content from our scholars and announce our own events. In addition, we provide information there about events in which our professors are involved externally, such as conferences.

Furthermore, we announce media appearances of our professors on TV, podcasts, newspapers, magazines, or radio shows, among other channels. On Twitter, we can also share activities of our partners and other digitalization initiatives. We currently have 2,795 followers. There is a close exchange with the press offices of the Berlin universities, the Charité – Universitätsmedizin Berlin and our partners, which enables the publication of ECDF contributions on their Twitter channels, as well as on additional social media platforms such as Facebook or Instagram. For example, the TU Berlin press office publishes event announcements or new ECDF research projects via its Facebook (currently 49,289 followers) and Instagram account (currently 38,100 followers). Mutual sharing and liking with our partners

//LINKEDIN

The use of the LinkedIn networking platform has proven to be very successful. Since 2021, the ECDF has been sharing longer content here, which has allowed us to tap into an additional audience: partners and experts from the business sector. LinkedIn offers us the opportunity to maintain existing business contacts and make new connections with a wide global reach – with a particular focus on the European regions. The ECDF publishes event announcements on the platform that are of particular interest to our partners – such as the ECDF Industry Forum or the "One Space – Four Perspectives" format. A particularly high number of visits is recorded for publications of job offers.

//SLACK

The web-based instant messaging service Slack has been very successful since its introduction in the ECDF during the Covid-19 pandemic. The collaborative software provides ECDF members fast and direct communication through open and closed channels. At the ECDF, we have extra channels for ECDF professors, the Women in STEAM Initiative, the Micro Factory, and the Management Office. Slack enables direct exchange between professors and the Management Office. In addition, calls for applications, job postings, cooperation requests, and daily updated information is shared.

//NEWSLETTER

The newsletter has more than 1,000 subscribers and is an important communication channel for the ECDF network. It informs readers about current activities of the professors, initiatives, and job postings and

announces events and links to articles on the website. The regular distribution of the newsletter strengthens the bond with interested citizens, industrial partners, researchers, politicians, and journalists. Sending the newsletter to the personal email addresses of our partners offers direct communication. It also gives interested parties a constant incentive to check the ECDF website for more information. The distribution list contains mostly people who have actively subscribed to our newsletter. In this way, we can ensure that only those people who are interested in the newsletter receive it.

//PRESS RELEASES, IDW

By sending out press releases, the ECDF informs interested journalists about current developments in digitalization research at the ECDF and about relevant events. In order to increase the reach, the coordination and the mailing will be done via the press offices of the participating universities, the Einstein Foundation Berlin as well as via the partners.

The use of the Informationsdienst Wissenschaft e.V. (idw) has proven its worth in recent years. The Internet platform bundles press releases and event information from around 1,000 scientific institutions. This includes universities, universities of applied sciences, governmental and non-governmental research institutes, research funding agencies, and science administration. It is accessible to journalists and offers the most comprehensive sources for science news in the German-speaking world.

//MEDIENMONITORING

Media monitoring of publications on digital transformation topics and media coverage of the ECDF has become an important tool in our press and public relations work. Cision monitors online, print, radio, and TV publications for us. Media monitoring is incorporated into the internal evaluation of the quality of our press work. In addition to traditional media monitoring, Cision's tool also allows us to identify suitable journalists for future press relations and events.

/ COMMITTEES AND GOVERNANCE

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

EXECUTIVE BOARD

The ECDF Executive Board 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 ECDF, and for the scientific research program, including decisions on changes to the overarching research agenda involving the addition or removal of research topics.

The committee also decides on the admission of further members such as Ambassadors, Fellows, Associated Members, Principal Investigators, or Visiting Scholars. The Board also reviews and makes decisions regarding the addition of new professorships and funders to ensure that additional research directions are consistent with the ECDF's overall vision. The members develop the ECDF's positions on various topics such as open access, digitalization in education, or guidelines for equal opportunities.

The Executive Board consists of a total of eleven members and is composed of:

// The speaker,
// Four Executive Board members who are professors at one of the managing institutions (TU Berlin, FU Berlin, HU Berlin, UdK Berlin, Charité) and are not funded by the ECDF ("Area Speakers"),
// Four Executive Board members who are ECDF professors and are co-speakers of one of the areas,
// One Executive Board member who is a professor at a partner university,
// One Executive Board member who is appointed by the Landeskonferenz der Frauenbeauftragten an Berliner Hochschulen und Universitätsklinika des Landes Berlin (LaKoF),
// The Managing Director, who attends all meetings in an advisory capacity.

