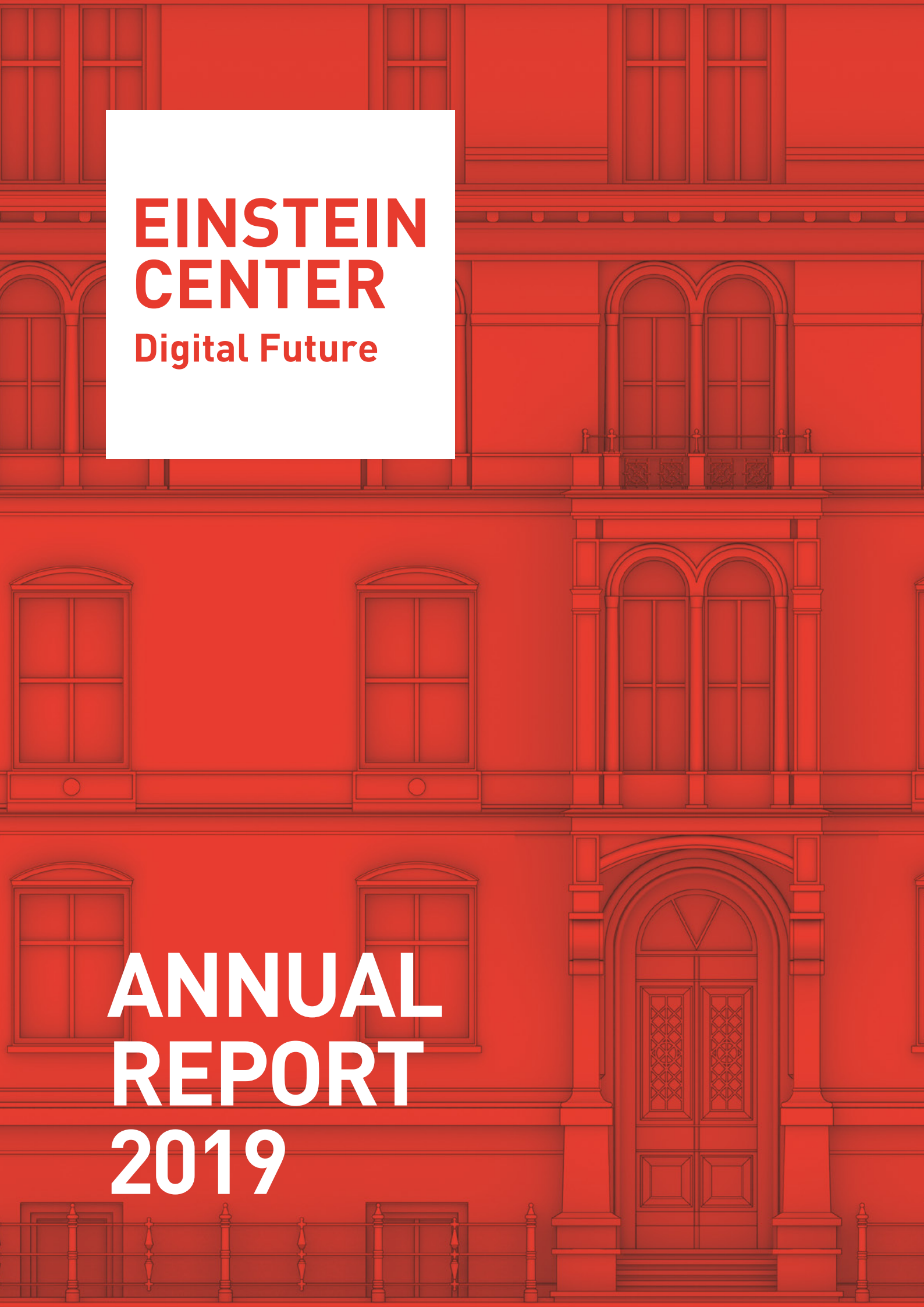

EINSTEIN CENTER
Digital Future

ANNUAL REPORT 2019

/ DIGITAL FUTURE BEGINS

PREFACE

Dear Readers,

An exciting and successful year is behind us: In spring 2019, the Einstein Center Digital Future (ECDF) was successfully evaluated. 17 new professors have been appointed at the participating universities. More than 70 events took place at the ECDF, which was attended by about 3,000 participants. One highlight was the Climathon – a 24-hour hackathon for climate protection, in which the ECDF participated with a challenge.

The interim evaluation of the ECDF in March 2019 was an important milestone for us. Over the course of two days, international experts from the Einstein Foundation Berlin took a close look at our interdisciplinary research activities, our international and national collaborations, and our public-private-partnership model, among other things. The positive feedback that followed was very encouraging.

The importance of the ECDF as a pioneer of interdisciplinary and cross-institutional research cooperation in Berlin has once again become apparent in 2019. In April 2019, the ECDF was part of the on-site inspection of the Berlin University Alliance (BUA) application. As part of the evaluation experts were presented with the excellent digitalization research conducted by Berlin universities. The successful approval of the BUA as a network of excellence in the excellence strategy competition of the federal and state governments strengthens Berlin as a location for science and opens up new opportunities for joint research projects for the ECDF professors.

Berlin is particularly well positioned in the field of digitalization research. In 2019, we were able to further expand our existing cooperative ventures, including the Weizenbaum Institute for Internet and Society, the Alexander von Humboldt Institute for Internet and Society (HIIG) and the Center for Machine Learning (BZML). With the opening of the Berlin Open Lab at UdK Berlin and the Berlin Institute for the Foundations of Learning and Data (BIFOLD), we have further expanded our network.

In addition to our national cooperation, we are intensifying our international activities. In 2019, our professors worked as visiting scientists, presented their research at conferences worldwide and initiated international research projects. Furthermore, our professors are increasingly in demand as experts in politics and non-governmental institutions – especially in the areas of artificial intelligence, climate and digitalization of the world of work. They contribute their expertise to committees of the Bundestag, expert commissions or committees of the Senate administration.

This expertise is now even more in demand in times of the global corona pandemic. As an interdisciplinary center for digitalization research, we therefore feel particularly called upon to contribute our knowledge in the fields of data science, digital health, online services, and machine learning, and to research the effects of the pandemic on the labor market, among other things.

We will face these special challenges in 2020 and jointly develop ideas for the (digital) future.

Prof. Dr. Odej Kao
Chairman of the Einstein Center Digital Future

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EINSTEIN CENTER DIGITAL FUTURE

//ABOUT US

The Einstein Center Digital Future (ECDF) is the center for digitalization research in Berlin. Since its opening on April 3, 2017, the professors and its staff have been doing research in the core area of "Digital infrastructures, methods and algorithms" as well as in the innovation areas "Digital Health", "Digital Society", and "Digital Industry and Services"

The ECDF is based on a large public-private-partnership (PPP) of more than 30 companies and organizations, Technische Universität Berlin, Freie Universität Berlin, Humboldt-Universität zu Berlin, Berlin University of the Arts, Charité – Universitätsmedizin Berlin, and more than ten research institutes from the Berlin scientific community. The Berlin University of Applied Sciences and Technology and the Beuth University of Applied Sciences are also involved. The ECDF was approved by the Einstein Foundation Berlin in September 2016. Technische Universität Berlin acts as the host university.

The research center aims to link Berlin's stakeholders in the field of digitalization more closely and to test new forms of cooperation. The focus is on innovative, interdisciplinary cutting-edge research and the acquisition of excellently trained scientists. The ECDF provides orientation in digital change, which many perceive as disruptive by thinking outside the box, strengthening evidence-based research and taking a holistic approach to mastering the current challenges of our digital future.

The ECDF supports interdisciplinary research projects and thus enables a holistic view of the demanding challenges of digital transformation.

//MIDTERM EVALUATION

The ECDF has made an impressive start since it opened: The professors appointed have a very high level of qualification and competence. The center is a role model for the establishment and implementation of inter-university collaborations. The development of the public-private-partnership model significantly exceeds expectations. This is the conclusion of the international expert group that had assessed the ECDF at the end of March 2019 on behalf of the Einstein Foundation Berlin (ESB).

The commission visited the ECDF for two days. During a poster and prototype presentation, the reviewers got to know the professors and their research. In addition, the Executive Board, professors, principal investigators, the university presidia, fellows, the ambassador and partners reported on the structures and work at the ECDF.

After receiving the report and the recommendations of the experts, Prof. Dr. Odej Kao was very pleased, "We are proud and happy that we could express our common spirit and enthusiasm for research at the ECDF in the presentations, the poster sessions and through the contributions of partners. The experts valued the concept of the center, the PPP model and our governance. They recognized our potential and they look forward to being able to accompany us on our way."

According to the group of experts, the ECDF has achieved positive awareness far beyond Berlin, academia and Germany itself. Through its creative and innovative concept, the promotion of originality, commitment to cooperation, interdisciplinarity and independence, the research center provides great added value, not only for the people involved, but also for future employers within and outside the academic community.

The experts were very impressed by the strong support that the ECDF receives from the presidents of all Berlin universities and Charité – Universitätsmedizin Berlin. The ESB follows the assessment of the group of experts that the positive impulses of the establishment of the ECDF and the ongoing cooperation of the sponsoring universities cannot be overestimated.

"It's a big step forward towards a culture of solidarity, cooperation and mutual coordination, as they are essential for the future of the Berlin system of science and research," Prof. Dr. Dr. hc Günter Stock, the Chairman of ESB, emphasized.

//SCIENCE IN THE LIGHT OF CLIMATE CHANGE

Whether it's "Fridays for Future" or the federal government's climate package – in 2019, climate protection was a topic that was very much in the forefront of public discourse as well as in the academic community. But although everyone is talking about climate protec-

tion, there are still many unanswered questions. What are the key challenges of climate protection? What kind of scientific findings are there? What do effective measures for climate protection look like and how can digitalization support them?

Initiated by the students' commitment to "Fridays for Future", a group of scientists and students at TU Berlin has been active in recent months to strengthen climate protection at the university. In addition to organizing the "TU Berlin for Future" lecture series in winter semester 2019/2020, the topic of short-haul flights was taken up with an initiative. For routes up to 1,000 km, flights should be voluntarily avoided and alternatives used.

In addition to the initiator Prof. Dr. Dr. Martina Schäfer, the academic Managing Director of the Center for Technology and Society at TU Berlin, ECDF Professor Tilman Santarius is one of the driving forces behind the movement. For example, as part of the the lecture series "TU Berlin for Future" on December 16, he gave a lecture on "Digitalization – Opportunity or Risk for Climate Protection?"

"The assumption that digitalization is automatically the solution to man-made problems has been a view that has been held for far too long. Digitalization processes will develop much more in the future. Therefore, the current balance of power in the digital economy is already heavily entrenched and the scope for 'sustainable digitalization' is very limited. Not least because of the commitment of the 'Fridays for Future' movement, digitalization, ecological sustainability, social justice and their interrelationships are now finally being discussed in public and have also come to the forefront in politics. In July 2019, we published the conference volume 'Was Bits und Bäume verbindet' (What connects bits and trees). In it, we present which ideas, initiatives and (new) alliances are emerging to make digitalization a driver for a sustainable society. This requires significantly more in-depth sustainability research. It has to address the diverse challenges of digitalization and it has to be interdisciplinary. Whether IT, engineering, economics, social sciences or other disciplines: we have to develop knowledge and options for action together," Santarius says.

A total of 440 TU employees joined the initiative in a very short time and want to do without short-haul flights in the future. The signed commitments were presented to the President of TU Berlin, Prof. Dr. Christian Thomsen, on September 20, 2019.

In addition to TU Berlin, other universities in Berlin and Brandenburg have joined the initiative. A total of 1,728 commitments have been signed in eight institutions.


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/ PROFESSORS

/ URBAN RESILIENCE AND DIGITALIZATION / DISTRIBUTED SECURITY INFRASTRUCTURES / INTERNET OF THINGS FOR SMART BUILDINGS / CONTROL OF CONVERGENT ACCESS NETWORKS / DIGITAL TRANSFORMATION AND IT INFRASTRUCTURES / DIGITAL TRANSFORMATION AND STRATEGIC INFORMATION MANAGEMENT / DIGITALIZATION AND SUSTAINABILITY / MOBILE CLOUD COMPUTING / E-HEALTH AND SHARED DECISION ALLOCATION / SECURE AND TRUSTWORTHY NETWORK-ATTACHED SYSTEM ARCHITECTURES / SOCIOLOGY OF WORKING WORLD'S DIGITALIZATION / TRUST IN DIGITAL SERVICES / DATA SCIENCE AND ANALYTICS / DIGITAL SELF-DETERMINATION / WEARABLE COMPUTING / DIGITAL EDUCATION

RESEARCH AT THE ECDF

Electronic textiles, cybercrime, and AI-based procedures in medicine or safety in cycling: At the Einstein Center Digital Future (ECDF), scientists from different disciplines conduct research on digitalization issues. Since opening in April 2017, the ECDF has become the pioneer and engine of digitalization research in Berlin.

The digital transformation is a big undertaking for our society. The research areas at the ECDF are correspondingly diverse: Prof. Dr. David Bermbach is developing a smartphone app in the "SimRa – Safety in Cycling" project that collects data on near-accidents. Prof. Dr. Daniel Fürstenau and Prof. Dr. Dr. Felix Balzer are investigating how data exchange can reduce the number of older patients with complications after surgery. Prof. Jochen Rabe and Prof. Dr. Florian Tschorsch are researching the possibilities and limits of digital participation processes in the BBBlockchain project. In her research, Prof. Dr. Berit Greinke is exploring the question as to how handicrafts and innovative manufacturing technologies can be combined. Together with Prof. Dr. Helena Mihaljević, Prof. Dr. Setareh Maghsudi and Prof. Dr. Elisabeth Mayweg she also initiated the "Women in STEAM" initiative at the ECDF. They would like to offer an inspiring discussion platform that strengthens the representation of women in different career levels in the field of digitalization research.

The up to 50 new professorships, which are distributed among all seven participating universities, thus form the core of the research center. In 2019, a total of 17 professors were appointed to the participating universities, with a total of 38 professors taking up their positions by December 2019, nine of them women and 29 men. The following pages reflect the status of the appointment procedures in the order in which they started their service until the end of 2019, portray the professors appointed in 2019 and provide an insight into joint projects.

OVERVIEW OF APPOINTMENT PROCEDURES

Appointed Professors

Name	Denomination	Institution	Start Date
Prof. Jochen Rabe	Urban Resilience and Digitalization	TU Berlin, Faculty VI – Planning Building Environment	10/01/2016
Prof. Dr. Florian Tschorsch	Distributed Security Infrastructures	TU Berlin, Faculty IV – Electrical Engineering and Computer science	04/01/2017
Prof. Dr. Sergio Lucia	Internet of Things for Smart Buildings	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	05/01/2017
Prof. Dr. Setareh Maghsudi	Control of Convergent Access Networks	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	08/01/2017
Prof. Dr. Daniel Fürstenau	Digital Transformation and IT Infrastructures	FU Berlin, School of Business & Economics	10/01/2017
Prof. Dr. Christian Meske	Digital Transformation and Strategic Information Management	FU Berlin, School of Business & Economics	10/16/2017
Prof. Dr. Tilman Santarius	Socio-Ecological Transformation and Sustainable Digitalization	TU Berlin, Faculty I – Humanities and Educational Sciences	12/15/2017
Prof. Dr. David Bermbach	Mobile Cloud Computing	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	12/20/2017
Prof. Dr. Stefan Kirchner	Sociology of Working Worlds' Digitalization	TU Berlin, Faculty VI – Planning Building Environment	04/01/2018
Prof. Dr. Jan Christoph Nordholz	Secure and Trustworthy Network-Attached System Architecture	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	04/01/2018

Name	Denomination	Institution	Start Date
Prof. Dr. Dr. Felix Balzer	E-Health and Shared Decision Allocation	Charité – Universitäts-medizin Berlin, Department of Anesthesiology and Operative Intensive Care Medicine (CCM/CVK)	04/01/2018
Prof. Dr. Timm Teubner	Trust in Digital Services	TU Berlin, Faculty VII – Economics and Management	04/01/2018
Prof. Dr. Helena Mihaljević	Data Science and Analytics	HTW Berlin	07/01/2018
Prof. Dr. Max von Grafenstein	Digital Self-Determination	UdK Berlin, Berlin Career College	08/01/2018
Prof. Dr. Berit Greinke	Wearable Computing	UdK Berlin, Institute of Product and Process Design	08/01/2018
Prof. Dr. Daniel D. Hromada	Digital Education	UdK Berlin, College of Architecture, Media and Design	08/01/2018
Prof. Dr. Felix Biessmann	Data Science	Beuth University of Applied Sciences für Technik Berlin, Faculty VI – Computer Science and Media	09/17/2018
Prof. Dr. Andrea Cominola	Smart Water Networks	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	10/01/2018
Prof. Dr. Elisabeth Mayweg	Digital Knowledge Management in Higher Education	HU Berlin, Faculty of Humanities and Social Sciences	10/01/2018
Prof. Dr. Tilo Schwalger	Data Assimilation in Neuroscience	TU Berlin, Faculty II – Mathematics and Natural Sciences	10/01/2018

Name	Denomination	Institution	Start Date
Prof. Dr. Michael Gensch	Terahertz and Laser Spectroscopy	TU Berlin, Faculty II – Mathematics and Natural Sciences	01/01/2019
Prof. Dr. Tobias Schaeffter	Biomedical Imaging	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	01/01/2019
Prof. Dr. Leonid Goubergrits	Cardiovascular Modeling and Simulation	Charité – Universitäts-medizin Berlin, Institute for Imaging Science and Computational Modeling in Cardiovascular Medicine	02/01/2019
Prof. Dr. Philipp Staab	Sociology of the Future of Work	HU Berlin, Faculty of Humanities and Social Sciences	02/01/2019
Prof. Dr. Anastasia Danilov	Organizational Economics – Future of Work	HU Berlin, Faculty of Economics and Business Administration	04/01/2019
Prof. Dr. Janik Wolters	Physical Foundations of IT Security	TU Berlin, Faculty II – Mathematics and Natural Sciences	07/01/2019
Prof. Dr. Michelle Christensen	Open Science	TU Berlin, Faculty I – Humanities and Educa-tional Sciences	08/01/2019
Prof. Dr. Florian Conradi	Open Science	TU Berlin, Faculty I – Humanities and Educa-tional Sciences	08/01/2019
Prof. Dr. Emmanuel Baccelli	Open and Secure IoT Ecosystem	FU Berlin, Department of Mathematics and Computer Science	08/22/2019

Name	Denomination	Institution	Start Date
Prof. Dr. Guillermo Gallego	Robotic Interactive Perception	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	09/01/2019
Prof. Dr. Michael Ortgiese	Traffic and Mobility Management	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	09/01/2019
Prof. Dr. Rebecca Frank	Information Management	HU Berlin, Faculty of Arts and Humanities	10/01/2019
Prof. Dr. Björn Globisch	Terahertz Sensor Systems	TU Berlin, Faculty II – Mathematics and Natural Sciences	10/01/2019
Prof. Dr. Anna Almosova	Digital Currencies / Cryptocurrencies	TU Berlin, Faculty VII – Economics and Management	10/16/2019
Prof. Dr. Adrian Paschke	Semantic Data Intelligence	FU Berlin, Department of Mathematics and Computer Science	10/17/ 2019
Prof. Dr. Joachim Seifert	Digital Networking of Buildings, Energy Supply Systems and Users	TU Berlin, Faculty III – Process Sciences	12/18/2019
Prof. Dr. Rita Streblow	Digital Networking of Buildings, Energy Supply Systems and Users	TU Berlin, Faculty III – Process Sciences	12/19/2019

Alumni

Name	Denomination	Duration	New Position
Dr. Sebastian Köhler	Methods for Digital Phenotyping	06/01/2018 - 10/31/2019	Information Architect, ada Health

Pending Appointments

Denomination	Institution	Expected Starting Date
Digital Technologies For The Rehabilitation Of Patients With Complex Facial Treatments	Charité – Universitätsmedizin Berlin	02/01/2020
Cooling And Noise Reduction In Aircraft Engines	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	04/01/2020
Digital Engineering 4.0	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	10/01/2020

Active Negotiations

Denomination	Institution
Dental Health System	Charité – Universitätsmedizin Berlin
Digital Trial Outcomes	Charité – Universitätsmedizin Berlin
IT Consulting or Enterprise IT Architecture	HTW Berlin
Rehabilitation Sciences	HU Berlin, Faculty of Life Sciences
Internet of Things	UdK Berlin
Discrete Optimization in the Context of Big Data	TU Berlin, Faculty II – Mathematics and Natural Sciences
Digital Methods of Collaborative Urban and Quarter Planning	TU Berlin, Faculty VI – Planning Building Environment

PROF. DR. MICHAEL GENSCH

Terahertz and Laser Spectroscopy

Since January 2019, Prof. Dr. Michael Gensch has held the professorship "Terahertz and Laser Spectroscopy" at the Institute for Optics and Atomic Physics at Technische Universität Berlin and at the Einstein Center Digital Future. At the same time, he was appointed department head of the "Terahertz and Laser Spectroscopy" department at the DLR Institute of Optical Sensor Systems in Berlin Adlershof. Born in Berlin, he studied at the University of Manchester and TU Berlin before moving to the Leibniz Institute for Analytical Sciences – ISAS for his doctorate. After various stations at DESY and at the BESSY II storage ring at the Helmholtz-Zentrum Berlin (HZB), he became senior scientist and project manager for the construction and scientific program of the TELBE THz User Facility at the ELBE accelerator at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) in 2010. From 2015 until his appointment to TU Berlin, he worked as group leader "Hochfeld-THz driven phenomena" at the Institute for Radiation Physics at Helmholtz-Zentrum Dresden-Rossendorf (HZDR). "My research focuses on instrument development for customized laser-based spectroscopy methods with applications in materials analysis, diagnostics on acceleration-based light sources and, in the future, robotic missions to explore the solar system," said the scientist explained.

PROF. DR. TOBIAS SCHAEFFTER

Biomedical Imaging

Since January 2019, Prof. Dr. Tobias Schaeffter has been ECDF Professor for "Biomedical Imaging" at Technische Universität Berlin. He also heads the Department of Medical Physics and Metrological Information Technology at Physikalisch-Technische Bundesanstalt (PTB).

Schaeffter studied electrical engineering and computer science at Technische Universität Berlin. "Towards the end of my studies, I heard a series of lectures on medical imaging and was fascinated by the technical challenges and the diverse medical applications," he says. For him, inter-disciplinarity is the overarching topic of his career. Consequently, he completed his diploma thesis at Charité Campus Virchow-Klinikum in the field of magnetic resonance tomography (MRT), where he worked on radiological issues with engineering solutions. For his doctorate, he switched to the Department of Biochemistry at University of Bremen, where he used spectroscopic MR methods to examine the brain metabolism in a spatially resolved manner.

His main goal is to quantifiably measure biophysical parameters in the human body with imaging methods: "The challenge of the future is to back up imaging methods with numbers in order to establish a comparable diagnosis and objective measurement of therapy effects," he says. "If we succeed in quantitatively measuring biophysical parameters such as blood speed, oxygen supply or other tissue properties, we can assess therapy effects much faster and more objectively than if a purely visual finding is conducted." This requires cooperation with clinical users and industry.

He completed his doctoral thesis in cooperation with the Philips research laboratory in Hamburg. "I then worked in industrial research at Philips for ten years and, in addition to basic research on MRI equipment, I also worked on integrating our research results into products for clinical use." In 2006, he became part of the efforts at creating a new Biomedical Engineering department at King's College London. In his research, he continued to work on the development of fast and quantitative measurement techniques with a focus on imaging of the heart. In 2015, the PTB appointed him as head of department in Berlin. The aim of his department is to develop quantitative measurement methods and reference procedures for medical metrology to ensure comparability of measurement data between different devices and manufacturers.

"At ECDF, I work in the field of digital health. We already have a wealth of data in medicine. The problem is that this data is usually not comparable because it is based on different measurements and thus makes combining it very difficult. My personal goal is to develop methods in cooperation with colleagues from data science, machine learning and medicine that characterize such data in such a way that it is comparable and thus meaningful for large population-based studies."

PROF. DR. LEONID GOUBERGRITS

Cardiovascular Modeling and Simulation

Leonid Goubergrits became interested in his current specialty – cardiovascular modeling and simulation – when he moved to Germany in 1995. Previously, he had studied applied mathematics and physics at Moscow University of Physics and Technology with a focus on fluid mechanics. "In Germany, I became familiar with a special area of fluid mechanics – the application in medicine. I am still fascinated by the interdisciplinarity of this research area and its challenges," Leonid Goubergrits explains. He has held the professorship of "Cardiovascular Modeling and Simulation" at the Einstein Center Digital Future and Charité – Universitätsmedizin Berlin since February 1, 2019.

While working as a research assistant at the laboratory for biofluid mechanics at Charité – Universitätsmedizin Berlin and during his doctorate at TU Berlin, he dealt with the numerical modeling of blood flow: "I researched the connection between blood flow and atherosclerosis in order to find new risk factors for the development of this disease. I was one of the first to develop the field of patient-specific modeling of blood flow in vessels," the Moscow-born scientist, said.

Gradually, his initial interest in modeling blood flow in the carotid artery expanded to a very broad field of cardiovascular research. He bundled these different approaches of modeling blood flow in coronary arteries, in cerebral aneurysms, in the heart with heart valves and in the aorta, but also the modeling of blood disorders by artificial organs such as heart valves or cardiac support systems as well as the development and optimization of artificial organs at Charité – Universitätsmedizin Berlin and the German Heart Center Berlin with a focus on numerical modeling of cardiovascular diseases. "My vision is the use of numerical models in everyday clinical practice, as these approaches can reduce the use of invasive diagnostic procedures, predict postoperative results and provide precise diagnoses and more information than today's clinical practice. Overall, this will be the digital medicine of the future," Goubergrits, said.

Since 2001, Leonid Goubergrits has also partly taken over and redesigned the teaching of fluid mechanics in medicine for students at TU Berlin. "As part of the ECDF professorship, I would like to continue my work on the digital future of medicine and build a bridge between computer scientists, engineers, mathematicians, and doctors in research and teaching. I found the coupling of basic and applied research, teaching and industrial cooperation to be very constructive and motivating. I would like to further expand this model in my future work."

PROF. DR. PHILIPP STAAB

Sociology of the Future of Work

Prof. Dr. Philipp Staab who has been ECDF Professor for the "Sociology of the Future of Work" at Humboldt-Universität zu Berlin since February 2019 describes himself as "a sociologist with a foot in political economy." Staab studied sociology, political science and psychology in Kassel and at University of Paris X, Nanterre. After completing his doctorate, he worked in various research projects at the Hamburg Institute for Social Research and the Institut für die Geschichte und Zukunft der Arbeit (Institute for the History and Future of Work). His main focus was on technology research, social inequality, digitalization and work sociology. "Even during my doctorate, I was already working in the charged sphere between the sociology of work and social structure analysis. My topic was the emergence of a service proletariat in the OECD countries as an effect of the tertiarization of the labor markets, i.e. the emergence of these service provision societies. Since then my work has strongly focused on technology and my research today centers on developing a theory of digital capitalism," Staab says.

In recent years, he has dealt specifically with the work structures of the leading companies on the commercial Internet such as Google, Microsoft, Amazon, Apple, and Facebook, and smaller companies as well. In 2018, he completed a guest stay in the research group "Globalization, Work and Production" at the Berlin Social Science Center (WZB) and represented the professorship "Technology Studies" at the School of Humanities and Social Science at University of St. Gallen.

As part of his professorship, Staab focuses on how certain logics that have shaped the rise of the commercial Internet are being transferred to other areas, such as the industrial sector, as the digitalization of the world of work progresses. "According to my theory, we are at the beginning of the second half of digital capitalism. I am interested in whether structures of the digital world of work, as we know it from the commercial Internet, also form in other areas, e.g. in industry. What recurs from the history of the commercial Internet and what will be different in the second half of digital capitalism? In viewing this issue, I want to start with the analysis and comparison of different industrial platforms," Philipp Staab says. A second research focus is on the political economy of artificial intelligence. "At the beginning of digital capitalism, as it developed on the East Coast of the USA, an entrepreneurial state existed – and not the entrepreneurial individual. At present, an entrepreneurial state is again forming around a research topic in Europe and Germany – artificial intelligence. I am also interested in observing and analyzing this formation dynamic," he says.

The special construction of the ECDF suits him. "Here at the ECDF, the technical sciences are closely linked to the reflection sciences. And in an extremely exciting location, right in the heart of political Berlin. This creates exciting perspectives for my work!"

PROF. DR. ANASTASIA DANILOV

Organizational Economics – Future of Work

How can you increase cooperation among employees and how do people react to certain incentives or organizational structures? These and other questions about employee behavior are the focus of Prof. Dr. Anastasia Danilov, who took up her professorship for "Organizational Economics – Future of Work" at Humboldt-Universität zu Berlin and the Einstein Center Digital Future on April 1, 2019. She studied business administration with a focus on human resources, finance and statistics at University of Cologne and at the same time earned a master's degree in "International Management" (CEMS) at Copenhagen Business School in Denmark. Anastasia Danilov received her PhD from one of the most renowned German personnel researchers, Prof. Dr. Dirk Sliwka in Cologne. After completing her doctorate, she devoted herself to topics in the field of business ethics.

"In my research, I deal with questions of human resources and organizational economics. I use economic experiments to investigate the effects of different forms of remuneration, incentive systems and social norms on individual work performance and on counterproductive behavior such as sabotage or lies," the researcher explains, who was born in Ukraine. In a current project, she is investigating discrimination against disadvantaged groups. Her experiments demonstrate that unequal treatment tends to be avoided if it jeopardizes your own positive image or positive self-perception. However, if the subjects can trace their motives to compliance with moral or social norms, it is much easier to discriminate.

"Digitalization is changing working conditions, but also leadership structures and forms of motivation. Some control mechanisms and incentive instruments lose their efficiency. Personal responsibility and the commitment of employees are becoming increasingly important. How can companies support and promote the motivation of their employees in the changing world of work?" The scientist would like to pursue this question further.

"What I particularly like about the connection to the ECDF is the unique environment that enables interdisciplinary collaboration very directly. I'm pleased that behavioral and human resource management, together with other scientific disciplines, is taking a role in shaping the future," Anastasia Danilov says.

PROF. DR. JANIK WOLTERS

Physical Foundations of IT Security

For most people, quantum communication is more of a concept for the future. Prof. Dr. Janik Wolters is already one step ahead: the professor for "Physical Foundations of IT Security" at TU Berlin, the German Aerospace Center and the Einstein Center Digital Future, is researching the technology which should make tap proof quantum communication possible even over long distances.

Born in Berlin, he studied physics at TU Berlin and wrote his thesis in theoretical physics on semiconductor devices based on quantum points and how to simulate them on the computer. "A very exciting – but also very theoretical topic. Above all, I lacked practical work on experiments to check the calculations," Wolters said.

According to the theory, the physicist was therefore attracted to the experiment: "After completing my studies at the Institut d'Optique in Palaiseau, France, I tried an experiment on the quantum physics of individual atoms before returning to HU Berlin for my doctorate." As part of his doctorate, Wolters worked on quantum systems based on artificial atoms. He examined color centers in nanometer-sized diamonds that behave similarly to a single atom. "The aim was to embed these color centers in optical resonators in order to strengthen the light-matter coupling." After a postdoctoral stay at TU Berlin, Wolters switched to Prof. Dr. with a Marie Skłodowska-Curie grant from the European Commission in the Quantum Optics Lab led by Philipp Treutlein at University of Basel, Switzerland. "By then I had already worked on a wide variety of quantum systems. In Basel, I researched how and whether one could combine these different quantum systems to form a hybrid system."

On July 1, 2019, Wolters started the appointment in Berlin. His research focuses on the development and research of quantum memories and quantum light sources, i.e. key components for quantum technology. "In contrast to the amplifiers of classic telecommunications, there are no quantum amplifiers in quantum communications. Therefore, quantum communication can now be extended to a maximum of 100 kilometers. There are different concepts to move even beyond that. One of these concepts is based on so-called quantum repeaters as an analogue to the classic amplifier. These do not work with individual photons, but with pairs of photons. There are theoretical suggestions and experimental preparatory work, but no one has yet been able to implement a functioning quantum repeater. One important component is missing, namely, quantum memory. The development of such quantum memories is one of my main research areas," Wolters explains.

In Berlin and at the ECDF, Janik Wolters finds ideal conditions for this: "If you want to develop secure communication, you urgently need contact with future users and neighboring technologies. I expect an intensive exchange with my ECDF colleagues."

PROF. DR. MICHELLE CHRISTENSEN

Open Science

Since August 2019, Michelle Christensen has been a Visiting Professor at Technische Universität Berlin and the Einstein Center Digital Future (ECDF). Together with Florian Conradi, she holds the professorship for "Open Science".

Prof. Dr. Michelle Christensen is a sociologist and designer exploring the spaces in between these realms. Her research interests include trans- and postdisciplinarity, the politics of objects, and the democratic potentials of free and open technologies. Michelle Christensen wrote her Ph.D. (Dr. phil.) in the field of Design Research at the Berlin University of the Arts. Prior to this, she studied political sociology at Roskilde University in Denmark (B.A.), conflict studies at Utrecht University in the Netherlands (M.A.), gender studies at the University of Amsterdam (M.Sc.), and integrated design at the Köln International School of Design in Cologne (M.A.). She worked at the Crisis Department of Amnesty International USA, was a Humanity in Action Fellow, and a Congressional Fellow in the United States Congress in Washington DC. As a researcher she worked at the Design Research Lab (UdK Berlin), the German Research Centre for Artificial Intelligence (DFKI), and together with Florian Conradi she currently heads a research group on critical making at UdK Berlin as part of the Weizenbaum Institute. She has taught courses in conflict analysis, gender studies and design methods at universities in the Netherlands and Germany, most recently as a visiting professor at the international master's program (MAID) at Anhalt University of Applied Sciences in Dessau. Since 2015, she has been a member of the Board of International Research in Design (BIRD) at Birkhäuser, and since 2014, she has been a board member of the German Society for Design Theory and Research (DGTF).

In the framework of their visiting professorships at the Einstein Center Digital Future, Michelle Christensen and Florian Conradi explore the potential of research practiced within open labs as a mode of open science. Currently, they are initiating the "Critical Maker Lab" as a site of research – as a transdisciplinary and trans-university terrain that attempts to exceed the boundaries of theory and practice, the political and the everyday, and academia and activism. This is done with the aim of probing new modes of collaboration within research, in order to bring critical perspectives and practices to the surface. Within the "Critical Maker Lab", their research, teaching and experimental design practice focuses on decolonial, feminist/queer theoretical and sustainable approaches to critical making and free/open technologies.

"ECDF gives me the opportunity to be right in between academia, politics and civil society. An inclusive digital society can only be built by working across and beyond scientific disciplines – and exactly that is what the ECDF creates a space for", she says. Michelle Christensen is especially looking forward to the unforeseen questions and concerns that surface in the clash of an international and interdisciplinary debate on digitalization. "ECDF gives me the opportunity to re-question my own approaches and assumptions in an interdisciplinary and interuniversity context."

PROF. DR. FLORIAN CONRADI

Open Science

Since August 2019, Florian Conradi has been a Visiting Professor at Technische Universität Berlin and the Einstein Center Digital Future (ECDF). Together with Michelle Christensen, he holds the professorship for 'Open Science'.

Prof. Dr. Florian Conradi is a designer and researcher, combining critical theory and design practice as an approach to critical making. Using the means and principles of free and open technologies, he explores the politics of design within the digital society. Florian Conradi studied communication design at the University of Applied Sciences Mainz and art at the Bezalel Academy of Art and Design in Jerusalem. He went on to complete an M.F.A. in design at the Sandberg Institute (Gerrit Rietveld Academie) in Amsterdam, an M.A. in integrated design at Köln International School of Design in Cologne, and wrote his Ph.D. (Dr. phil.) in the field of Design Research at Berlin University of the Arts (UdK Berlin). Since 2008, he has been initiating socio-political design projects with institutions in the field of critical media and political advocacy, carrying out field research in Europe, as well as in the Middle East, East and West Africa. As research associate, he worked for the University of Applied Sciences Mainz and the Design Research Lab at UdK Berlin, the German Research Centre for Artificial Intelligence – and together with Michelle Christensen, he currently heads a research group on maker culture at UdK Berlin as part of the Weizenbaum Institute. He has taught critical approaches to design and design methods at amongst other places Köln International School of Design, UdK Berlin, and most recently, as a visiting professor at the international master program in Integrated Design at Anhalt University of Applied Sciences in Dessau.

In the framework of their visiting professorships at the Einstein Center Digital Future, Florian Conradi and Michelle Christensen explore the potential of research practiced within open labs as a mode of open science. Currently, they are initiating the 'Critical Maker Lab' as a site of research – as a transdisciplinary and trans-university terrain that attempts to exceed the boundaries of theory and practice, the political and the everyday, and academia and activism. This with the aim to probe new modes of collaboration within research, in order to surface critical perspectives and practices. Within the Critical Maker Lab, their research, teaching and experimental design practice focuses on decolonial, feminist/queer theoretical and sustainable approaches to critical making and free/open technologies.

Florian Conradi is particularly looking forward to unexpected collaborations with other scientists in order to experimentally challenge his own research interests through an interdisciplinary dialogue and thereby create new collaborations. "The ECDF offers me the opportunity for an open dialogue and an academic experimental space to build bridges between civil society, politics and science. Critical perspectives on the challenges and opportunities in a digital society must be addressed and developed together," he says.

PROF. DR. EMMANUEL BACCELLI

Open and Secure IoT Ecosystem

Since September 2019, Emmanuel Baccelli has been Professor for "Open and Secure IoT Ecosystem" at Freie Universität Berlin, in partnership with Inria (Inria is the French national research institute for digital sciences) and the Einstein Center Digital Future (ECDF).

In his research, he is investigating how low-power protocols and deeply embedded open source software can improve the functionality and the security of the Internet of Things (IoT). "The trade-off between energy efficiency and security is a key technical challenge for IoT," Baccelli says. His research not only focuses on technical aspects. "Issues also affect the privacy and the sovereignty of users, as well as transparency", he says. "We should use open specifications and open source as often as possible".

Today, IoT users typically have little control over their system and their data. As an example, Baccelli mentions the case of a very popular connected kitchen appliance, which hackers recently exposed. This IoT device was sold bundled with unmaintained, vulnerable software, and even embarked an unused, hidden microphone which was not mentioned by the manufacturer – making it a perfect target for cyberattacks. "Change is necessary, as people are increasingly concerned about their data," Baccelli emphasizes. Privacy-by-Design is one of the key points he makes. "If we want people to trust IoT technologies, then we must develop appropriate software and network protocols. A general-purpose open source alternative must be available, which facilitates maintenance and modifications adding various pre-processing of data on-board, before it even leaves the device," he says.

Emmanuel Baccelli received his PhD in 2006 in Paris from the renowned École Polytechnique on "Routing and Mobility in Large Packet-Based Networks". In his thesis, Baccelli investigated the compatibility of classical Internet concepts with the inherent limitations of ad hoc wireless communication. In 2012, he completed his habilitation at Université Pierre et Marie Curie. In 2007, Emmanuel Baccelli joined Inria as scientific researcher, where he currently takes part in the proect team TRiBE. Since 2013, Emmanuel Baccelli is also co-founder and coordinator of the open source community developing RIOT, an operating system for IoT devices based on microcontrollers.

He is looking forward to working with the other professors at ECDF. "My research is a building block that can be applied in practice in many other disciplines – for example in the medical or smart agriculture fields," Baccelli says. He is also interested in the exchange with humanities scholars, lawyers and designers on the topic of Open Source.

PROF. DR. GUILLERMO GALLEGO

Robotic Interactive Perception

Guillermo Gallego has been Professor for "Robotic Interactive Perception" at Technische Universität Berlin and Einstein Center Digital Future since September 2019. The Spaniard previously worked as a postdoctoral fellow at the Department of Neuroinformatics at University of Zurich and ETH Zurich. From 2005 to 2011, he was a Fulbright scholar conducting research at the Georgia Institute of Technology in the USA, where he received his doctorate in 2011.

The focus of his research work lies on at the intersection of robotics, computer vision and applied mathematics, with an emphasis on optimization. "Broadly speaking, my focus is on robot perception using cameras, and on optimization methods for interdisciplinary imaging and control problems", Gallego explains.

Within the framework of his ECDF professorship, he wants to focus on improving the perception system in robots. "As sensors such as cameras and processors become cheaper, smaller and better, they also become more ubiquitous. This is something that we observe in everyday life, on our smartphones. It is also the case of robots and remote sensing networks", Gallego says. The amount of information that such devices are able to acquire about the environment is enormous and steadily growing. To make the most out of these technological advantages, new efficient methods are needed to extract information (patterns) from the raw data and convert it into knowledge. "Such perceptual knowledge is essential to make predictions about the future or to provide autonomy for robots operating in changing environments", Gallego says. This is a challenging research project that involves multiple trade-offs, since the amount of available resources like memory, computing capabilities, power and bandwidth is largely constrained.

Gallego is very interested in interdisciplinary research. As an example, he cites a research project during his doctoral studies. "I combined my electrotechnical background with that from researchers in civil engineering to design a remote sensing tool that allowed us to extract information from stereo videos of the surface of the ocean. We used it to study nature, such as to measure the energy-transfer interaction between the sea and the atmosphere over large areas and in a non-intrusive way, and to provide an early warning system for coastal regions at risk, such as the Venice Lagoon in Italy. I am sure that similar interesting opportunities will arise among the ECDF professors due to our diversified knowledge."

Other interdisciplinary fields of research he is interested in are digital signal processing and machine learning. "These fields are boundless, with applications in many scientific disciplines. Everyday, huge amounts of data in the form of images or videos are generated, and almost anywhere where there is an image it is digital and calls to be processed to extract meaningful information from it. We, as humans, do it effortlessly, but for computers it is another story; mathematical techniques from the above fields, now under the name of Data Science, are used to extract such information in a computer. Having mathematics and information processing at my heart, it opens many possibilities to apply this knowledge to other disciplines, as far apart as medicine, autonomous driving, space exploration or social media."