The Executive Board usually meets on a monthly basis. Together with the international Scientific Advisory Board (SAB), the Executive Board members implement the governance and quality assurance strategy and define KPIs and milestones to continuously review and manage the Center's vision and mission.

In the summer of 2022, there was also a rotation of the representative of the participating universities (HTW Berlin University of Applied Sciences and Berliner Hochschule für Technik). Prof. Dr. Agathe Merceron (Berlin University of Applied Sciences) was succeeded by Dr. Juliane Siegeris (Professor of Software Engineering, HTW Berlin) as a new member of the ECDF Board.

The members of the Executive Board are:

// Speaker:
Prof. Dr. Odej Kao

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

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

// Digital Health:
Prof. Dr. Tabea Flügge

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

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

// Representative of the 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

ECDF/PR/Kay Herschelmann

MANAGEMENT OFFICE

The ECDF Management Office is located in the Robert Koch Forum. It supports the Executive Board and the ECDF Professors and is responsible for the operational and strategic development of the ECDF. It not only acts as the administrative backbone, but is also responsible for internal and external communications. The members of the office continuously develop the ECDF further – be it through the establishment of the Micro Factory, the development of new event formats, or the redesign of the co-working spaces. The office works closely with TU Berlin as the head university in administrative matters.

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

// Managing Director:
Simone Harr

// Press & Public Relations:
Samira Franzel

// Events and Cooperations:
Tim Kawalun

// Interdisciplinarity and Open Labs:
Friedrich Schmidgall

// Graduate Program and Teaching:
Dr. Sandra Pravica

// Finance:
Anja Hertel
Jennifer Friese

// Secretary:
Ursula Menzel

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. Since October 2021, the SAB has consisted of eight members who meet at least once a year to review progress, advise the ECDF on its future development, and provide comments on the professional and scientific development of ECDF professors.

SAB members also help to foster collaboration with other research institutions and organizations and shape the formulation of medium- and long-term goals related to the global development of digital transformation.

Members of the Scientific Advisory Board

Prof. Dr. **Kristina Höök**	Chair of the Scientific Advisory Board, KTH Royal Institute of Technology, School of Computer Science and Communication, Sweden
Prof. Dr. Dr. hc. mult **Wolfgang Wahlster**	Vice Chairman of the Scientific Advisory Board, Saarland University, Institute of Computer Science and Director of the German Research Center for Artificial Intelligence (DFKI GmbH), Germany
Prof. Dr. **Peter Apers**	University of Twente, Dean of the Faculty of Electrical Engineering, Mathematics and Computer Science, The Netherlands
Prof. Dr. **Søren Brunak**	Technical University of Denmark, Disease Systems Biology, Denmark
Prof. Dr. **Juliane Fluck**	University of Bonn, ZB MED, Germany
Prof. Dr. **Hans Hansson**	Mälardalen University, Director of Mälardalen Real-Time Research Centre, Sweden
Prof. Dr. **Iwona Miliszewska**	University of Technology Sydney, Head of School, Information, Systems and Modelling, Australia