PROF. DR. MICHAEL ORTGIESE

Traffic and Mobility Management

Prof. Dr. Michael Ortgiese has been Professor for "Traffic and Mobility Management" at the Einstein Center Digital Future (ECDF) since September 2019. The joint professorship of Technische Universität Berlin and the German Aerospace Center (DLR) is linked to the management of the ÖPNV (Department of Traffic Management and Public Transport) at the DLR Institute of Transportation Systems.

According to Ortgiese, the greatest challenge in traffic development is the transformation of the mobility system with the aim of securing mobility and at the same time reducing the negative effects on people, the environment and cities. "I deliberately view the wording broadly, since the current climate debate is certainly crucial, but other negative effects should not be overlooked," he says. The challenge is to establish new mobility concepts in smaller cities and not just in the big cities. When Ortgiese is out and about in Berlin and Potsdam, he prefers the combination of public transport and bicycle. "The transformation in transport intervenes in a complex structure of effects. Just to say something like use your bike, use public transport, just don't fly, is too simplistic. In the future, we'll have to find ways of presenting complex relationships in a more easy-to-understand way, and discuss them with those who are using the public roads," he says.

His research focuses on the integration of new digital solutions in traffic and mobility management. "This can only succeed if new technological approaches are integrated into the planning structures and operating concepts of the cities. In addition to the development of technologies, new co-creation processes are required here, in which actors work together who have not yet really worked together. In addition to the actual technology development, I would like to focus my research here," he says. For him, the digital future is not just a question of the technical migration of systems, but also the transformation of processes and organizational structures. "In my view, we are still not giving enough thought to how we can profitably incorporate new digital solutions into the processes of planning and operating the mobility systems. In addition to road users, those responsible in administrations and politics should also be addressed. Given the interdisciplinary orientation of the ECDF, I hope to find comrades-in-arms."

Ortgiese would like to research and work beyond the disciplinary boundaries. "The academic community in particular still thinks too much in terms of its disciplinary pillars. That is something I just saw – or, I would even go so far as to say, suffered – during my work as Vice President for Research and Transfer at a university," he notes. He would therefore be pleased to discuss the challenges of digital transformation with other ECDF researchers and to jointly develop questions.

PROF. DR. REBECCA FRANK

Information Management

How can organizations manage and preserve their digital data well? How do data curation and sharing processes change in a digital and networked environment? Which role do social and ethical issues play when it comes to trusting digital repositories? Prof. Rebecca Frank, Ph.D. is investigating these questions. Since September 2019 she has been ECDF Professor at Humboldt-Universität zu Berlin at the Institute for Library and Information Science (IBI). Previously, she was a Research Fellow at the University of Michigan School of Information (USA). Her work has been supported by the National Science Foundation and the Australian Academy of Science.

"My research examines the social construction of risk in trustworthy digital repository audit and certification", she says. She investigates what the concept of risk means to different people involved in digital preservation, and the factors that influence how people develop their understanding of risk. Frank also conducts research in the areas of digital preservation, digital curation, and data sharing and reuse."In my research, I focus on the social and ethical barriers that limit or prevent the preservation, sharing, and reuse of digital information", she explains.

Rebecca Frank is curious about her work at ECDF: "I am looking forward to collaborating with other researchers at the ECDF and in Berlin in order to find interdisciplinary approaches to address big social issues around topics such as access to information, open science, digital ethics and privacy. There are a lot of exciting opportunities to do research that will have a big impact."

PROF. DR. BJÖRN GLOBISCH

Terahertz Sensor Systems

Anyone who has walked through a body scanner in the security checkpoint has already experienced terahertz sensors. Prof. Dr. Björn Globisch has been researching this electromagnetic radiation, which lies in the spectrum between the classic high frequency and the infrared range for more than seven years. Since October 2019 he has been ECDF Professor for "Terahertz Sensor Systems" at the Fraunhofer Heinrich Hertz Institute (HHI) and at Technische Universität Berlin. The physicist is also head of the research group "Terahertz Sensor Systems" at the HHI.

According to Globisch, the generation and detection of terahertz radiation is still a challenge, but it has unique properties. "Many materials, such as plastics, ceramics, paints and varnishes, as well as textiles, are transparent in the terahertz frequency range," he explains. In addition, terahertz measurement technology is contactless, so that, for example, the thicknesses of lacquer layers on automobile bodies can be measured with a resolution in the micrometer range. "Thanks to its low photon energy, terahertz radiation is also completely harmless to humans. This opens up a variety of other applications."

It is also exciting for Globisch to transfer large amounts of data using terahertz frequencies. "Our data rates continue to rise due to increasing digitalization. Thus, the question arises: what comes after 5G? With the help of terahertz waves, significantly higher data rates can be transmitted wirelessly. Transmission lines with a length of 100 to 500 meters already work in the laboratory," he reports.

In the future, Globisch would also like to deal with 3D imaging methods and the intelligent evaluation of image data. "As a physicist, I would like to work with colleagues at the ECDF who are data scientists or experts in the field of machine learning," he says.

PROF. DR. ANNA ALMOSOVA

Digital Currencies / Cryptocurrencies

How are Bitcoin, Ethereum and others changing the financial system? How do digital means of payment affect the economy as a whole? Prof. Dr. Anna Almosova deals with these and other questions. Since mid-October 2019 she has been Professor for "Digital Currencies/Cryptocurrencies" at the Einstein Center Digital Future (ECDF) and Technische Universität Berlin.

The macroeconomist often works with Bayes' theorem – a mathematical proposition from probability theory that describes the calculation of conditional probabilities. Her macroeconomic models examine how economic actors make decisions based on available resources, information, and beliefs.

Anna Almosova relies heavily on interdisciplinary collaboration in her research – especially with experts in machine learning or big data. "I see great potential in the combination of the various disciplines, especially due to the diverse disciplinary approach, and I look forward to working with ECDF in a variety of ways. I find the view of computer scientists in particular very exciting," Anna Almosova says.

In the course of her doctorate, she dealt with the concept and methods of machine learning for the first time and since then has applied them to the models of macroeconomics, producing macroforecasts with the help of deep learning methods. For example, she investigated the prediction of macroeconomic time series with recurring neutral networks.

With regard to digital currencies, she examines what would happen if only crypto currencies were used as means of payment. "We need to invest more in a macroeconomic model to experiment," she says. One of the questions the professor wants to investigate is whether the experiments with digital payments and cryptographic tools lead to different results than classical models based on traditional payment methods.

PROF. DR. ADRIAN PASCHKE

Semantic Data Intelligence

Prof. Dr. Adrian Paschke has been Professor for "Semantic Data Intelligence" at the Einstein Center Digital Future since mid-October 2019. The professorship is a joint appointment between Freie Universität Berlin and Fraunhofer FOKUS. Paschke has been Director of the Data Analytics Center (DANA) at Fraunhofer FOKUS since 2016 and Professor and Head of the Corporate Semantic Web Group (AG-CSW) at the Institute of Computer Science at Freie Universität Berlin since 2008.

In his research, Paschke deals with two technologies of artificial intelligence (AI): semantic AI and machine learning. "In my work I combine both areas of symbolic and sub-symbolic AI. Because on the one hand it's about model-based and semantic knowledge and on the other hand it's about learning of the computer from data," he says. He cites the semantic plausibility check for image recognition as an example. "When a cat's in the picture, we humans recognize it because we've learned what the animal looks like. We don't necessarily need many different cat pictures for this, but can learn from one and the same picture. Such additional knowledge from semantic knowledge bases, such as ontologies, can be used by the machine for interpretation and knowledge inference," Adrian Paschke explains.

These technologies are also important in autonomous driving, for example to make exceptions recognizable and interpret situations correctly. "We have to train computers so that cars can recognize people on the freeway, for example, and can identify and have the ability to assess a potentially dangerous situation and then make correct behavioral decisions based on normative and value-based AI," he says. Therefore, semantic models are necessary to convey the necessary knowledge to the computer and simulation models with semantic knowledge to generate a sufficient amount of training data for machine learning.

In addition to researching semantic AI technologies and knowledge representation standards, Paschke also deals with edge intelligence applications, e.g. in the field of Industrial IoT, i.e. the Internet of Things in Industry. If the data in the Edge Intelligence Applications can be used directly, the automatic monitoring and maintenance of the machines can be improved, for example.

Another exciting field for Paschke is quantum-assisted AI. "We can think of first applications in this area, but it will still take some time before it actually happens. It's therefore very exciting for me to be at the interface between basic research at Freie Universität Berlin and early application with industrial partners at Fraunhofer FOKUS," he says. The ECDF is an interesting network for him. "I'm really looking forward to exchanging ideas with my colleagues. As a semantic specialist, I am used to working interdisciplinary with domain experts from various areas in semantic knowledge modeling and to use my application-oriented AI research to transfer benefits between science and industry. "

PROF. DR. JOACHIM SEIFERT

Digital Networking of Buildings, Energy Supply Systems and Users

Prof. Dr.-Ing. habil. Joachim Seifert has been a Professor at the Einstein Center Digital Future (ECDF) and Technische Universität Berlin since December 2019.

Together with Rita Streblow, he holds the visiting professorship for "Digital Networking of Buildings, Energy Supply Systems and Users". He has been the spokesman for the National 5G Energy Hub since 2018.

Joachim Seifert studied mechanical engineering at TU Dresden with a focus on technical building equipment. He has been a research assistant at TU Dresden since 2001; there he worked first at the Institute of Thermodynamics and Building Services Engineering and later at the Institute of Energy Technology. In 2005, Prof. Seifert received his doctorate with a thesis titled "On the influence of air flows on the thermal and aerodynamic conditions in and on buildings". As part of his doctorate, he worked at TU Dresden, at Alborg University and at University of Hong Kong (SAR). Prof. Seifert completed his habilitation in 2009. Since 2010, he has been the section manager for building energy at TU Dresden.

The main focus of Prof. Seifert's work is on aspects of human thermal physiology and human-technology interaction. In addition, Prof. Seifert deals with the networking of energy systems, with a special focus on thermal and electrical systems (regional virtual power plants).

So far, Prof. Seifert has authored seven specialist books; until 2019, he was also editor-in-chief of the trade journal "Gebäudeenergietechnik und Innenraumklima" ("Building Energy Technology and Indoor Climate"). In addition, Prof. Seifert is active in various committees or specialist committees in the field of energy technology.

"Working at the ECDF gives me the hope of networking intensively with other specialist colleagues and developing new solutions for current issues in energy technology," he says.

PROF. DR. RITA STREBLOW

Digital Networking of Buildings, Energy Supply Systems and Users

How can data from fitness apps, smart heating or intelligent thermostats help to reduce energy consumption in buildings? Prof. Dr. Rita Streblow is concerned with this and other questions. The engineer has been a Professor at Technische Universität Berlin and the ECDF for "Digital Networking of Buildings, Energy Supply Systems and Users" since December 2019. Rita Streblow shares the professorship with Prof. Dr. Joachim Seifert.

"In my research, I want to investigate how we can sensibly combine data that arises in everyday life and make it usable for everyone involved," she says. She would like to develop individual solutions – depending on the needs and requirements of the users. "So far, we have designed systems according to standard values and static operating points. However, we have to take into account the system dynamics and flexibility in order to create stable operation of the energy system with renewable energies without restrictions for comfortable interiors", Streblow says. The topic of data protection and data security is important to her. "We cooperate with ECDF professor Max von Grafenstein who as an attorney deals questions surrounding with data protection law, among other things," she reports. "Both structural and technical measures can be considered to reduce the energy consumption of the building sector. In the networked energy system, it's essential to reconcile the locally optimal solutions for the individual user and for the building with the global considerations of the national climate protection goals," she says.

Since 2013, Rita Streblow has been researching and working on the topics of user comfort, optimal building energy and decentralized urban energy supply concepts using the sector coupling and the necessary communication structures. After studying building technology, she was a research assistant at the Hermann Rietschel Institute for Heating and Air Conditioning Technology at TU Berlin. Since 2007, she has been a senior engineer at the Chair for Building and Indoor Air Conditioning at RWTH Aachen.

In 2013, she conducted research at AIST in Japan and deepened her research knowledge in the optimization of building energy systems and energy management systems. At RWTH Aachen, she is currently leading the interdisciplinary Urban Energy Lab 4.0 project, which creates a flexible test field for controllable experiments from the supply of a room to the energetic consideration of a city district.

"In my work, I want to gain further knowledge in the field of digital society for my field of building energy technology, prepare it in a structured manner and help shape the process of change and provide practical help," she says.

Rita Streblow is looking forward to the exchange with her colleagues at ECDF on the subjects of data protection, data security, artificial intelligence, and automated evaluation of data.

RESEARCH PROJECTS

Digitalization affects all areas of our lives and crosses the boundaries of individual disciplines and established specialist areas in a previously unknown and unpredictable way. Therefore, at the ECDF, computer scientists, medical doctors, designers, economists, sociologists, and engineers conduct research together on questions of digital transformation. This interdisciplinary research work at the ECDF is an integral part of the center. "Only when we look at individual topics such as sustainability, mobility or data protection from different angles can we face the many and varied challenges of digital transformation," Odej Kao says. The aim of the ECDF is to inspire and support the professors to make substantial contributions to the social discourse on future issues.

In 2019, ECDF professors submitted or prepared numerous research applications for the German Research Foundation (DFG), federal ministries, the EU, private foundations and companies. Most of these research projects will start in 2020. These research projects include international collaborations, for example with the Oxford Internet Institute at the University of Oxford, Great Britain.

On the next pages, we present a selection of research projects, collaborations and initiatives which the ECDF professors participated in during the year.

BBBLOCKCHAIN

Digital participation processes in urban development

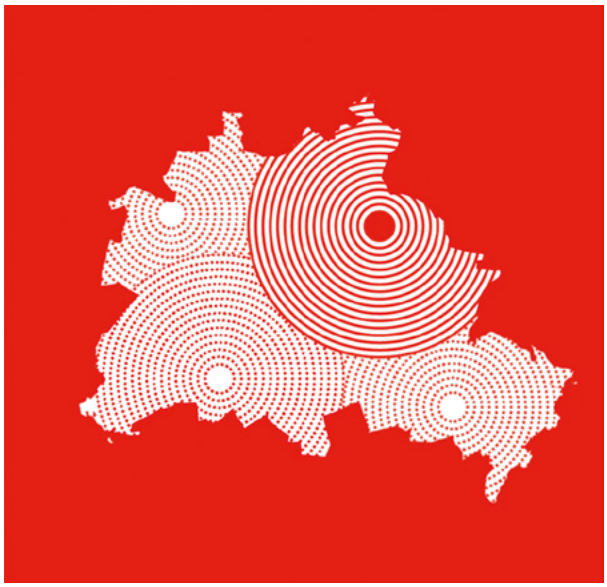
The ECDF research project BBBlockchain is an online participation platform based on blockchain technology. In the BBBlockchain project, the two ECDF professors Jochen Rabe and Florian Tschorsch are investigating which functions it could fulfill, for example, in the context of digital participation processes in urban development. With the support of two new research assistants, the first joint ECDF research project of two ECDF professors started in October 2018. The project, which will initially run for a period of two years, is funded by namely six state-owned Berlin housing associations, degewo, Gewobag, GESOBAU, HOWOGE, Stadt und Land, and WBM.

BBBlockchain was examined as a new possibility of digital citizen participation in urban development processes as a complementary procedure to existing analog formats. As part of the research project, an online participation platform was developed based on the block chain technology. BBBlockchain relies in particular on the building blocks of decentralized data management and the permanent immutability of the information collected. By using the BBBlockchain app, details on participation procedures can be made permanently and reliably available. Blockchain technology also enables direct, binding co-determination of previously defined questions. These characteristics make it interesting to use the technology in urban planning, as participation processes are often characterized by distrust of approval authorities and lack of transparency. The aim is to investigate whether transparency and trust in planning processes can be increased using blockchain technologies and to what extent direct participation can be made possible using BBBlockchain. For this purpose, the app was tested in two construction projects in Berlin over several months.

The BBBlockchain platform currently offers the following functions:

// Document and data management (information)
// Open surveys (consultation)
// Voting rights administration and voting (co-decision)

BBBlockchain has already been in use at Kietzer Feld in Berlin-Köpenick since October 2019 and will also be examined in Bülowstrasse 90 in Berlin-Schöneberg starting in February 2020. In the first building project, the project focuses on increasing the transparency of the ongoing participation process. All relevant documents and information are added to the online platform and can be accessed there permanently. In Schöneberg, the project goes one step further. Here, tests are being conducted as to which decisions can be made by citizens directly via the online platform. The residents in the neighborhoods will be able to take part in various surveys and votings.



STADTMANUFAKTUR

Real laboratories for a city worth living in

//THE IDEA

StadtManufaktur is an initiative of Technische Universität Berlin together with Zentrum Technik und Gesellschaft (ZTG – Center for Technology and Society) and the ECDF. Its aim is to solve complex urban challenges in the network of science and practical experience. In StadtManufaktur projects, researchers cooperate with city actors to develop forward-looking solutions for Berlin. In a long-term process, city experts collaborate with scientists on issues of Berlin's future. StadtManufaktur is an open innovation platform. Be it questions of climate adaptation or the promotion of social coexistence, the establishment of sustainable mobility concepts or the transformation to a city of short distances – StadtManufaktur is the contact for joint project development. It facilitates the matching of scientists with partners from politics, business, culture, and civil society, accompanies joint projects, and collects the extensive findings of the projects in a common knowledge pool.

//STADTMANUFAKTUR@CITYLAB BERLIN

StadtManufaktur works closely with CityLAB Berlin, an experimental laboratory for the city of the future. CityLAB serves as a network, think tank, and showcase. In the heart of the city – at the former Tempelhof Airport – people, projects, and solutions come together to make Berlin even more livable.

//THE PILOT PROJECT@ECDF

StadtManufaktur's initial project is called "Last Mile – New Neighborhood", and is being led by three ECDF professors, Jochen Rabe (TU Berlin), Helena Mihaljević (HTW Berlin), and Max von Grafenstein (UdK Berlin). The project is dedicated to the systematic intertwining of residential and mobility data. The aim is to develop new neighborhood concepts in Neu-Hohenschönhausen as the basis for a sustainable redesign of the monostructural city structure. In multidisciplinary teams, the concepts are to be developed in a participatory manner with members of civil society.

//REAL LABS FOR BERLIN

The projects are developed in the form of real laboratories. A real laboratory is a trans-disciplinary format that takes place in real space. In real laboratories, scientists collaborate on practical applications. The partners mutually benefit from each other: knowledge from practical experience merges with scientific know-how – resulting in solutions that can exist not only on paper but also in direct application. Together, the building blocks for a livable city of the future can be developed and implemented.

SIMRA – SAFETY IN CYCLING

Eight partner regions will join the Citizen Science project in 2019

Prof. Dr. David Bermbach's Citizen Science project, "SimRa – Safety in Cycling", attracted a lot of attention in 2019 with around 25 newspaper articles, radio interviews and television reports as well as numerous social media contributions.

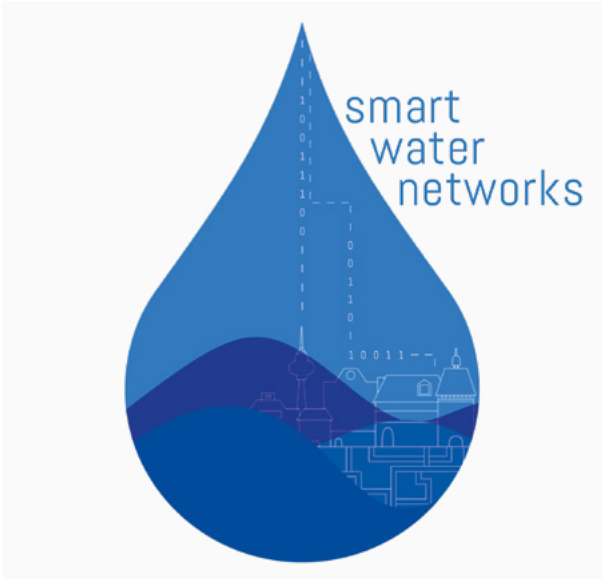
In the SimRa project, the research team collects – in a data protection-compatible manner – data about dangerous locations for cyclists in the city, what they are, whether they occur frequently or locally and where most of the bike traffic happens. To this end, the project developed a smartphone app that uses GPS data to record driving routes and uses acceleration sensors to detect dangerous situations – such as sudden braking, evasive action or even a fall. After their trip, cyclists are asked to categorize and annotate these detected dangerous situations, to add any undetected dangerous situations and to upload them to the project server. The data is pseudonymized for each trip.

This data will make it possible to gain a comprehensive overview of bicycle traffic in Berlin and any dangerous situations that may arise. In addition, unfavorable traffic flows or traffic light switches can be identified and optimized, so that bicycle use will become more attractive and safer in the medium term. The data obtained in the project will be evaluated together with partners from other specialist areas such as urban and regional planning, but also with the involvement of interested citizens, in order to achieve sustainable changes together with the Berlin Senate Department for Environment, Transport, and Climate Protection.

The researchers also presented their project at the Long Night of the Sciences 2019 (see page 103) in the ECDF and were met with great interest. Bicycle initiatives from Germany and Switzerland became aware of the research project through media coverage. The SimRa app is now available in the following partner regions: Augsburg, Berne, Düsseldorf, Leipzig, Pforzheim/Enzkreis, the Ruhr region, Stuttgart, and Wuppertal/Remscheid/Solingen.

David Bermbach is delighted about the huge response. "We hope that these collaborations will have a greater reach and thus greater relevance for SimRa. The more users we have, the more importance our findings will have. So far, we have recorded more than 15,000 trips in Berlin alone," he says. The local initiatives play an important role in this.

"The SimRa app has to be advertised in every region in order to attract additional users," research assistant Ahmet-Serdar Karakaya explains. In addition, the project partners will later discuss the data and the knowledge gained from it with the local administration. "In undertaking this project, we want to achieve sustainable changes for cycling," David Bermbach emphasizes. The project is funded for a period of three years as part of the Citizen Science Initiative of TU Berlin (start: September 2018).



SMART WATER SURVEY

Digital transformation in water supply

Smart Water Survey is a collaborative research project carried out by an international consortium. The Smart Water Networks group of Prof. Dr. Andrea Cominola (ECDF) is leading this research project in collaboration with the Stanford Woods Institute for the Environment (USA), the Cities Research Institute at Griffith University of the Gold Coast (Australia), and the Environmental Intelligence for Global Change Group at Politecnico di Milano (Italy).

The survey is part of Andrea Cominola's ECDF project on "Intelligent technologies and decision analytic tools to support digital urban water management".

//BACKGROUND

Digitalization has already arrived in several industries worldwide and is now changing the traditional paradigm of water suppliers. However, water utilities around the world are facing the digital transformation with heterogeneous strategies and priorities, business plans, and technologies. Understanding patterns of digital transformation related to time, space, and water supply in general is key to characterizing their development, their current impact, and the impact on future plans.

//THE SURVEY

Smart Water Survey is a research project that aims to investigate how the paradigm of water supply is changing in the age of digitalization. The utility companies point of view is examined to analyze common priorities, best practices, and technologies, as well as challenges related to digital change.

"We have designed a survey in which we investigate these issues. After tests with a number of tility companies, including Berliner Wasserbetriebe, the survey went online," Andrea Cominola reports.

The survey will runs until the end of February 2020.

CRITICAL MAKER LAB

Experimental design practice

The discussion about "Open Science" has recently sparked a lively debate about the future of knowledge acquisition and how science needs to be more open both internally and to society. As a concept, "Open Science" stands for overcoming the limits of traditional formats of learning environments and stimulating a form of research and teaching that requires an opening of the circumstances under which knowledge is created – with a critical view of who participates in the production of knowledge, who has access to this knowledge and how to gradually bridge the gap between academic and social concerns.

As part of their ECDF professorship, Michelle Christensen and Florian Conradi examine the potential of research that is practiced in "Open Labs" as a method of "Open Science". Currently, they are initiating the "Critical Maker Lab" as a research site – as a trans-disciplinary and trans-university terrain linking the activities of their ECDF professorship and their research group at the Weizenbaum Institute. With the lab, they want to create a hybrid research environment that tries to overcome the boundaries of theory and practical experience, science and civil society. In cooperation with communities of trans/feminist hackers and makers from the global south, they explore new methodological approaches from art, design and civic engagement in the university environment. "The Critical Maker Lab creates a space where researchers and interventionists from different disciplines and groups from civil society can exchange their critical perspectives – and discuss alternative visions and values for a more diverse and heterogeneous digital society," Christensen explains. "This is important for us in order to promote diversity in our research process," Conradi says.

The research, teaching and experimental design practice of Christensen and Conradi focuses on decolonial, feminist/queer and sustainable approaches to open design and technology. In December 2019, the symposium "Trans/Feminist Hacking – Spaces, Communities, Practices" was being held, in which international scientists, artists and activists took part. The symposium collected perspectives, experiences, and positions on trans/feminist hackspaces in order to discuss both the opportunities and the current challenges of a growing international community.

Through formats such as studio classes and compact seminars, Christensen and Conradi bring together students from the fields of philosophy, cultural studies, medicine, design, art, architecture, musicology and physics to develop critical perspectives on design and technology from a variety of perspectives. By addressing issues such as bottom-up smart cities, monitoring capitalism or decolonizing the Internet, design students become home improvement biologists and philosophy students become critical programmers. This gives them access to new perspectives, experiences and questions in critical debate.

PRIVACY ICONS

Making data protection understandable

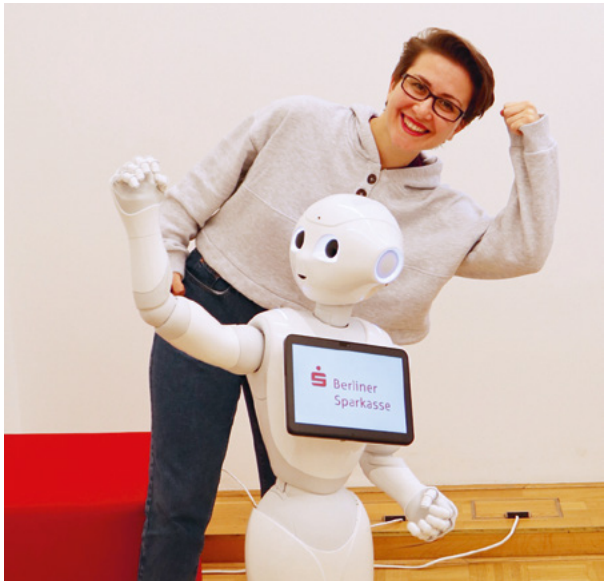
When surfing the Internet, personal data of users is processed. With the introduction of the GDPR – the General Data Protection Regulation – in the EU, there is an extensive transparency obligation, according to which the data processor must inform the data subjects about the processing of the data. Currently, it is generally cookie warnings that appear when you visit a website. With the research project "Privacy Icons", Prof. Dr. Max von Grafenstein (Einstein Center Digital Future / Berlin University of the Arts) wants to develop image symbols that indicate data processing and its extent.

In addition to Max von Grafenstein, the project team includes Timo Jakobi, who conducts research on the design of privacy in networked devices at the University of Siegen, and Kevin Klug, whose research focus is on data protection.

The image symbols to be developed are intended to convey to those affected (e.g. website users) in a particularly simple and intuitively understandable manner the scope and consequences of the processing of their personal data, i.e. their meaning. The image symbols are intended to complement the classic text, not to replace it.

Therefore, if users want to know in detail what the icons mean exactly or what exactly happens to the data, they can still click on a text level that shows this in a higher level of detail. The GDPR stipulates that this information should be machine-readable on a third level.

This is made possible, for example, by so-called privacy agents. These are technologies that pass on their privacy preferences to other technologies on behalf of users (such as websites). Then users would no longer have to click on everything themselves, but this would happen automatically.



HUMAN-MACHINE INTERACTION

Students develop the humanoid robot Pepper

How can a robot inspire bank customers for innovative ideas? How can artificial intelligence be used sensibly? Since October 2019, students of business informatics at Freie Universität Berlin have been dealing with these questions. The research project of ECDF professor Daniel Fürstenau is a cooperation with the "Birds Nest", the existing innovation laboratory of the Berliner Sparkasse. "Pepper is programmed by the manufacturer Softbank Robotics so that it can analyze our human facial expressions and gestures and react accordingly. With its sensors, for example, it detects when a person walks past it," Fürstenau explains.

As part of the digitalization of the financial sector, the Berliner Sparkasse wants to create new ways of communicating innovative ideas. In this context, application scenarios of artificial intelligence will also be investigated. "Four of my students will therefore attempt the language skills, human interaction and emotional abilities that can be achieved using artificial intelligence as part of their master's thesis," reports Daniel Fürstenau. Matthias Schulte-Althoff is accompanying the project as a research assistant. "It is exciting to see what the students have developed with Pepper in these first days. Just by integrating existing interfaces, such as Wikipedia or WolframAlpha, and thus connecting enormous sources of general knowledge, an astounding effect can quickly be achieved," he says. In the coming months, the students will further refine the robot's dialog system and adapt it to various applications. Current methods from the field of computational linguistics and artificial intelligence are to be checked for their applicability. Later on, the robot is intended to inspire enthusiasm for customer-oriented digital innovations.

Gabriella Volpe is one of the four master's students. She is examining the emotions that interact with Pepper. "I would like to investigate where these emotions come from and whether this has an impact on the overall loyalty of users towards the company that owns the robot," she explains. For this purpose, she invited test subjects to an experiment in the ECDF. In a first questionnaire, information about origin, age, and affinity for technology and previous experience with humanoid robots was collected. "Afterwards, the participants interacted as freely as possible with the humanoid robot. They asked Pepper questions, listened to presentations, played an animal game with it, watched it dance and took selfies with it," Gabriella Volpe says. In a second questionnaire, they were then asked about their interaction experiences and the emotions aroused in them. "Although an exact analysis will only be possible in the coming months, we can already say that users' general perception of Pepper is quite positive," Gabriella Volpe said. Prof. Dr. Daniel Fürstenau is looking forward to the results of the experiment. "Working with Pepper can promote further research in the field of artificial intelligence and helps us to better understand the possibilities and limits of technology," he says.

DIGITALIZATION IN GERMANY

A study examines how people perceive digital change

"Zeit für ein Update – Was die Menschen in Deutschland über Digitalisierung denken" ("Time for an update – What people in Germany think about Digitalization") is the title of the Friedrich Ebert Foundation survey published in June 2019. The author of the study, Prof. Dr. Stefan Kirchner, is a professor at the ECDF.

How do people in Germany perceive digitalization and how do they rate its development?
Kirchner: For many, the results show a general openness and in some cases also confidence towards current technical developments. At the same time, the study also indicates problem areas that people perceive as negative.

According to your study, people view future developments much more skeptically than previous technology leaps. Where does this skepticism towards new technologies come from in the course of digitalization?
In the past, you basically always knew what you had. The future, however, remains uncertain. Threatening scenarios dominate the current debate. This perception of a threatening future could play an important role for some respondents. At the same time, however, the future is still an open question and can be affected.

From the point of view of the respondents, who should actually influence digitalization?
The respondents state very clearly that they would like to have more structure from the state and from politics.

Digitalization also means a change in the world of work. What advantages and disadvantages do the respondents see?
From the point of view of the interviewees, there will be a clear advantage in terms of flexibility. Work can be better reconciled with private life, for example, by introducing flexible working hours. At the same time, however, there is also a certain skepticism. Some respondents assume that digitalization will not improve compatibility. Indeed, with digitalization there is also a risk that more and more work will be moved into leisure and family life.

What do you derive from the study for your research?
Overall, the results show a good overview of the current status of digitalization from the perspective of people in Germany. These, as well as many other empirical studies, are required to better understand the current digital transformation. Overall, we have insufficient quantitative test results at many points in the current development. On the one hand, technological development is so rapid that the development of large-scale investigations can hardly keep up. On the other hand, social science research has only benefited to a very limited extent from the large amount of data that is generated by digitalization. Thus far, and with a few exceptions, it has hardly been possible to conduct basic research with existing resources and recognized empirical methods. It is precisely in this area that we need greater efforts in order to continuously analyze digitalization.

DIGITAL CAPITALISM

Effects of digitalization on society, consumerism and politics

Whereas the top rankings of the most valuable companies globally had been, until a few years ago, dominated by energy companies such as Exxon and bank consortia such as Wells Fargo, these have long since been replaced by giants like Amazon, Apple, and Facebook. Digital technology is omnipresent: for instance, we carry high-performance computers in our pockets, and even washing machines can connect to the Internet. But does this exhaust the novelty in digital capitalism?

In his book, "Digitaler Kapitalismus – Markt und Herrschaft in der Ökonomie der Unknappheit" (Digital Capitalism – Market and Rule in the Economy of Scarcity), which was published in October 2019, Prof. Dr. Philipp Staab (ECDF/HU Berlin) casts a spotlight on digital capitalism from different perspectives in order to define it more precisely. He demonstrates how digital surveillance and evaluation practices are increasingly penetrating even more areas of the economy, thereby increasing social inequality in the process. What is specific to digital capitalism, according to Staab, is the formation of "proprietary markets": whereas in the past it was important to produce things and sell them at a profit, in the age of plenty, it's about ownership of the markets themselves.

On October 31 2019, Philipp Staab and Dr. Florian Butollo (Weizenbaum Institute) organized an international symposium on "The Global Political Economy of Digital Capitalism" at the ECDF with about 50 participants.

At the event, Nick Srnicek spoke about "AI and the Global South". He is a lecturer at the Department of Digital Humanities at King's College in London and author of the book "Platform Capitalism".

The Chinese perspective was highlighted by Yu Hong in her lecture on "China and the Global Political Economy of AI". She teaches at the College of Media and International Culture at Zhejiang University. Yu Hong wrote the book "Networking China – The Digital Transformation of the Chinese Economy".

This was followed up on December 2, 2019 – also at the ECDF – with the official book launch of the book "Digitaler Kapitalismus" published by Suhrkamp Verlag. Besides Philipp Staab, who offered the participants an insight into the process of creation and writing, Manuela Bojadžijev and Heinz Bude shared their assessments of the work.

Bojadžijev is deputy director and deputy head of the department "Integration, social networks and cultural lifestyles" at the Berlin Institute for Empirical Integration and Migration Research (BIM). Since 2015, she has been a professor for globalized cultures at Leuphana University Lüneburg and since 2018 vice director of the BIM. The sociologist Prof. Dr. Heinz Bude has been a professor of macrosociology at University of Kassel since 2000.

After the book launch, the participants discussed the effects of digital capitalism. "The rise of platforms of the same market raises the question of how we can shape the democratic economy of the future," Philipp Staab concluded.

STUDY: CARE FOR ELDERLY PATIENTS

Exchange of data relevant to aging in medical care

Whether it's new hips, bone fracture treatment or tissue removal: elderly patients, especially those over 65 years of age, are prone to complications due to their frailty after an operation. A paper by Prof. Dr. Daniel Fürstenau and Prof. Dr. Dr. Felix Balzer illustrates how the exchange of aging-relevant data in an integrated digital supply could help. "Sharing frailty-related information in perioperative care" was published in 2019, together with research partners from Charité – Universitätsmedizin Berlin (including ECDF Principal Investigator Prof. Dr. Claudia Spies) and Freie Universität Berlin (including ECDF Principal Investigator Prof. Dr. Martin Gersch).

Why did you concentrate on patients over 65 years of age in your evaluation?
Balzer/Fürstenau: Due to the demographic change, we are dealing more and more often with elderly patients in medicine, who usually also have more pre-existing conditions than younger ones. This multi-morbidity represents a special challenge in operative medicine. In addition, elderly people are more often frail, but not necessarily. There are also young people who meet the criteria for frailty and, conversely, elderly people who are very fit. The good news is: frailty is basically reversible. You can achieve a lot with exercise, nutrition, social inclusion, and so on. This increases the chances of surviving an operation without complications.

Charité has introduced special consultation hours for non-urgent operations for patients over 65 years of age. How important was this for your research work?
The results of research on frailty are also incorporated into clinical routine. There are also further projects at Charité, which also deal with frailty and which aim to establish an understanding of the importance of such treatment throughout Germany.

You write that in the German health care system, there is little time for discussions between medical staff and patients. What role does the time factor play in terms of patient frailty after the operation?
After the operation, it's essential to support the patients so that they can return to familiar surroundings as quickly as possible. It's important that there's enough time and support to facilitate this step. Even later in outpatient care, doctors and nurses are needed who take their time and listen. This is crucial for the success of the treatment, as is adequate documentation so that everything essential is recorded and repeated examinations are avoided. What is needed here is a fair remuneration system for documentation tasks that creates the right incentives, whereby digital support systems can play an important role.

How can the various stakeholders – resident doctors, nurses in homes for the elderly, physiotherapists, medical staff in clinics, and so on – be better involved before and after operations?
First of all, an understanding of the entire care process from a patient's perspective and the relevant result parameters is necessary. This concerns something like the quality of life of those affected and other health outcomes, but also concerns cost factors that are relevant from a social perspective. Then it's a matter of designing existing incentive systems so that existing interests are brought under one roof, that is, a balancing

of interests occurs. This can happen in the form of financial but also non-financial impulses for cooperation. In this way, existing fears and hurdles can be reduced and the participants involved. Ultimately, you cannot compel anyone to do anything – the environment and the conditions must be right. And ultimately, of course, there is also a need for digital solutions that support the smooth process flow and simplify collaboration.

What needs to change for the number of elderly patients with complications due to frailty to decline after the operation?
The bottom line is prevention. The earlier this starts, the better. Currently, the approaches mostly relate to risk stratification in the hospital and then to build up those whose fitness can be improved preoperatively – for example through targeted nutrition training or physiotherapy. Basically, this could start much sooner and help elderly people before an operation is due – as is already partially done in Sweden and Denmark.

How could the data relevant to aging be exchanged between those involved in practice?
Technical solutions already exist. Denmark, for example, has a portal that doctors, patients, and other authorized professional groups can access. Automated interfaces and real-time access are desired. With specific technologies, such as FHIR web services for healthcare, there are also technical standards. The exchange could therefore be largely automated.

How do you ensure data protection?
Detailed data protection and data security concepts are required, especially when data is exchanged between institutions, in order to comply with legal requirements. It is primarily about which data should be exchanged for what purpose and in what form, for instance, where the patients' consent is needed, within what scope and in what form. Certain legal bases must be observed, such as the EU General Data Protection Regulation and the respective data protection laws of the federal states. If this is the case, appropriate IT security measures have to be developed – be it end-to-end encryption, as is commonly known today from many messaging services, or two-factor authentication, in which a number code generated on the smartphone is entered in addition to the password. Data protection should not be seen as a brake on the digitalization of healthcare, but as an opportunity.

What are the next steps in your research project?
We want to take appropriate steps to expand the concept for the care of frail patients in various dimensions. The aim is to put it into practice, to scale it spatially and to take a closer look at certain aspects, such as cognitive limitations. An expansion towards self-assessment of the patients and the use of other digital technologies, such as wearables and smart clothing, seems reasonable. Here too, interdisciplinary approaches are necessary, for example in cooperation with designers.

Prof. Fürstenau, you are a business IT specialist, and Prof. Balzer, you are a medical doctor and computer scientist. What is the mutual benefit in your work?
We have excellent cooperation on several levels. We supervise students at the Bachelor, Master and PhD level, work on papers and project applications. The different disciplinary backgrounds are enriching. They incorporate different perspectives and methods. Many questions are so complex that they can only be worked on in teams with different backgrounds – especially in medicine.

SOCIAL DATA SCIENCE

A collaboration between the ECDF and the Oxford Internet Institute

Prof. Dr. Timm Teubner (ECDF) and Dr. Fabian Braesemann (Oxford Internet Institute) initiated the new "Social Data Science Collaboration" in 2019. It connects researchers and students from Oxford and Berlin who are interested in social data science and the digital platform economy. Fabian Braesemann is a research fellow and data scientist at the Saïd Business School at the University of Oxford (Great Britain).

The international initiative aims to intensify the cooperation between social data scientists from both cities. For this purpose, joint research projects are being undertaken and a thesis exchange program has been devised. Students supervised by members of the Social Data Science Collaboration are invited for short research stays at the partner university. There they will be given a workstation, are supervised on site and given the opportunity to present their research project to other data scientists.

"As part of this cooperation, members of my research group traveled to England in November 2019 to make further contacts at the Oxford Internet Institute and to present our research. The cooperation has now resulted in a program for co-supervision of master's theses and joint publications," Timm Teubner reports.

In order to facilitate the exchange of knowledge between social data scientists from Oxford and Berlin, the first social datathon is being organized in cooperation with the United Nations Development Program (UNDP) and the Hertie School of Governance, which is planned for early May 2020 at the ECDF.

WOMEN* IN STEAM

An initiative of the ECDF Professors

Like perhaps no other term, "digitalization" is associated with contradicting expectations, forecasts about social development, about our life, and our work. In this context, science must ask how its research can contribute to an inclusive digital society and thus to more equal opportunities, diversity, and digital empowerment. From the perspective of the long-standing inequalities in gender relations, the crucial question is how digitalization can be designed in such a way that it promotes a comprehensive change towards gender equality and diversity.

To what extent can digitalization be used to question hegemonic concepts of gender roles? How can the perspectives of women and other underrepresented groups actively shape the transformation processes taking place?

In order to contribute to this discussion, ECDF professors Michelle Christensen, Florian Conradi, Anastasia Danilov, Rebecca Frank, Berit Greinke, Setareh Maghsudi, Elisabeth Mayweg, and Helena Mihaljević together with the research assistants Ireti Amojo, Maryam Daneshfar, Kerstin Eisenhut, and Maria Zimmermann have launched the initiative "Women* in STEAM". In doing so, they expand the classic focus on the STEM disciplines to include the arts and the humanities in order to obtain the most diverse and comprehensive view of the opportunities and risks of the "digital era". At the heart of the initiative is an international series of events with female scientists and artists, which will address the role of gender in the context of the digitalization and technologization of our society. In this context, a network is to be built up in which participation at different levels and in various forms is possible. The primary goal is to promote public and critical debate at the ECDF and beyond. In addition, various paths to a scientific career will be shown and the role of inter- and trans-disciplinary research in this process should be discussed.