PUBLIC-PRIVATE PARTNERSHIP

The ECDF is financed by industry, non-university research institutions, and the state of Berlin. This is made possible by the public-private partnership model, which is unique in Germany.
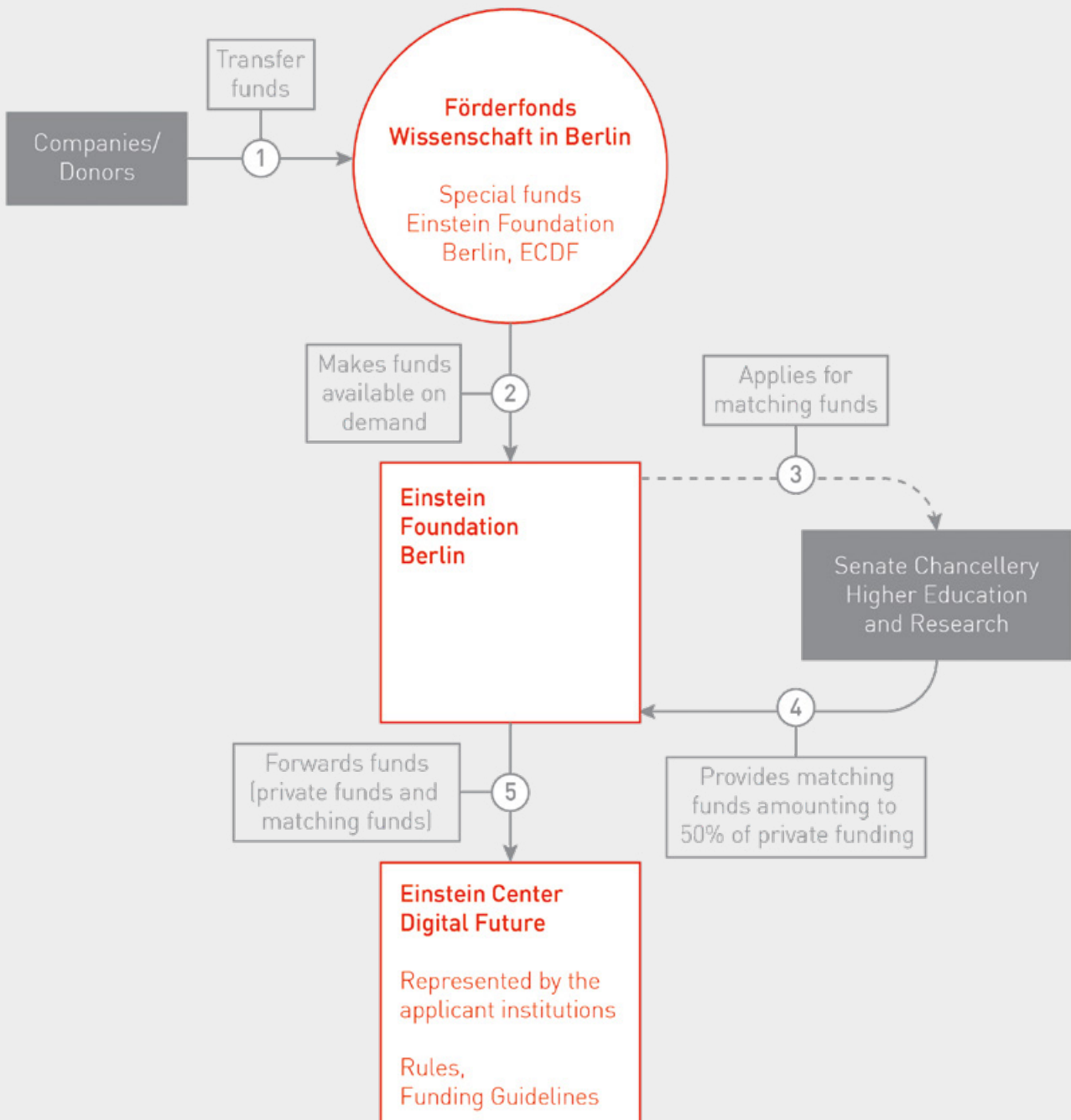
In addition, more than 20 companies participate in the initiative. From them, more than twelve million Euros flow into financing the professors during the project period. The companies include Amazon, Berliner Sparkasse, Berliner Verkehrsbetriebe, Berliner Wasserbetriebe, Bundesdruckerei GmbH, Commerzbank-Stiftung, Cornelsen Verlag, Daimler Fonds im Stifterverband, Deutsche Kreditbank AG, Deutsche Telekom AG, Elsevier B.V., GESOBAU AG, HOWOGE Wohnbaugesellschaft mbH, Roche Pharma, Santander Consumer Bank AG, 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 – these are the "matching funds."

In addition, the Federal Ministry of Labour 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 Physikalisch-Technische Bundesanstalt – Institut Berlin (PTB).

Funding is provided by the Einstein Foundation Berlin. It receives the corporate donations via the Stifterverband and applies for the corresponding matching funds from the state of Berlin. As the contractual 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

Companies/Donors

Transfer funds ①

Förderfonds Wissenschaft in Berlin

Special funds
Einstein Foundation
Berlin, ECDF

Makes funds available on demand ②

Einstein Foundation Berlin

Applies for matching funds ③

Senate Chancellery Higher Education and Research

Provides matching funds amounting to 50% of private funding ④

Forwards funds (private funds and matching funds) ⑤

Einstein Center Digital Future

Represented by the applicant institutions

Rules, Funding Guidelines

/ IMPRINT AND LEGAL NOTICE

IMPRINT AND LEGAL NOTICE