The opening event of "Women* in STEAM" will take place on February 4, 2020. Envisaged are contributions from ECDF Executive Board Member Prof. Dr. Gesche Joost, Prof. Dr. Corinna Bath, holder of the Maria Goeppert Mayer Professorship "Gender, Technology and Mobility" at Technische Universität Braunschweig, and Prof. Dr. Aysel Yollu-Tok, professor of economics at the Harriet Taylor Mill Institute for Economics and Gender Research at the Berlin School of Economics and Law and Chair of the commission of experts for the 3rd Federal Government Equality Report. "We are very pleased that Women* in STEAM has met with such a strong response in Berlin. Over 50 people from various disciplines and contexts have registered for our kick-off evening next February, which underscores the importance of the topic digitalization and gender. We are very much looking forward to the diverse forms of cooperation in a great network," Prof. Dr. Helena Mihaljević, co-founder of the initiative says.

AWARDS

The excellent research work of the ECDF professors is also reflected in various national and international awards that the scientists received in 2019. We present a selection here:

//OUTSTANDING REVIEWER

Prof. Dr. Andrea Cominola was recognized in 2019 for his review as "Outstanding Reviewer of the Journal of Water Resources Planning and Management" (American Society of Civil Engineers).

//IEEE SENIOR MEMBERSHIP

Prof. Dr. Guillermo Gallego has been appointed Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) in 2019. IEEE is the world's largest professional association of engineers for the advancement of technology. Senior Member is the highest professional level of the IEEE – only ten percent of the more than 400,000 members have reached this level. "I am very proud to have been appointed an IEEE Senior Member. It recognizes my professional achievements and my accomplishments in the fields of engineering, computer science and information technology. I hope to continue to make valuable research and excellent contributions in the fields of electrical engineering and computer science, especially now as an ECDF professor at TU Berlin and in the Cluster of Excellence Science of Intelligence," Guillermo Gallego says.

//PAPER-A-THON AT ICIS 2019

Prof. Dr. Christian Meske, together with Niklas Kühl from the Karlsruhe Institute of Technology (KIT) and Jodie Lobana from McMaster University (Hamilton, Canada), won the Paper-a-Thon at the International Conference on Information Systems 2019 (VHB-Rank: A). The final topic was "Do you comply with AI? – The impact of personalized explanations of learning algorithms on compliance behavior." The paper focuses on machine learning algorithms as "black boxes" and addresses the situation that, based on different backgrounds of the users (experience, training, etc.), there are also different mental models about reality and thus the algorithms in the work context. This makes a model-specific personalization of explanations ("Explainable AI") necessary, which in turn has an impact on trust, compliance behavior and ultimately task performance. First results from a qualitative study support these assumptions, which will be tested quantitatively in a follow-up project.

//INFLUENTIAL PAPER

The paper "Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencies" by **Prof. Dr. Florian Tschorsch** and **Prof. Dr. Björn Scheuermann** (ECDF PI) was listed by SV Insight in 2019 as one of the 50 most influential papers on blockchains and was honored at the Blockchain Connect Conference.

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/ ASSOCIATED MEMBERS

OVERVIEW OF ASSOCIATED MEMBERS

Since its inception, the ECDF has shown great interest in looking beyond its own scientific horizons and, incorporate valuable external expertise into digialization research. One of the vehicles to achieve this goal is to appoint highly respected scientists and researchers from all over the world as Associated Members.

The idea is that the Associated Members engage in academic discourse withthe ECDF Professors and PIs, initiate and participate in joint research projects, but also to use their experience to identify research topics that can be addressed by the ECDF. Five of seven Associated Members that have been appointed so far were admitted in 2019.

The following short profiles provide an overview of the newly admitted Associated Members of the ECDF.

Name	Field of Study	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 Neurosciences	Charité – Universitätsmedizin Berlin	August 2019
Dr. Samuel Knauss	Neurology and Neurosciences	Charité – Universitätsmedizin Berlin	August 2019
Prof. Dr. Janina Sundermeier	Business Administration, especially Digital Entrepreneurship and Diversity	Freie Universität Berlin	November 2019
Prof. Dr. Meike Hopp	Digital provenance research	Technische Universität Berlin	December 2019

PROF. DR. DR. AYAD AL-ANI

Prof. Dr. Dr. Ayad Al-Ani is Professor of Change Management and Consulting. He has been an Associated Member of the ECDF since 2019. Furthermore, he is associate Prof. at the School of Public Leadership at Stellenbosch University, South Africa, and teaches at the University of Basel in the field of digital culture. Previously, he was a professor at ESCP Europe Business School in Berlin and at Hertie School of Governance in Berlin. In addition, he led the Berlin ESCP Europe Business School Berlin as rector. He is the Managing Director of the consulting agency "tebble" and has over 20 years of management experience in international consulting firms, most recently as an Executive Partner at Accenture and Managing Director of the Vienna office.

His research focuses on digital economy and politics, digital transformation and peer-to-peer production. "The focus of my work and my interests are changes in organizations in business and politics as well as the simultaneous transformations in society, economy and education," he says. At the ECDF, Prof. Dr. Dr. Ayad Al-Ani is concerned with the application of digital forms of organization and technologies in the sectors of business and politics: "The current phase of 'digitalization and...' requires interdisciplinary collaboration, which is hardly possible anywhere else to the extent that it is at the ECDF," he says. One of his projects is the in-house study "digital@work". In cooperation with Prof. Dr. Dr. Ayad Al-Ani, Volkswagen researched the knowledge work of the future. The study looked at the tasks in which technologies such as Big Data, machine learning, blockchain and artificial intelligence can be helpful in the future.

In April 2019, Prof. Dr. Dr. Ayad Al-Ani, together with the Digital Arabia Network (DAN), organized the "MENA Tech Talents Day" at the ECDF. DAN connects the leading creative and powerful digital innovators in the Arab world. As a platform for digital pioneers, DAN connects all those who contribute to the transformation of our everyday life into a better place: in art, education, business, media, NGOs, and politics. The topic of the panel discussion in the ECDF was "MENA Tech Talents and the Future of Work".

Prof. Dr. Dr. Ayad Al-Ani is a sought-after interview partner in global media. His expertise has been recognized in numerous publications – including The Beijing News (Media and automotive industry will be at the forefront of the digital transformation), jungle.world (Die Gewerkschaften müssen kooperieren (Unions must cooperate), ZEIT ONLINE (New Work: Kommt bald die Firma ohne Chef (New Work: Will the company soon be without a boss?), and ZDF (Folgen der Digitalisierung – Billiglohnländer: Wenn Roboter den Job machen (Consequences of digitalization-low wage countries: When robots do the job).

DR. JULIUS EMMRICH

Dr. Julius Emmrich works as a neurologist and neuroscientist at Charité – Universitätsmedizin Berlin. He is a co-founder and has been chairman of the Doctors for Madagascar Association since 2011. Julius Emmrich has been an Associated Member of the ECDF since 2019.

Born in Freiburg im Breisgau and raised on a farm in Franconia, his path to medicine led him via Africa: Julius Emmrich first became acquainted with the living conditions there as a nursing assistant in Cape Town, then as a hospital trainee, with time spent in Cameroon and Mali, among others. He also trained to pack boxes and suitcases during his studies: first studying medicine in Freiburg and Leipzig, then during his doctoral thesis at Mount Sinai Hospital, New York City, and finally during a master's degree with a focus on neuroscience at the University of Cambridge in England, where afterwards he worked as a scientist. In 2013, he was a guest researcher in the Department of Clinical Neurosciences, University of Cambridge, UK.

Impressed by the meeting with the Malagasy colleagues, he has been committed to improving health care on the island, especially in rural areas, since 2009 – initially privately and then as part of the Doctors for Madagascar Association.

Dr. Emmrich is a member of the Center Charité Global Health and, as a project manager of the Berlin Institute of Health's Digital Health Accelerator Program, he is responsible for the development and use of digital methods in development cooperation.

In 2019, Julius Emmrich was selected for the new "Digital Clinician Scientist Program" (D-CSP) of Charité – Universitätsmedizin Berlin and the Berlin Institute of Health (see page 81).

DR. SAMUEL KNAUSS

Dr. Samuel Knauss is a neurologist and neuroscientist at Charité – Universitätsmedizin Berlin. While still studying in Berlin and at Harvard Medical School, he founded a digital health start-up. As a digital clinician scientist and project manager in the Berlin Institute of Health's Digital Health Accelerator program, he works on the conception, implementation and scientific evaluation of digitalization projects in global health and is particularly responsible for the software development of the health savings book mTOMADY.

He has been an Associated Member of the Einstein Center Digital Future (ECDF), member of the Charité Global Health Center and since 2019 coordinator of the working group "Digital solutions to protect against financial risks" of the Global Health Hub Germany.

Since 2016, he has been involved in the Doctors for Madagascar Association in order to effectively protect low-income patients in particular from medical impoverishment by using digital solutions.

Dr. Samuel Knauss is a Digital Clinician scientist (see page 81) at the Berlin Institute of Health Research and Charité – Universitätsmedizin Berlin. Dr. Knauss works at the Einstein Center Digital Future on the development and application of digital and mobile technologies that are intended to simplify access to quality health care worldwide. "The interdisciplinary collaboration with colleagues from various disciplines at the ECDF is unique and enables this complex problem area to be tackled jointly with financial, medical, and social aspects," he says.

PROF. DR. JANINA SUNDERMEIER

Janina Sundermeier is Professor of Business Administration, in particular Digital Entrepreneurship and Diversity, at Freie Universität Berlin. She has been an Associated Member of the ECDF since 2019. In her research at the interface between entrepreneurship, management, and business informatics, she deals with the following topics:

// Effects of 'deep-level' diversity dimensions (primarily personality traits) on the exercise of central entrepreneurial functions
// Influence of digital technologies on start-up processes (primarily with a focus on female founders)
// Opportunities and obstacles for entrepreneurial diversity in the context of digitalization

"The transfer of my research results into teaching and practice is one of my major concerns," Prof. Dr. Janina Sundermeier says.

For this reason, she launched the following initiatives:

// Hello Diversity! Conference 2019 and the Podcast of the same name
// Module "WoMenventures"
// Digital Entrepreneurship Hub

In addition, Prof. Dr. Janina Sundermeier also serves as an ambassador for "Women's Entrepreneurship" within NFUSION, the Entrepreneurs Network of Freie Universität Berlin, and regularly gives lectures and workshops on her research areas.

Janina Sundermeier has been associated with ECDF since 2017 and contributes her expertise to various research projects and events. "For me, the ECDF is a great opportunity to complement my research interests in various facets of entrepreneurial diversity in the context of digitization with interdisciplinary perspectives and to contribute to related topics. I am therefore very much looking forward to the interdisciplinary exchange and many other joint projects, discussions and events at ECDF," she says.

PROF. DR. MEIKE HOPP

Prof. Dr. Meike Hopp is Professor for Digital Provenance Research at TU Berlin. She has been an Associated Member of the ECDF since 2019. Meike Hopp studied Art History, Theater Studies and Classical Archeology at Ludwig-Maximilians-Universität München, where she gained her doctorate in 2012 on the subject of "Art Trade under National Socialism". Since 2009 she has led various projects in the field of provenance research.

"In art history and above all in provenance research, we are dealing with ever larger and more diverse amounts of data – data from institutions that preserve cultural assets themselves, but also from art dealers or context research. Nevertheless, there are hardly any generally applicable standards for how the provenance of objects is documented and archived. Museums and researchers often choose their own path, depending on the available infrastructure. Although there are standards, for example for the registration of paintings, there are as yet no convincing national and sustainable concepts for the collection of provenance or metadata that may be relevant to the origin of an object," the Art Historian explains.

There are technical standards – for example to prove the authenticity of a work – but where the work comes from, who acquired it during its existence, when and under what circumstances – there is hardly any documentation on this. "On the contrary: The sensitivity that this data could be relevant in the long term has only increased in recent years," Meike Hopp says. While such data can be assigned relatively easily for works of art such as paintings or sculptures, this is completely different when it comes to drawings, graphics or even in handicrafts. In such cases, the provenance can often no longer be determined. This is why research needs more data on the relocation of works of art or data from the museum's inventory books. The scientist considers one of her most important tasks in developing standards that are as universal as possible for the acquisition of object data. "In addition, I am also concerned with prioritizing and classifying the data. Only from a scientific point of view can we classify how context or provenance research must be documented so that this data can be widely used subsequently. It is also about professionalizing knowledge transfer and data exchange between researchers, museums, and retailers."

For Dr. Hopp, the current political debates about the restitution of works of art demonstrates the importance of establishing generally applicable documentation standards: "I assume that in the foreseeable future public institutions will be increasingly obliged to make access data and inventory books public. This transparency makes sense and makes conducting efficient research possible. For this we need standards for digitalization so that science can use this data in a targeted manner," the 37-year-old said. As far as the technological side of her work is concerned, as a scientist, she is particularly looking forward to the diverse cooperation opportunities with the many digitalization experts available to her at TU Berlin and ECDF.

/ TEACHING AND TRAINING

/ JOINT TEACHING / LECTURE SERIES DIGITAL FUTURE / MENTORING PROGRAM / HEIBRIDS

JOINT TEACHING

Due to the rapid development of digital transformation, the establishment and expansion of educational programs at all levels in the field of digitalization is essential: from the introduction of digital technologies in schools to academic research and training programs to courses for people who are not yet versed in digital technologies and services. With various educational offers, the ECDF also contributes to this important task for society as a whole. We pay particular attention to interdisciplinary and inter-institutional teaching. This approach is also reflected in the joint supervision of Bachelor and Master theses by ECDF professors and ECDF PIs.

On May 27, 2019, Prof. Dr. Florian Tschorsch (ECDF / TU Berlin) spoke on the topic of being "Anonymous on the Internet". The event was part of the lecture series "Internet and Privacy" at Technische Universität Berlin. Confidentiality, which is achieved for example through encrypted communication, is an important building block when it comes to enforcing data protection on the Internet. However, this alone is not sufficient; so-called metadata continue to reveal personal information. The lecture addresses this weak point and, with the Tor network, introduces another building block that makes anonymous Internet communication available to the public. In particular, the technical advantages of so-called Onion Services were presented and discussed. "The lecture was primarily about anonymous communication. The lecture is a (technical) plea for anonymous communication and at the same time cleared up a few myths about the Darknet," Tschorsch says.

In August the Berlin School of Public Health, in close collaboration with Prof. Dr. Dr. Felix Balzer from ECDF, started a five-day intensive course. The full-day course "Applied Digital Health" was aimed at clinicians, scientists, computer scientists, engineers and healthcare workers who want to continue their education in these areas. The seminar took place at Campus Charité Mitte.

LECTURE SERIES DIGITAL FUTURE

The lecture series "Digital Future", co-organized by Prof. Dr. Florian Tschorsch and significantly co-designed by the ECDF, highlights the various facets of digital transformation and aims to provide a basic understanding. A curated selection of lecturers presents topics from their field in weekly events. Different aspects of digitalization intersect from the perspective of different disciplines. In this way, the far-reaching importance of digitalization is also meant to be demonstrated.

The series of lectures is aimed explicitly at all students at TU Berlin at all levels and from various disciplines. In this way, it contributes to interdisciplinary and holistic training as well. The students receive an overview of methods and applications in the field of data-driven digital transformation. This is the first step to "data literacy."

While the lecture format focused on general aspects of digitalization research in the winter semester 2018/19, in the winter semester 2019/20 the focus was on data-driven areas of digital transformation with 'Data Science'.

The following ECDF members were part of the program in 2019 and gave lectures:

Winter semester 2018:

// Prof. Dr. Tilman Santarius: „Making Digitalization work for Sustainability" (January 29, 2019)
// Prof. Dr. Timm Teubner: "Digital Platforms in Electronic Commerce" (February 5, 2019)

Winter semester 2019/20:

// Prof. Dr. Timm Teubner: "How to become a Data Scientist (in 3 steps)" (October 22, 2019)
// Prof. Dr. Felix Biessmann: "Data Quality in Machine Learning Production Systems" (November 19, 2019)
// Prof. Johann-Christoph Freytag, PhD: "Privacy in Database Systems: Approaches and Their Limits" (December 3, 2019)
// Prof. Dr. Helena Mihaljević: "Paint the Black Box White: Bias and Transparency in Machine Learning" (December 17, 2019) At the onset of 2020, the following two lectures from ECDF members were still pending for the end of the winter semester:
// Prof. Dr. Sergio Lucia: "Predictive Control" (January 7, 2020)
// Prof. Dr. Dr. Felix Balzer: "How Data Science Is Changing Our Understanding of Perioperative Care" (January 14, 2020)

The lecture series "Digital Future" will be continued in the winter semester 2020/21.

MENTORING PROGRAM

ECDF Fellow Adam Wolisz supports professors in career planning

Prof. Dr. Adam Wolisz has been a fellow of the ECDF since October 2018. The renowned academic and researcher founded the Department of Telecommunications Networks at TU Berlin and managed it for 25 years. With his mentoring program at ECDF, he supports professors making research proposals and career planning, among other things.

When you became a fellow, you said that you had had a successful academic career and now had time to pass on your knowledge to the younger generation. How do you see the first year?
Wolisz: It was an extremely exciting time for me. The ECDF assembled very interesting and energetic personalities that I came to know during this time. Of course, I was very happy that my activities were rated as very helpful in a recent survey. But also as a mentor, working with the ECDF professors is enriching. I come from area of engineering sciences and I have now developed a better understanding of the numerous non-technical aspects of digitalization. I have been able to gain exciting insights into sociology, linguistics or law and their view of digital transformation. This is also the experience of the ECDF professors who are active in the engineering sciences.

Your main concern is the individual development of an academic career. What questions do the ECDF professors address to you?
The variety of concerns is quite wide-ranging: quite often, we discuss the breadth versus the focus of one's own research. This is particularly important in the context of the interdisciplinary research that is specific and expected at the ECDF. Among other things, the design of the publication strategy, the organization of work in the own research group, and the degree of participation in science organizational activities are addressed. Many questions also concern research funding, such as the identification of suitable sources of funding, but also the strategy of finding a partner and formulating proposals.

You are a great networker and here at the ECDF you bring together the professors, both amongst themselves and also with other researchers worldwide. How important is this networking for young academics?
I think it's very important that young academics identify their national and international "community" early on and raise their profile clearly and visibly in this community by asserting their own individuality and quality. Of course to do this, it's necessary, but generally not sufficient, to "only" publish very solid research results. Incidentally, one's individual orientation needn't only have to be anchored in the broadly recognized "core" and "fashionable" trends in one's own area. Interdisciplinary research provides interesting opportunities to set individual, clearly visible accents.

As an ECDF Fellow, you also initiate collaborations and projects.
Yes, I see my role primarily as a catalyst in discussions in which ideas for cooperation (within the ECDF or externally) are developed. I am the initiator of meetings with each other and with external actors. Ultimately, however, it is clearly the commitment of the ECDF professors involved that leads to successful collaborations.

The ECDF is celebrating its third birthday in 2020. What would you like to work on with the professors in the next three years?
Three directions are important to me for the upcoming years: on the one hand, the continuation of the previous activities; on the other hand, there are more and more questions from the ECDF professors regarding further

"The ECDF has brought together very interesting and enthusiastic personalities." – WOLISZ

career planning and applications for higher-ranking permanent professorships – and in the meantime, additionally, initial questions about appointment negotiations. Third, the discussion of alternative career paths in non-university research or business. I personally intend to spend more time talking about ambitious funding programs such as ERC grants.

As a mentor for ECDF professors, what is particularly important to you?
ECDF professors – especially those with longer ECDF affiliations – have already started several new projects – many of them in collaboration with two or three other ECDF professors – and are also busy due to teaching and research responsibilities. I would be very happy to be able to contribute to the fact that if, despite this high workload, broader, multifaceted discussion groups of ECDF professors and their employees could be established when it comes to fundamental digitalization questions.

HEIBRIDS
HELMHOLTZ EINSTEIN INTERNATIONAL
BERLIN RESEARCH SCHOOL IN DATA SCIENCE

In autumn 2018, the first 13 doctoral students started the graduate program of the Helmholtz Einstein International Berlin Research School in Data Science – HEIBRiDS for short. HEIBRiDS was jointly established by the ECDF and the Helmholtz Association and trains academics at the intersection of Data Science and one of the disciplines that is being researched and taught at one of the six participating Helmholtz Centers. The doctoral students are supported by a team of two supervisors, with professors of Charité – Universitätsmedizin Berlin, Freie Universität Berlin, Humboldt-Universität zu Berlin, and Technische Universität Berlin, representing the Data Science and researchers of Alfred Wegener Institute for Polar and Marine Research (AWI), Deutsches Elektronen-Synchrotron (DESY), German Aerospace Center (DLR), GFZ German Research Centre for Geosciences, Helmholtz-Zentrum Berlin für Materialien und Energie (HZB), and Max Delbrück Center for Molecular Medicine (MDC) representing the so-called domain discipline.

HEIBRiDS doctoral students can participate in various specialist workshops and seminars specifically tailored to the program. Experts from the participating disciplines are invited to hold public lectures as part of the HEIBRiDS Lecture Series which takes place every other week during the lecture period. At the same time, the PhD seminar wherein doctoral students present their own research results to each other and discuss open questions has become a solid fixture within the program. Since the doctoral students cover a wide range of disciplines and are sometimes far apart thematically, these discussions in particular produce new ideas which have a very positive influence on the research of the presenter.

In the second round of applications in 2019, another three junior researchers were selected for HEIBRiDS research projects. In autumn 2019, new research projects were developed, some with the help of a match-making event that brought together representatives of the universities and Helmholtz Centers. 17 of these project proposals were then selected for international publication by the HEIBRiDS Steering Committee. HEIBRiDS received just over 300 applications for this call and hopes to be able to fill at least ten of the advertised projects with highly qualified doctoral candidates in the Interview Week in April 2020.

HEIBRIDS
HELMHOLTZ EINSTEIN INTERNATIONAL
BERLIN RESEARCH SCHOOL IN DATA SCIENCE

OVERVIEW OF DOCTORAL PROJECTS

Name of the Doctoral Candidate	Working Title of the Doctorate	Supervisor	Cohort
Siddhant Agarwal	Unraveling the Interior Evolution of Terrestrial Planets Through Machine Learning	Doris Breuer and Nicola Tosi (DLR), Klaus-Robert Müller (ECDF TU)	2018
Felix Fiedler	Low-Power Data Analytics for Self-Localization Systems	Sergio Lucia (ECDF TU), Anko Börner (DLR)	2018
Binayak Ghosh	Online Learning and Decision Making for Real-Time Analytics of Synthetic Aperture Radar (SAR) Data	Mahdi Motagh (GFZ), Setareh Maghsudi (ECDF TU)	2018
Paolo Graniero	Optimization of Solar Energy Yield and Specific Load Conditions Considering Electric Buses in Public Transportation	Natalia Kliewer (ECDF FU), Carolin Ulbrich and Rutger Schlatmann (HZB)	2019
Olga Kondrateva	On-board Image Classification based on Space-Based FPGA Processing	Björn Scheuermann (ECDF HU), Winfried Halle (DLR)	2018
Henning Lilienkamp	Enhanced Computational Approaches for Seismic Risk Assessment of Infrastructure Networks	Fabrice Cotton (GFZ), Guiseppe Caire (ECDF TU)	2018
Nicolas Miranda	An Unsupervised Census of Astrophysical Transients in the Universe	Johann-Christoph Freytag (ECDF HU), Marek Kowalski (DESY)	2018
Jannes Münchmeyer	Fast Assessment of Earthquakes	Frederik Tilmann (GFZ), Ulf Leser (ECDF HU)	2018
Gregor Pfalz	Arctic Environmental Data Analytics	Bernhard Diekmann (AWI), Johann-Christoph Freytag (ECDF HU)	2018
Sergey Redyuk	End-to-End Management of Experimental Data Science on Biomedical Molecular Data	Volker Markl (ECDF TU), Uwe Ohler (MDC)	2018

HEIBRIDS
HELMHOLTZ EINSTEIN INTERNATIONAL
BERLIN RESEARCH SCHOOL IN DATA SCIENCE

Name of the Doctoral Candidate	Working Title of the Doctorate	Supervisor	Cohort
Tabea Rettelbach	Faciliating Machine Learning on Super High Resolution Earth Observation Data for Detecting and Quantifying Arctic Permafrost Thaw Dynamics	Guido Grosse (AWI), Johann-Christoph Freytag (ECDF HU)	2019
Kanishka Singh	Machine Learning Meets Theoretical Chemistry: Data-driven Analysis of Grapheneoxide	Annika Bande (HZB), Ulf Leser (ECDF HU)	2019
Peter Tillmann	Optimizing Nanotextured Solar Cells for Realistic Weather Conditions	Christof Schütte (ECDF FU), Klaus Jäger (HZB)	2018
Femke van Geffen	*Under review*	Ulrike Herzschuh (AWI)	2018
Anna Vlot	Pattern Identification and Clustering of Single Cell RNA-Sequencing Data Using Concepts from Data Analytics and Network Science	Uwe Ohler (MDC), Setareh Maghsudi (ECDF TU)	2018
Leon Weber	Corpus-Wide Inference of Gene Relationships Using Semantic Word Representations	Ulf Leser (ECDF HU), Jana Wolf (MDC)	2018

SPRING RETREAT 2019 AT DÖLLNSEE IN SCHORFHEIDE

/ NETWORK

/ WEIZENBAUM INSTITUTE / ALEXANDER VON HUMBOLDT INSTITUTE FOR INTERNET AND SOCIETY (HIIG) / BERLIN BIG DATA CENTER / BERLIN CENTER FOR DIGITAL TRANSFORMATION / BERLIN CENTER FOR MACHINE LEARNING / MEDICAL INFORMATICS INITIATIVE GERMANY / BIH CHARITE CLINICIAN SCIENTIST PROGRAM / BERLIN INSTITUTE FOR THE FOUNDATIONS OF LEARNING AND DATA (BIFOLD) / ASSOCIATED MEMBERS / FUTURE SECURITY LAB / BERLIN OPEN LAB / INTERNATIONAL VISITS

DIGITALIZATION RESEARCH IN BERLIN

The Academic Network of the ECDF

Since its inception, the ECDF has developed an extensive network of strategic partnerships with stakeholders in Berlin's academic community. Thanks to its interdisciplinary approach, the center has been able to establish itself as a hub for digitalization research in the capital. Thereby, we benefit from the prosperous, diverse landscape of excellent research.

In 2019, collaborations with existing and new scientific institutions in the digitalization field could be intensified. This networking is particularly successful when it is driven and lived by people. The ECDF reaps the benefits thanks to the close interaction between academics, researchers and scientists who are active as Principal Investigators, Executive Board Members or Directors in several centers. Several researchers are active both at the ECDF and at the Weizenbaum Institute: Prof. Dr. Martin Emmer (FU Berlin), Prof. Dr. Manfred Hauswirth (TU Berlin), Prof. Dr. Gesche Joost (UdK Berlin), Prof. Dr. Nils Pinkwart (HU Berlin), Prof. Dr. Björn Scheuermann (HU Berlin) and Prof. Dr. Dr. Thomas Schildhauer (UdK Berlin), the latter also being research director at the Alexander von Humboldt Institute for Internet and Society (HIIG).

The ECDF Professors themselves are well networked in the Berlin academic community. Below we present a selection of their activities.

//WEIZENBAUM INSTITUTE

The BMBF-funded Weizenbaum Institute for the Networked Society conducts interdisciplinary and fundamental research into the changes in society brought about by digitalization and develops design options for politics, business, and civil society. With this focus, it optimally complements the interdisciplinary research at the ECDF, which is also dedicated to the underlying technologies, methods, and applications of digital transformation.

Prof. Dr. Max von Grafenstein, ECDF Professor for "Digital Self-Determination", initiated the research project "Privacy Icons" (also see page 40). Together with other institutions from Italy and Luxembourg, the Privacy Icons Forum (PIF) platform was founded, which supports similar research initiatives across Europe in coordinating and strengthening potential research synergies.

Prof. Dr. Philipp Staab, ECDF Professor for "Sociology of the Future of Work" cooperates with Dr. Florian Butollo at the Weizenbaum Institute. His research focuses on the relationship between technical change and transformation in the world of work in Germany and China. Together, the two researchers organized an international symposium on "The Global Political Economy of Digitalization" at the ECDF in October 2019. On the podium, Nick Srnicek spoke on the topic of "AI and the Global South". He is a lecturer at the Department of Digital Humanities at King's College in London. Yu Hong, who teaches at Zhejiang University, also spoke at the symposium about "China and the Global Political Economy of AI". The scientists are planning further formats of this kind. Philipp Staab also supervises two doctoral students at the Weizenbaum Institute: Christine Gerber and Robert Koepp.

Prof. Dr. Florian Tschorsch, ECDF Professor for "Distributed Security Infrastructures", moderated a panel discussion at the "Blockchain Nights" (#BCN015) on the topic of "Security of Smart Contract Platforms" at the Weizenbaum Institute. The event, organized jointly by Weizenbaum Institute and HU Berlin, took a closer look at the infrastructure of Smart Contract Platforms and thus at the foundation of so many projects in which the research community has invested hopes, money and efforts.

Moreover, **Prof. Dr. Michelle Christensen** and **Prof. Dr. Florian Conradi** share the ECDF visiting professorship for "Open Science" at the Weizenbaum Institute research group 2 "Production Possibilities of the Maker Culture". The research group's principal investigator is **Prof. Dr. Gesche Joost**.

//ALEXANDER VON HUMBOLDT INSTITUTE FOR INTERNET AND SOCIETY (HIIG)

An important cooperation partner of ECDF is the Alexander von Humboldt Institute for Internet and Society (HIIG). HIIG which is located in Berlin focuses

its research on the development of the Internet from a social perspective. The aim is to better understand the associated digitalization of all areas of life.

ECDF Professor **Max von Grafenstein** is co-director of the research program "Data, Actors, Infrastructures: Governance of Data-Driven Innovation and Cybersecurity" at HIIG. Cross-institutional research offers him exciting opportunities. "In my dual role at ECDF and HIIG, I coordinate several research projects and increase the synergy effects between the research institutions in Berlin in the field of digitalization," he says. One of these projects hones in on the regulation of data-driven innovation with a focus on "Data Protection and Security by Design". A second project is concerned with data governance and how companies should set up and coordinate

"I have a unique opportunity to build bridges between research disciplines and institutions." – GRAFENSTEIN

their internal business processes in certain areas to improve their data-driven innovative capacities. "For me and my research, my connection to the ECDF and the HIIG represents a unique opportunity to build bridges between research disciplines and institutes," he says.

Prof. Dr. Elisabeth Mayweg is ECDF professor for "Digital Knowledge Management". At HIIG, she is associated with the "Knowledge & Society" research program. This examines the change in knowledge production, organization, and transfer through digital innovations. To make even better use of the synergies of the three institutions (ECDF, Weizenbaum Institute, and HIIG), actors from all institutions developed different formats, including the Research Meet-up, which took place at HIIG in winter 2019. Here scientists from the three institutions had the opportunity to exchange ideas in an informal setting and discuss their research in the field of digitalization. In addition, a large joint event is planned as part of the Berlin Science Week in autumn 2020.

//BERLIN CENTER FOR DIGITAL TRANSFORMATION

The ECDF is an associated partner of the digital networking service center of the four Fraunhofer institutes in Berlin (FOKUS, HHI, IPK and IZM). Since 2016, the Center has been providing a catalyst for the rapid transfer of research results into innovative products, especially in the area of Industry 4.0 and Smart City. Two of the four main topics are "Mobility and City of the Future" and "Industry and Production" and thus also include ecological issues for the future. Four heads of the Fraunhofer Institutes **(Prof. Dr. Manfred Hauswirth, Prof. Dr. rer. nat. Martin Schell, Prof. Dr.-Eng. Thomas Wiegand, Prof. Dr. Klaus-Dieter Lang)** are PIs at the ECDF. In addition, **Prof. Dr. Odej Kao**, Chairman of the ECDF, is a member of the Center's scientific advisory board.

//BERLIN INSTITUTE FOR THE FOUNDATIONS OF LEARNING AND DATA (BIFOLD)

As part of the Federal Government's AI strategy, a flagship of top AI research is being launched in Berlin. To this end, the two existing AI competence centers at Technische Universität Berlin, the Berlin Big Data Center (BBDC) and the Berlin Center for Machine Learning (BZML), will merge in January 2020 and form the new Berlin Institute for the Foundations of Learning and Data (BIFOLD. The cooperation with other Berlin partner institutions will also be expanded. The previous collaborations between ECDF and BBDC and ECDF and BZML will continue at BIFOLD. The two directors of BIFOLD, Prof. Dr. Volker Markl and Prof. Dr. Klaus-Robert Müller, are both PIs at ECDF. There are also numerous PIs who are both connected to ECDF and BIFOLD: Prof. Dr. Guiseppe Caire, Prof. Dr. Anja Feldmann, Prof. Dr. Manfred Hauswirth, Prof. Dr. Odej Kao, Prof. Dr. Titus Kühne, Prof. Dr. Christof Schütte and Prof. Dr. Thomas Wiegand. The research centers benefit equally from the resulting synergies. "In order to push the theoretical and algorithmic foundations for Big Data and machine learning even further, we need more researchers who are bilingual, i.e. who 'speak' machine learning and Big Data," said Klaus-Robert Müller at the opening ceremony of BIFOLD. In terms of content, the BIFOLD will deal with five main topics:

// Theoretical foundations and scientific methods of big data management and machine learning
// Management of data science processes and systems
// Data architecture and data technologies,
// Explainable Artificial Intelligence
// Technologies and tools for new applications in science and industry.

//DIGITAL CLINICIAN SCIENTIST PROGRAM

Together, Charité – Universitätsmedizin Berlin and the Berlin Institute of Health (BIH) are organizing the "Digital Clinician Scientist Program" (D-CSP). Prof. Duska Dragun, director of the BIH Biomedical Innovation Academy, leads the program. It is primarily directed at medical professionals who have already dealt with innovative research projects, technological challenges and data-driven medicine during their specialist training. The German Research Foundation (DFG) is funding the project for an initial three years with over three million Euros (possibly an extension of two years with a grant of two million Euros). For the new program, various experts from Charité and BIH as well as partners from the Max Delbrück Center for Molecular Medicine (MDC), the Berlin Institute for Medical Systems Biology (BIMSB), the Einstein Center Digital Future (ECDF) and the Bernstein Center for Computational Neuroscience (BCCN) will be involved in the design of the concept as well as the recruitment and supervision of program participants.

Prof. Dr. Odej Kao (ECDF) is a supervisor of both **Dr. Julius Emmrich** (see page 65) and **Dr. Samuel Knauss** (see page 66). In 2019, the two neurologists and neuroscientists from Charité – Universitätsmedizin Berlin were accepted by the Executive Board as Associated Members of the ECDF.

BERLIN OPEN LAB

The Berlin Open Lab was officially opened on May 28, 2019. The lab is a new location for digital research at the interface between experimental design, architecture, and engineering. It adds another level to the close cooperation between Berlin University of the Arts and Technische Universität Berlin. With a laboratory for "Computational Fabrication" and "Wearable Computing" on the one hand and a studio for "Augmented and Virtual Reality" on the other hand, the doors have been opened wide for future research.

The Berlin Open Lab provides spaces in which stakeholders in the realms of art, design, science, and society can work together locally, but also in a virtually networked manner – a rare opportunity for researchers in Germany in the digital age. Together with the Weizenbaum Institute for the Networked Society and the ECDF, solutions for the challenges of a digital society are developed here. With this investment, UdK Berlin is sending out a clear signal for interdisciplinary research on digital transformation. The renovations of the premises, which are part of the historic shed halls of UdK Berlin, was supported by the Berlin Senate Chancellery for Higher Education and Research.

The new ECDF junior professorships from UdK Berlin will also carry out their experimental research in the Berlin Open Lab. Prof. Dr. Berit Greinke works on "Performative Materials" and combines intelligent textiles with 3D printing. The networked education of the future plays a role for Prof. Dr. Daniel Hromada, which he implements in an interactive digital primer. Prof. Dr. Max von Grafenstein dedicates his time to issues regarding digital self-determination and researches on topics of security on the Internet. New icons that are intended to familiarize users with data protection and data usage of services are being developed to make conventional data protection declarations intuitively understandable for consumers.

In addition to the scientists and researchers from UdK Berlin, Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi, both guest professors for "Open Science" at ECDF and TU Berlin since August 2019, are conducting research regarding "Critical Making" at the Berlin Open Lab. In addition to their ECDF affiliation, they also lead a research group on maker culture at UdK Berlin as part of the Weizenbaum Institute.

Prof. Dr. Gesche Joost, speaker for the Berlin Open Lab, professor at UdK Berlin and Executive Board Member of the ECDF, commented on the opening of the opening of the collaboration: "I advocate a new type of research – trans-disciplinary, keen to experiment, committed and political. Here, the arts and design can play a major role if they dare to dip a toe in the water with the natural and engineering sciences. A research that sparks discourse in the open lab, in artistic experiments and prototypes of a future society – that's the kind of research I would want to see being conducted."

INTERNATIONAL VISITS

In 2019, it was clearly demonstrated that the ECDF is viewed both nationally and internationally as a key player in digitalization research. In addition to various meetings with German stakeholders, we were happy to receive visits from Australia, Brazil, China, Kuwait, Switzerland, and USA among others.

In conversations with ECDF Executive Board Member Prof. Johann-Christoph Freytag, a high-ranking Australian delegation, including Treasurer Josh Frydenberg and Ambassador Lynette Wood, showed great interest in the ECDF's PPP model and in the interdisciplinary orientation of digitalization research.

The discussion with a group of students and teachers from Adtalem IBMEC Educacional Brasil, who wanted to learn more in person about the ECDF on site during a research stay under the motto "Berlin Smart City", had a more specific focus. They were particularly interested in the "SimRa – Safety in Bicycle Traffic" app, developed by ECDF Professor David Bermbach and his team.

The topic "Industry 4.0 and Its Impact on Management and Marketing" was the focus of a visit by a delegation of MBA students from the Gulf University of Science & Technology who attended an intensive course in Berlin. They used their visit to the ECDF for a deeply focused exchange with ECDF Professor Daniel Fürstenau and were also enthusiastic about the Micro Factory.

Since 2013, Cultural Vistas has been offering students and faculty members from Spelman College and Morehouse College (USA) first-hand insights into global perspectives in the fields of science, technology, engineering, and mathematics as part of the STEM Learning and Understanding New Career Horizons (LAUNCH) tour through Germany. As in the previous year, in 2019 the ECDF welcomed 20 students and four professors during their study trip, who, in conversation with ECDF Professor Tilman Santarius, were particularly interested in sustainability aspects in the context of digital transformation.

Prof. Dr. Tilman Santarius also welcomed a study group from the ZHAW Zurich University of Applied Sciences, Department of Applied Psychology, to the ECDF. He gave the students a brief insight into his research and had a conversation about the structure of the ECDF and his experience in collaboration with the other ECDF professors.

INTERNATIONAL ACTIVITIES

Visits – Cooperation – Conferences

The digital transformation affects business, science, and societies globally. Excellent researchers around the world are therefore facing challenges posed by digitalization. International cooperation with them is of particular importance to the ECDF. The Center for Digitalization Research considers global networking extremely important and is conducting active exchanges with universities and companies in the USA, Australia, Canada, Italy and Norway, among others. The international activities range from conference participation and guest visits to universities to joint publications and research projects. Contributions to international conferences, workshops, specialist conferences or symposia are an important aspect of the academic and scientific work of the ECDF professors. They offer them great opportunities to share their research results and are ideal places for exchange and networking. Below we present a selection of the activities at the ECDF.

//AUSTRALIA: EXPLAINABLE ARTIFICIAL INTELLIGENCE

Prof. Dr. Christian Meske was a visiting professor at the University of Technology Sydney, Australia in November 2019. He worked with various researchers from the School of Information, Systems and Modeling on the subject of "Explainable Artificial Intelligence" (XAI). "Explainability is a prerequisite for fair, responsible and trustworthy AI, which ultimately affects the way we manage, use and interact with it," Christian Meske says. He initiated projects with Australian colleagues that deal with the use of XAI in the areas of hate speech detection or medical diagnostics.

//BELGIUM: PRIVACY AND DEMOCRACY

Prof. Dr. Max von Grafenstein participated at a panel on "Certification for GDPR-compliant Anonymity: Real Anonymization or just Another Risk Assessment?" at the "Computers, Privacy & Data Protection 2019" conference in Brussels. It was here that the legal scholar presented his approach to the certification of anonymization technologies. The conference in Belgium brings together researchers, lawyers, practitioners, policymakers, computer scientists, and civil society from around the world to share ideas and discuss the latest issues and trends.

//DENMARK: DIGITAL TRANSFORMATION

Prof. Dr. Daniel Fürstenau conducted research at the Copenhagen Business School (CBS), Denmark, at the Department for Digitalization in February and March 2019. During his research stay, he worked with Prof. Abayomi Baiyere on a digital transformation project. "The time in Denmark was very important for me and my research, because I was able to discuss and develop my work in one of the best environments for digitalization research in Europe and worldwide. The intensive cooperation with Professor Baiyere has helped me to advance academically and has strengthened the ECDF's networking," Daniel Fürstenau says.

"I was able to further develop my work in one of the best environments for digitalization research worldwide." – FÜRSTENAU

//GREAT BRITAIN: ELECTRONIC TEXTILES

Prof. Dr. Berit Greinke spoke at the symposium "On Braiding and Dancing – AlgoMech" on the topic "Crafting holes in space with textiles" in May 2019. The interdisciplinary symposium in Sheffield brought together perspectives from the areas of digital media, choreography and dance technology, traditional textiles, e-textiles, philology, live coding, and architecture. In September, Berit Greinke was in Great Britain again; as co-chair of the "Materials and Processes" session of the "Textile Intersections" conference at Loughborough University.

//JAPAN: GAME THEORY

Prof. Dr. Setareh Maghsudi was a visiting scientist in Japan in 2019 – supported by a grant from the Japan Society of the Promotion of Science (JSPS). In the summer of 2019, she investigated "multi-agent systems" in Prof. Makoto Yokoo's research lab at Kyushu University. Setareh Maghsudi was also a visiting researcher in September 2019 at University of Kyoto

"Life in Japan was a deeply inspiring and enriching experience for me." – MAGHSUDI

and Keio University in Japan. At both universities, she gave a lecture on "Machine Learning, Game Theory, Network Science and IoE" and a tutorial. "In addition to the opportunity to work scientifically with outstanding academics, life in Japan was a deeply inspiring and enriching experience for me," Setareh Maghsudi says.

//CANADA: CHANGE IN CORPORATE ARCHITECTURE

From August to mid-October 2019, **Prof. Dr. Daniel Fürstenau** undertook a research stay at the University of British Columbia (UBC) in Vancouver, Canada. Together with Prof. Carson Woo, he conducted research on the topic of "Change in Corporate Architecture". The basis was a joint project between the two professors as part of the strategic partnership between Freie Universität Berlin and University of British Columbia. The research stay ended with a presentation of the project results at the research seminar of the MIS Department at the UBC Sauder School of Business. Daniel Fürstenau discussed the preliminary project results with the professors, postdocs, and PhD students present. In December, Professor Woo came to Freie Universität Berlin to further consolidate the joint research partnership.

//CANADA: AI AND THE FUTURE OF WORK

In September 2019, **Prof. Dr. Christian Meske** traveled to Toronto, Canada, at the invitation of the German-Canadian Chamber of Commerce and Industry. As a member of the German delegation of the "Transatlantic Dialogue", he met representatives of AI start-ups and think tanks (e.g. MoBerries, Paddle, Knockri, MaRS) as well as large companies (e.g. LinkedIn, Bank of Montreal), NGOs (e.g. CivicAction), and universities (e.g. Ryerson University), to discuss the effects of Artificial Intelligence on business models and employees. During the conference "Future of Work & AI" Christian Meske exchanged ideas with experts about the latest developments in this area. As speaker of the panel "Future Talent – How can it be retained and developed using AI?" he held discussions with Pat Whelan (CEO & Co-Founder, Paddle HR), Andrew Noble (Account Executive, plum.io) and Dean Delpeache (Manager for Talent Acquisition, Fiix Software). "The exchange with my Canadian colleagues provided me with new insights for my research. In Canada, the hurdles for using artificial intelligence seem to be lower compared to Germany, which makes the speed of the digital transformation of economy and society even more dynamic," Christian Meske says.

//NETHERLANDS: SHARING ECONOMY

At the "International Workshop on the Sharing Economy (IWSE)" in Utrecht, the Netherlands in summer 2019, **Prof. Dr. Timm Teubner** held one of the two keynotes in front of around 350 participants. In his lecture, he provided insights into his research on platform economics with a particular focus on the ubiquitous topic of trust in digital services.

//NORWAY / POLAND: SMART WATER NETWORKS

Prof. Dr. Andrea Cominola gave lectures in 2019 at Cracow University of Technology in Poland and Norwegian University of Science and Technology in Trondheim (NTNU) on the topic of "Digital transformation of urban water systems". The universities are part of the "Nordic Water Network", which also includes TU Berlin, Dublin City University, Technical University of Denmark and Aalborg Universitet. The goals of the network include the mutual use of infrastructures, the expansion of joint teaching and research and the promotion of joint international project proposals. "I benefit greatly from the international cooperation with the three universities. As part of this network, I was able to expand my teaching experience in an international and multidisciplinary context, improve my network of research contacts in Europe and formulate ideas for joint projects," Andrea Cominola says.

//PORTUGAL: PROFESSIONAL TEACHER TRAINING

Prof. Dr. Elisabeth Mayweg was invited to speak at the "Teachers' Professional Development Conference 2019" in Lisbon, Portugal. The topic of her presentation was "Critical questioning in argumentation contributes to critical thinking". The conference is an important initia-

tive for the further education of teachers in Portugal. "The lecture in Lisbon enabled me to share my work and approaches to critical handling of online information

"The lecture in Lisbon enabled me to share my work and approaches with teachers from other countries." – MAYWEG

with teachers from other countries. Together with other European researchers and the participating teachers, we discussed in detail the importance of our academic knowledge for school practice," Elisabeth Mayweg says.

//CZECH REPUBLIC: GENDER GAP IN SCIENCE

The International Congress of Logic, Methodology and Philosophy of Science and Technology (CLMPST) takes place every four years and brings together communities consisting of more than 800 logicians, philosophers of logic, and philosophers and historians of science and technology. In August 2019, **Prof. Dr. Helena Mihaljević** attended the conference in Prague. As Chair, she was responsible for the session entitled "The gender gap in the sciences and philosophy of science". In her lecture, she explored the question, "What can publication records tell about the gender gap in STEM?"

//USA: INTERDISCIPLINARY LINGUISTICS RESEARCH

In July, together with **Dr. Maria Zimmermann**, **Prof. Dr. Elisabeth Mayweg** participated in the "29th International Conference of the Society for Text and Discourse 2019 " in New York, USA. During the poster session, the scientists presented their research on the topic entitled "Collaborative online discourses promote critical thinking". Scientists and students from various disciplines such as psychology, linguistics, neurosciences, pedagogy, and educational sciences took part in the conference. "Poster sessions at international conferences are important to us because not only can we present our own research here, but we can also become more familiar with our colleagues' research. In discussions with other scientists, we obtain a variety of interdisciplinary insights and can continue existing collaborations and initiate new collaborations," Maria Zimmermann says.

SCIENTIFIC EXPERTISE

Knowledge Transfer between Science and Politics

Around two years after the opening of the research center, ECDF professors have become sought-after experts in federal, national, and European politics as well as for non-governmental institutions. The knowledge transfer between science and politics is a good opportunity for the ECDF to present digitalization research findings to political and non-governmental decision-makers.

It is not about delivering ready-made solutions, but about being part of the discourse. Expertise on topics such as artificial intelligence, machine learning, sustainability and consumption was particularly in demand. ECDF professors are members of formal bodies such as expert commissions of the federal government or scientific advisory boards, as well as in informal formats such as panel discussions. Below we present a selection of their activities.

//EXPERT COMMISSION OF THE GERMAN GOVERNMENT

Federal Minister for Women Dr. Franziska Giffey has appointed Prof. Dr. Timm Teubner to the Expert Commission for the Third Gender Equality Report of the German Government. In collaboration with his colleagues, the ECDF professor is concerned with the question of how digitalization can promote gender equality. The committee chaired by Professor Dr. Aysel Yollu-Tok (Berlin School of Economics and Law) deals with the topic of digitalization. The focus is on the question as to what measures are required so that women and men will have the same opportunities in the digital economy. "I am honored to be able to work on such a relevant and current topic. For me, this task also represents a new challenge, which I am happy to take on," Timm Teubner says.

The expert commission works on a voluntary basis and independently. It consists of eleven researchers who deal with the most important aspects of digitalization in various specialist areas (economics, law, computer science, social sciences). Timm Teubner is particularly looking forward to the exchange with his colleagues in the commission, gaining numerous new perspectives and getting a look behind the scenes of a federal ministry.

He is pleased that he can contribute his own expertise to the commission: "I have no background in gender research, but definitely do in the areas of digitalization and platform economy. Many data-based business models and platforms are increasingly shaping our lives, and questions about equality and discrimination naturally arise there, too. Because of the direct connection between interface and mechanism design on the one hand and user behavior on the other, political and economic requirements are currently becoming increasingly apparent."

The expert commission's report is an important part of the Third Gender Equality Report, which is due to be published in spring 2021.

//PARLIAMENTARY ADVISORY COUNCIL ON SUSTAINABLE DEVELOPMENT IN THE GERMAN BUNDESTAG

Prof. Dr. Tilman Santarius (ECDF) was invited to the public technical discussion on the topic of "Digitalization and Sustainability" of the Parliamentary Advisory

Council in the German Bundestag in May 2019. In a total of eight theses, he explained to the MPs why he sees opportunities and risks for sustainability in equal measure in digitalization. Tilman Santarius stated that in Germany, there is great potential for a turnaround in terms of energy, mobility, and consumption; in this respect, one has to move from a demand-driven system to a supply-driven one. "I think the transfer between science and politics is important because I basically try to be socially relevant with my research as a scientist using trans-disciplinary research. The invitation to the Parliamentary Advisory Council of the Bundestag has provided me the opportunity to explain which instruments and measures can be used to politically shape digitalization so that it contributes to a fundamental transformation of current production and consumption patterns," Tilman Santarius says.

//EXPERTS' COMMITTEES: CITY DEVELOPMENT, SMART CITY

Prof. Jochen Rabe is a member of the "Smart Cities Dialog Plattform" expert panel of the Federal Ministry of the Interior, Building and Community and advises the Ministry on the further development of the Smart City concept. In 2019, he evaluated the 2019 BMI Smart City model projects and supervised a selection of municipalities in order to leverage their model character. In addition, Prof. Jochen Rabe supports the Berlin Senate Chancellery as a digitalization expert in realigning the city's smart city strategy, designing the Berlin CityLAB at Tempelhof Airport and applying for funding. Jochen Rabe is also a member of the Advisory Board of Tempelhof Airport, which advises the state-owned company on the future orientation and development of Europe's second largest building. Other challenging tasks include his participation as an Advisory Board member of the Lausitz Digitalization Strategy and as a member of the Board of Trustees of the International Building Exhibition in Heidelberg.

"The digitalization of the city is bringing about a significant change for the municipalities. After a slow start, the topic is now on the agenda of many states, counties and municipalities, and I am very happy to get involved. The topic offers me the opportunity to present and discuss our research, but also to understand the future challenges in detail. This ensures the necessary exchanges between the worlds of science and politics and is enjoys growing interest, both nationally and internationally," Jochen Rabe says.

/ ROBERT-KOCH-FORUM

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

HOUSE OF DIGITALIZATION

An interdisciplinary research and meeting space

Cooperation requires common ideas, but also a common working environment in which researchers can meet, listen to one another, and exchange ideas. In order to build a community, an inspiring environment must be created that promotes precisely these opportunities for encounter. The Robert Koch Forum (RKF) is an ideal location for this.

As a house of digitalization, the RKF is the melting pot of the ECDF, as it offers numerous opportunities for members and partners to meet and exchange ideas. The ECDF researchers have their co-working space, laboratories, and workshop and cooperation rooms here. The results achieved can be presented in the event rooms and showrooms, where researchers can also meet informally. The RKF is also the location of the ECDF Management Office.

//CO-WORKING SPACE

The Co-Working Space on the second floor of the RKF offers researchers and scientists the opportunity to work on their research projects and to exchange ideas with their colleagues in addition to the offices at their respective "home" universities. The location in the center of Berlin in particular benefits those researchers whose universities are located less centrally.

The different sizes of the co-working rooms offer the scientists the opportunity to concentrate on quiet work or to exchange or collaborate on research ideas and projects. The meeting room (Board Room), which is also available, and the newly created Social Space offer further opportunities for meetings and exchanges. In 2019, the Co-Working Space was once again a very important factor and driver for the initiation and implementation of interdisciplinary research projects at the ECDF.

//MICRO FACTORY

The Micro Factory also plays an important role when it comes to developing ideas and solutions outside of conventional research structures. This is where scientists find support when they try out ideas and concepts and want to examine their potential and risks. The prototyping method has exciting approaches ready for this – whether with paper, cardboard, (digital) mock-ups or 3D printing. Prototyping offers researchers early visual and haptic models from which the first results, challenges or requests for changes can be derived. Physical computing is also used in the Micro Factory. Sensors and microcontrollers such as "Arduino" are used to control electromechanical devices such as LEDs, motors or other hardware. These systems are of interest, among other things, for research projects in the fields of design, medicine, and architecture. The Micro Factory is headed by the experienced designer Friedrich Schmidgall, who supports and advises the scientists – from the first idea through conception to implementation. It offers workshops on the topics of "3D printing", "Electronic basics", and "Arduino microcontroller". The target group includes ECDF professors, research assistants, doctoral students, and student assistants. "It is gratifying that the Micro Factory has become a very popular part of the ECDF since it opened in spring 2019. I am particularly pleased when the possibilities of the Micro Factory are used to make the research and teaching of the ECDF scientists more tangible," Friedrich Schmidgall says. The new work-

space will also be used for events at the ECDF, such as workshops or hackathons.

//DEMO ROOM

Since the opening of the ECDF in April 2017, the Demo Room has existed directly opposite the large event hall. There, ECDF guests can experience current technological trends and research approaches, some of which were created in the Micro Factory, in a very tangible way. Accordingly, prototypes and research results from various ECDF stakeholders – various research institutions of Berlin universities, various industry partners of the joint projects and start-ups – come together in the Demo Room. The diversity of the exhibits shows how traditional ways of thinking can be broken up and illustrates the interdisciplinary approach of the ECDF. On the one hand, the Demo Room functions as an exhibition space and on the other hand generates new questions about the different aspects of a society, about living together, culture, health or about new forms of knowledge generation in a digital future.

The exhibits currently include, for example, the "Mobile Lorm Glove", a mobile communication and translation device for the deaf-blind (Design Research Lab, UdK Berlin); a tailor-made human heart valve prosthesis developed by combining the latest rapid manufacturing and "tissue engineering" technologies (TU Berlin; German Heart Center Berlin); the project "NurMut", an interactive sound sculpture for people with dementia, which aims to compensate for the loss of technical know-how and the ability to interact with music systems through curiosity about haptics and the interplay of modular elements (UdK Berlin, Charité – Universitätsmedizin Berlin). The "Soft Interaction Patterns" project examines surfaces that use traditional textile production techniques such as sewing, weaving and knitting and conductive fabrics and threads to produce counterparts to buttons, switches and sliders in a textile form. Interactive textiles are currently given an important role in terms of research and innovation. E-textiles generally have an advantage in that they feature both very specific and very broad applications (UdK Berlin). The non-profit start-up Calliope has set itself the goal of enabling schoolchildren from the third class onwards to playfully access the digital world with a comfortable single-board computer and to permanently anchor digital content in the curriculum.

The SimRa project collects data in a data protetion -compatible manner on where in the city bicyclists are at risk and what kind of hazards there are. To this end, the project developed a smartphone app that uses GPS data to record routes and evaluates acceleration sensors to detect dangerous situations. With the help of this data it becomes possible to obtain a comprehensive overview of bicycling traffic in Berlin and to achieve sustainable changes with the help of the Berlin Senate Department for the Environment, Transport and Climate Protection. In order to provide visitors with a spatial overview of the recorded bicycle traffic flows, a model table was built in the Micro Factory, on which bicycling traffic based on SimRa data can be transmitted and displayed in real time using the example of the Berlin-Mitte site.

Further projects are currently in development and implementation. The Demo Room is thus a constantly evolving exhibition space where the ECDF's research is displayed for the public to see.

FUTURE SECURITY LAB

Forschungsforum Öffentliche Sicherheit presents digital innovations at the ECDF

The Future Security Lab of the Forschungsforum Öffentliche Sicherheit (Public Security Research Forum) presents security research to see, touch and experience in realistic scenarios in the rooms at the ECDF. At the same time, it encourages people to reflect and discuss about the perception of technology and society – about intended and unintended consequences. The project is funded by the German Federal Ministry of Education and Research (BMBF) and is originally located at Freie Universität Berlin.

The ECDF interactively and informatively provides visitors with results from more than 50 research projects, especially from the BMBF's "Forschung für die zivile Sicherheit" (Research for Civil Security) framework program. The Future Security Lab is aimed at specialist groups from politics and security research as well as decision-makers from the field of disaster and civil protection.

The Future Security Lab was officially opened at the beginning of 2019; since then it has enjoyed great interest and high levels of interest from authorities and organizations with security tasks (BOS) and from the political arena. Various members of the Bundestag visited the Future Security Lab across political groups ranging from Michael Kuffer, Member of the Bundestag (CDU/CSU), Dr. Irene Mihalic, Member of the Bundestag (Bündnis 90/Die Grünen), Susanne Mittag, Member of the Bundestag (SPD) and Benjamin Strasser, Member of the Bundestag (FDP) to members of the Committee on Science and Research such as Kai Gehring, Member of the Bundestag (Bündnis 90/Die Grünen), all the way to authorities such as MinDir Franz-Josef Hammerl (Department Head at the Federal Ministry of the Interior, Building and Community) or Albrecht Broemme (President of THW). In addition to members of the German Bundestag, representatives of state parliaments and municipalities have also learned about the possible future of security.

The Future Security Lab was involved in events of the Forschungsforum Öffentliche Sicherheit, such as in the expert workshop "Vor die Lage kommen! Digitale Wege zur Lagedarstellung" (Get to the point! Digital approaches to visualizing the situation), which took place in May 2019 at the ECDF. 40 experts discussed the benefits and drawbacks of using digital technologies in practice.

The highlight of the Future Security Lab was the anniversary celebration of the 10th anniversary of the Forschungsforum Öffentliche Sicherheit, for which all of ECDF was temporarily transformed into the Future Security Lab. From virtual realities to serious games, visitors were able to try out exhibits and experience security research. Among others, President of Freie Universität Berlin, Prof. Ziegler, President Unger (Federal Office for Civil Protection and Disaster Assistance) and Dr. von Notz (Member of the Bundestag, Bündnis 90 / Die Grünen) viewed the successful work of the Forschungsforum Öffentliche Sicherheit and confirmed the Future Security Lab's great political and social importance in dealing with security issues. Together with the ECDF and its professors, there were various visits to the Future Security Lab, a joint appearance at the "Long Night of the Sciences" in Berlin as the House of Digitalization and lively discussions at all events.

/ EVENTS

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

Hackathon: Urban Data – Mind the Gap

January 16 – 19, 2019
Einstein Center Digital Future

How can residential areas in Berlin be developed further? What role does public transport play in this? From January 16-19, 2019, ECDF professors Helena Mihaljević, Jochen Rabe, and Max von Grafenstein organized the "Urban Data – Mind the Gap" hackathon to find answers to these questions. They cooperated with the three state-owned housing associations gesobau, howoge and STADT UND LAND as well as BVG. These organizations provided anonymized data records available to the teams of the hackathon. In seven working groups, students, scientists, and external experts worked on solutions for urban planning tasks, such as the revitalization of "suspended" urban spaces or the conflict potential of different living structures and the related opportunities for data-driven strategic inventory development.

In the end, the Hackmack working group took first place. Using the example of Neu-Hohenschönhausen, they designed a use of the largely deserted parking lots during the day by means of mobile cultural, educational and support services offers.

ECDF New Year's Reception

January 21, 2019
Einstein Center Digital Future

The first New Year's reception ever in 2019 was focused around the appointment of Prof. Dr. Rita Süssmuth as the new ambassador of the ECDF. During the ceremonial reception, the former President of the Bundestag was officially welcomed.

During her visit to the ECDF, Prof. Dr. Rita Süssmuth was impressed by the diverse research topics surrounding the topic of digitalization. "The digital transformation is a big undertaking for our society. The ECDF brings together engineers, doctors and designers as well as urban developers and computer scientists who are all facing this challenge together," she said.

For Prof. Dr. Odej Kao, speaker of the ECDF, the new ambassador is a great asset. "It's great recognition for the ECDF that Prof. Süssmuth is using her valuable time and energy for the further development of the ECDF. Her exciting inquiries, perspectives, and ideas for shaping the digital transformation have truly impressed me. Rita Süssmuth's wealth of experience and foresight will benefit both our professors and the entire initiative," he said.

ECDF INDUSTRY FORUM

The ECDF is funded by industry, non-university research institutions, and the state of Berlin. This is made possible by the nationwide unique public-private-partnership model. However, the donors are also an important source of relevant research topics addressed by the ECDF and our researchers. In order to systematically develop common topics and identify aspects that are of interest to several of our professors and donors, we have set up the ECDF Industry Forum as a structure that enables active participation and a multidirectional dialogue.

The ECDF Industry Forum proved to be a very successful format concept again in 2019 with a total of three events. The focus on the current challenges of digitalization and the dynamic character of the format – which at any rate was created as a regular exchange between our donors and researchers – proved to be of great added value for the participants. Thereby, we always take into account that, on the one hand, the topics are specific enough to address current challenges of digitalization for both researchers and donors, while on the other hand, they are presented and discussed in such an inclusive manner that participants who are not directly familiar with the subject matter also benefit from them.

Such a topic that's relevant across all industries is "The Last Mile", the title of the second ECDF Industry Forum in January 2019. Logisticians describe the route from the parcel center to the end customer as the last mile – and it's considered the most challenging section of any delivery. The phenomenon of the last mile can be found in many domains and is associated with numerous challenges: the precision, the scaling, the fault tolerance, the adherence to target times, the appealing contact design and other quality characteristics significantly influence customer perception and the efficiency of service provision. This applies to donors in public transport and logistics as well as in telecommunications, in schools, in water supply, or similar areas.

Digitalization enables new ways to overcome the last mile: with a delivery service, with public transport, in network expansion or with the transfer of knowledge in a school class. The central question is always: Which digital solutions help me in the last step of a business transaction – that is, when establishing contact – with the end customer(s)? During the event, however, it became clear that this is not only relevant – for example – with respect to the process of trading goods. In that instance, the focus was, among other things, on the development of solutions in the final steps of the implementation of collaboration projects between science and business. Representatives from Berliner Wasserbetriebe, BVG, and BSR presented key challenges at the second ECDF Industry Forum and, together with ECDF researchers and other representatives from industry and the sciences, conducted discussions about new digital methods and ways of overcoming the last mile.

At the third ECDF Industry Forum in June, the topic "Smart Urban Planning/Smart Infrastructure" was on the agenda. The event focused on current developments and digital innovations with regard to the challenges of urban and regional planning.

In short talks by the donors, Marguerite Bellec (Viessmann Group) explored the question of why energy

efficiency in buildings is essential, while Dr. Alexander Sperlich and Katharina Teuber from Berliner Wasserbetriebe emphasized the importance of using smart data in the Berlin water supply network. The challenges of using and sharing data were also the focus of the subsequent discussion "Many houses don't make a city" by the ECDF professors Andrea Cominola, Sangyoung Park and Jochen Rabe, as well as in the subsequent group work. In the final discussion, the participants agreed that digital innovations in the area of data sharing and data policy are essential for the joint development of solutions to the challenges of urban development.

Data validity and security had already emerged as central digital challenges for the donors and researchers at the ECDF. Therefore, the goal of ECDF Industry Forum #4, which was held together with InfraLAB Berlin, was to develop visions for collaborations on the topic of "Data Sharing". On the basis of the stimulating short talks by representatives of Vattenfall Wärme AG, Physikalisch-Technische Bundesanstalt, Berliner Verkehrsbetriebe and Siemens AG, the almost 70 participants subsequently identified intra- and inter-organizational data governance as overarching subject areas.

Interdisciplinary topics included data protection and cybersecurity issues (How do I comply with the requirements for data protection and cyber security in particular when setting up the Data Governance structures?) as well as data quality (How do I ensure data quality, not only with regard to data protection and cybersecurity, but also to guarantee the usability of the data?). Overall, it was confirmed that data sharing is a highly relevant topic for most companies and institutions and that solutions can only be developed together.

The interactive and integrative approach of the format has proven to be very helpful for the establishment and regular hosting of the ECDF Industry Forum. Regina Gnirss, Head of Research and Development Unit at Berliner Wasserbetriebe (BWB) and presenter at the ECDF Industry Forum "The Last Mile" in January, was impressed by the networking component of the format:

"Collaborations between sectors are being established that would not have been possible without direct interaction at the Industry Forum." – MESKE

"Thanks to the Industry Forum, we were able to further expand the already excellent cooperation with the ECDF and especially with Prof. Dr. Andrea Cominola and – together with other industry partners – lay the foundation for further joint projects, such as the Climathon and the networking on data mining with the InfraLAB."

The Industry Forum is also an extremely helpful format for ECDF researchers to initiate cooperation between science and industry, as ECDF professor Christian Meske confirms, "The discussions at the Industry Forum demonstrated to me that many companies from different branches of industry are struggling with very similar challenges when it comes to the digital transformation. In this context, collaborations between sectors are now being established, including research, that would not have been possible without direct interaction at the Industry Forum."

Workshop “Gender Gap in Science”

February 18 – 19, 2019
Einstein Center Digital Future

Prof. Dr. Helena Mihaljević (ECDF / HTW Berlin) is part of the “Gender Gap in Science” initiative and organized a coordination meeting on the project “A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to Measure It, How to Reduce It?” The project examines the gender gap in the natural sciences, mathematics, and computer science at a global level and asks how it can be measured and reduced.

The first goal is to create a solid and well-founded database that reliably reflects the various facets of women’s participation in the relevant areas, and then to analyze this data. The project, led by the International Mathematical Union and the International Union of Pure and Applied Chemistry, involves eleven science policy organizations. Various institutes and universities such as the American Institute of Physics or HTW Berlin support the project.

“DiGiTal” Ceremony

February 21, 2019
Einstein Center Digital Future

On February 21, 2019, the ECDF hosted the festive event of the DiGiTal higher education program, which was opened with greetings by State Secretary Barbara König of the Senatsverwaltung für Gesundheit, Pflege und Gleichstellung (Senate Administration for Health, Nursing, and Equality) and with a welcoming address by the President of Technische Universität Berlin, Prof. Dr. Christian Thomsen, in his function as Chairman of the Landeskonferenz der Rektoren und Präsidenten der Berliner Hochschulen (State Conference of Rectors and Presidents of Berlin Universities). State Secretary Barbara König emphasized the central importance of digitalization for the change of society in her greeting; Prof. Dr. Christian Thomsen emphasized the importance of digitalization research for Berlin as a science location and the link between excellence and the goal of implementing equality. In her speech entitled “People in digital transformation or the importance of organized skepticism”, Prof. Dr. Claudia Müller-Birn underlined that not only the small proportion of women in digitalization research should be viewed critically, but also the potential of digital technology itself to reproduce and cement inequality.

Digital Entrepreneurship Hub

March 7 – 8, 2019
Einstein Center Digital Future

The Digital Entrepreneurship Hub invited researchers and scientists to the Einstein Center Digital Future in Berlin on March 7 and 8, 2019, for the two-day spring workshop "Towards health futures: digital innovation, infrastructure, and entrepreneurship on bio data".

The participants focused on developing an understanding of the destabilizing character of the connection between "the byte" and "the gene" at the interface of digitalization, biology and medicine.

The aim of the workshop was to bring together scientists with different specialist knowledge and disciplinary backgrounds and to create an interdisciplinary community that initiates new types of discussions on this topic.

The Digital Entrepreneurship Hub bundles start-up theory and start-up research at the Department of Economics at Freie Universität Berlin. Founding members are Univ.-Prof. Dr. Martin Gersch (PI at ECDF), Prof. Dr. Hannes Rothe and Prof. Dr.Janina Sundermeier (Associated Member of the ECDF).

Exhibition: "Enception – The Beautiful Mind"

March 11–15, 2019
Einstein Center Digital Future

The Einstein Center for Neuroscience housed its exhibition "Enception - The Beautiful Mind" at Einstein Center Digital Future from March 11-15, 2019.

The exhibition was part of Brain Awareness Week. This is a worldwide campaign that provides information about the progress and benefits of brain research. Large-format photographs of microscopic images of nerve cells that were taken in various scientific institutions around the world were presented. Using immunohistochemical methods and so-called fluorescent markers, movements and changes in the cells are visualized.

#EP19 jung & wählerisch: Workshop Policy Kitchen #Digitalisierung

March 26, 2019
Landeszentrale für politische Bildung, Berlin

Prof. Dr. Tilman Santarius (ECDF / TU Berlin) spoke at "#EP19 jung & wählerisch: Workshop Policy Kitchen #Digitalisierung" in the Berlin Landeszentrale für politische Bildung on March 26, 2019.

The association Polis180 organized the event. Digitalization is one of the central issues for young voters. Instead of only profiting from the progress of digitalization, Polis180 offers young voters in the context of the European election campaign "jung & wählerisch" (literally: young and picky) the opportunity to actively participate in shaping European digitalization policy and to make calls for an improved digitalization policy. The aim of the event was to present developed proposals following the European elections to the newly elected members of the European Parliament.

At the meeting, proposals and ideas for the future European digitalization policy were developed and elaborated, which were then uploaded to the Policy Kitchen platform and could be further developed online by all participants.

DIGITAL arabia network

April 25, 2019
Einstein Center Digital Future

"MENA Tech Talents and the Future of Work" – this was the motto of the discussion round organized by the "DIGITAL arabia network" (DAN) at the Einstein Center Digital Future.

At the event, which was largely initiated by Prof. Dr. Ayad Al-Ani, an Associated Member of the ECDF, the 50 participants discussed ways to improve networking among digitalization experts from the MENA countries as well as Berlin and the whole of Europe. In addition to personal experience reports from DAN representatives and members of the DAAS (German-Algerian Academic Students' Association), a panel discussion was on the agenda: In the panel that followed, Prof. Dr. Al-Ani and Bastian Underberg (CEO and founder of jovoto) and Dr. Eng. Heba Aguib from the Aswan Heart Centre discussed the topic "MENA Tech Talents in Europe and the Future of Work".

Privacy Icons Workshops

May 13 & 15, 2019
Berlin Open Lab

The research project "Privacy Icons" led by ECDF Professor Max von Grafenstein invited participants to a research study in the Berlin Open Lab on May 13 and 15, 2019.

The "Privacy Icons" research project develops interdisciplinary methods for designing effective privacy icons. According to the General Data Protection Regulation (GDPR), privacy icons are intended to supplement or even replace the lengthy and difficult-to-understand information texts (key phrase: uselessness of the cookie banner). The particular challenge of privacy icons is to represent the complexity of the data processing and the associated risks by means of intuitively understandable picture symbols.

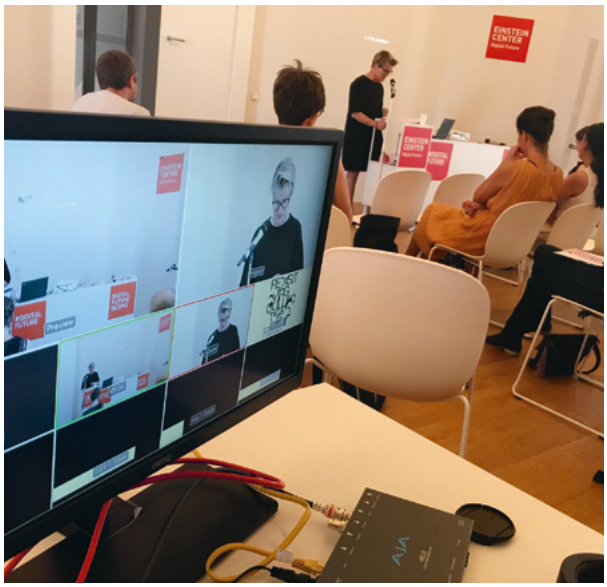
To ensure the effectiveness of the icons, users are directly involved in the research process of the project. To this end, several explorative design workshops will be held with interested users at the Berlin Open Lab of the UdK (Berlin University of the Arts) and in exchange with other research institutes in Europe.

5th Digital Future Science Match "What's next in Artificial Intelligence?"

May 14, 2019
KOSMOS Berlin

The Digital Future Science Match, which has been organized by the *Der Tagesspiegel* publishing house together with renowned scientific institutions since 2015, is one of the leading platforms for thought leaders in the digital future nationwide. In 2019, the competition focused on artificial intelligence (AI). With the AI Science Year and the AI strategy of the Federal Government in mind, the Digital Future Science Match set the course for new developments and necessary framework conditions.

The ECDF was significantly involved in the design of the program. A total of three ECDF professors, Prof. Dr. Felix Biessmann ("Measuring Trust in Artificial Intelligence Systems"), Prof. Dr. Daniel Fürstenau ("The Power of Algorithmic Practices"), and Prof. Dr. Philipp Staab ("Value Creation and Value Extraction on Digital Platforms"), held short talks in front of approximately 1,000 participants. In addition, the ECDF and the Future Security Lab presented themselves with a booth throughout the day and – especially during the lecture breaks – made various new contacts.



Symposium "Revisiting Collections"

June 4 – 5, 2019
Einstein Center Digital Future

The symposium "Revisiting Collections – Strategies of (Museum) Education in a Digitized World" was held on June 4th and 5th at the ECDF. The event, which was initiated by ECDF Principal Investigator Prof. Dr. Annette Jael Lehmann (Freie Universität Berlin), examined the relevance of the digital for current questions and application-related formats in art and culture education from a global perspective. This field of research deals with criticism of representation and postcolonial topics. It has strong overlaps with critical museology and museum science and aims to develop independent positioning in the field of digitalization. The organizer and the content curator was Yvonne Zindel (UDK Berlin).

The symposium was funded by the DFG (German Research Foundation) and the Kommission für künstlerische und wissenschaftliche Vorhaben (KKWV) of Berlin University of the Arts. It's a cooperative venture between Freie Universität Berlin (Institute for Theater Studies) and the Berlin University of the Arts (Institute for Art in Context).

Workshop "What is successful online information behavior?"

June 21 – 22, 2019
Einstein Center Digital Future

Prof. Dr. Elisabeth Mayweg (ECDF / HU Berlin) and Dr. Maria Zimmermann organized the workshop "What is successful online information behavior?" on June 21 and 22, 2019 at the Einstein Center Digital Future.

The workshop, which was attended by around 50 international participants, examined the social and cognitive factors that influence how learners research, select, evaluate, and use information from the Internet.

On the two workshop days, the academics explored the interfaces between reasoning, computer-based collaborative learning and scientific competence and examined how these concepts contribute to successful online information behavior. The participants then discussed how relevant models can be integrated, critical processes and learning outcomes can be made operationally effective, and possible research collaborations can be examined.

LONG NIGHT OF THE SCIENCES
JUNE 15, 2019

Around 300 guests visited the Einstein Center Digital Future (ECDF) for the 2019 Long Night of the Sciences (LNDW). In the House of Digitalization, visitors experienced music-making trees, virtual operations by the Red Cross, electronic textiles, the intelligent control of water networks and much more. Professors presented hands-on research until midnight.

How might energy be saved in residential areas? Visitors were able to try to answer this question themselves at Prof. Dr. Sergio Lucia's booth. They built their own smart neighborhood on a screen and considered how many batteries, photovoltaic systems, or gas boilers should be used.

Prof. Dr. Andrea Cominola is concerned with the intelligent control of water networks. He had installed sensors in a laboratory at the TU Berlin. They record various parameters such as pressure, flow, and vibrations. This data was transferred to the ECDF in real time and illustrated how the status of pumps and other components of a water network can be monitored in real time.

Prof. Dr. David Bermbach presented an interactive map of Berlin. The map is part of the research project "SimRa – Safety in Bicycle Traffic". The researchers use a specially developed smartphone app to collect data on near-misses.

Prof. Dr. Berit Greinke presented various patterns of textile-pleated sensors. The professor for Wearable Computing showed how adapted sensors can react to touch and deformation. Fashion design students at Berlin University of the Arts deal with utopias of digital physicality. In doing so, they dealt with questions such as: How can digital identity be a way to reflect on body and clothing? What skills does the digital body possess that transcend those of the human body? What if there was no physicality in the future?

Elsewhere, drum sounds were heard coming from a room. But upon entering, there was no instrument to be seen. Instead, a plant stretched out its leaves. The visitors tapped the individual leaves and played music. Prof. Dr. Daniel Hromada developed this "instrument". He is a Professor for Digital Education at Berlin University of the Arts. Using various educational artifacts such as the digital primer or the drum tree, he is breaking new ground in the transfer of knowledge.

Tours through the Future Security Lab are at other times reserved for specialist groups only. At the LNDW, the team of the Forschungsforum Öffentliche Sicherheit offered insights into current security research in Germany. The team members presented a demonstrator that is used to involve volunteers in the event of a crisis.

Furthermore, Cornelius Hutfless and his team led the visitors to various virtual rooms: a theater, a football stadium, a church or a mosque. This was made possible by the augmented reality app "CoCubes".

Forum Open:Education

June 26, 2019
Einstein Center Digital Future

"Open education for a digital society!" was the title of the event which took place on June 26, 2019 at the ECDF. With the "Forum Open: Education", the "Bündnis Freie Bildung" wants to advance the debate on contemporary teaching and learning and promote the exchange between civil society, educational practice, and political decision-making bodies.

Thanks to booths, workshops and discussion groups, educational initiatives and projects were provided with an open platform to present their work and exchange practical experiences. The second part of the event was a panel discussion, in which the 80 participants spoke to education politicians about the potential of digital participation and the next steps in the digital transformation of education.

The event took a look at the current educational projects of the federal and state governments and took stock of the status of open education in Germany.

Book presentation: "Was Bits und Bäume verbindet – Digitalisierung nachhaltig gestalten"

July 3, 2019
Innovation platform EINS, TU Berlin

On July 3, 2019, Prof. Dr. Tilman Santarius (ECDF / TU Berlin) presented his book: "Was Bits und Bäume verbindet – Digitalisierung nachhaltig gestalten" (What connects bits and trees – shaping digitalization sustainably). The event was held at the innovation platform EINS, Centre for Entrepreneurship of TU Berlin.

The "Bits & Bäume" conference (November 2018) offered more than 1,700 participants in around 130 events on twelve stages the largest debate forum for digitalization and sustainability to date. After a successful crowdfunding campaign, the book "Was Bits und Bäume verbindet" ("What connects bits and trees") was published.

At the book launch, the organizers offered the opportunity to talk with selected authors on topics such as platform capitalism, software obsolescence or free software. In doing so, the "Bits & Bäume" conference is meant to live on and continues to offer a forum where technology and ecology experts can combine their perspectives on digitalization in order to shape the digital change socially and ecologically.

1st Forum "Bits & Bäume" – Artificial Intelligence for Sustainable Development

September 10, 2019
Einstein Center Digital Future

The "Forum Bits & Bäume" format, initiated by ECDF Professor Tilman Santarius, serves to network politics, applied science, and civil society from the tech and sustainability community and seek to develop proposals for action on how digitalization can be designed for the future.

The kick-off event entitled "Artificial Intelligence for Sustainable Development" took place on September 10 at the ECDF. Artificial intelligence (AI) is increasingly being discussed and raises many questions about economic, ethical, social and ecological expectations and implementation potential, which were addressed at the event. The participants discussed, among other things, how sustainable and energy-hungry AI is in view of large amounts of data processing and which ethical questions are connected with the use of AI. In addition to defining meaningful AI fields of action, a fishbowl discussion with Anna Christmann, Member of the Bundestag (Bündnis 90/Die Grünen), Stefan Ullrich of Weizenbaum Institute and Mattias Spielkamp from AlgorithmWatch ultimately discussed which political structures exist to ensure that AI applications serve the common good.

Round Table Talks "Practical Solutions for Implementing Data Portability"

September 11, 2019
Einstein Center Digital Future

What practical solutions regarding data portability exist, and how can they be implemented? In September 2019, participants dealt with this question at the round table initiated by the Data Protection Foundation on September 11, 2019 at the ECDF.

The focus of the discussion group was, among other things, on trust in dealing with online portals.
Prof. Dr. Timm Teubner, Professor for "Trust in Digital Services", actively took part in the expert discussions. "User data and its portability also play a crucial role when it comes to the subject of trust," Teubner says. His research group examines, among other things, the effect of online evaluations outside their place of origin ("cross-platform reputation portability").

2nd Amazon Academy on Innovation – "Innovation through Diversity"

September 26, 2019
Einstein Center Digital Future

After the kick-off event in October 2018 at the Einstein Center Digital Future, the location was also chosen for the second edition of the Amazon Academy on Innovation. The main topic of the conference, which was held jointly with University of Münster, was "Innovation through Diversity".

Diversity is a key economic, social and cultural issue of the 21st century. The majority of people identify diversity as one of the most important drivers of innovation. Consequently, the organizers discussed the challenges and opportunities of diversity in the face of digitalization with the approximately 80 participants. Together they discussed which steps, tools and infrastructures are necessary with regard to diversity in order to sustainably spark the existing creativity and innovation potential in Germany. Renowned representatives from science, politics and the media explored and discussed opportunities and challenges for Germany as location in an interdisciplinary exchange.

Pairing Research Talks Berlin Science Week

November 5, 2019
Einstein Center Digital Future

How can bots be used meaningfully in university teaching or in companies? Can artificial intelligence be sustainable? Four professors of the Einstein Center Digital Future dealt with these and many other questions at the Pairing Research Talks.

Elisabeth Mayweg, ECDF Professor for "Digital Knowledge Management in Higher Education" started with a short talk on the topic "Online Information Behavior – Challenges and Approaches in Education". Afterwards, Christian Meske, ECDF Professor for "Digital Transformation and Strategic Information Management", explained how the use of AI affects the workplace.

In the second part, Felix Biessmann, ECDF Professor for "Data Science", dealt with data quality and transparency for machine learning, while Tilman Santarius, ECDF Professor for "Socio-Ecological Transformation and Sustainable Digitalization", explained how consumption is changing in times of digital transformation.

The speakers then held a discussion with moderator Prof. Dr. Gesche Joost and the audience.

CLIMATHON BERLIN
OCTOBER 25 – 26, 2019

Dynamic urban flood flow management for cities: with this idea, the "Flowmetrics" team won the challenge of the Einstein Center Digital Future (ECDF) at the Climathon Berlin. More than 120 participants met on October 25-26, 2019, at Futurium to develop climate innovations for Berlin.

Andrea Cominola is a professor at the ECDF and hosted the challenge with the question of how Berlin's resistance to increasingly frequent extreme weather events can be strengthened. "We were really impressed what these guys did in less than 24 hours," he said.

Students, developers, entrepreneurs, scientists, programmers and citizens came together for the Climathon. Four different challenges were available; around 20 participants took part in the ECDF task. Here they met experts Felix Biessmann and Sangyoung Park from ECDF, Niklas Boers from Potsdam Institute for Climate Impact Research (PIK) and Jasminko Novak from European Institute for Participatory Media (EIPCM). After the formation of the teams, the intensive part began. Berliner Wasserbetriebe provided data to the participants for solving the problem. "It was great fun working with the teams on their ideas and questions. I went home at midnight. When I got back at 10 a.m., I saw great progress had been made. They really worked hard through the night," said Andrea Cominola. Odej Kao, spokesman for the ECDF, was very impressed by the atmosphere at the Climathon: "It was nice to see how much joy and passion everyone worked with and how our professors got involved in the important topic of climate change."

The following day, "Flowmetrics", "Floodcast", "Urban Resilience Scheme" and "Crowd Weather" presented their solutions to the jury. Regina Gnirss (Berliner Wasserbetriebe), Gerardo Anzaldúa (Ecologic Institute), Andrea Cominola and Sergio Lucia (both ECDF) were very surprised by the results. "We were so satisfied with all the solutions because they really fit the challenge," Regina Gnirss reported.

At the festival of ideas, the Climathon Berlin teams had the opportunity to present their ideas to the public on the big stage. Valentin Rudloff presented the winning team "Flowmetrics", which would like to support cities in connecting urban high flood risk areas with nearby areas that can withstand a lot of water during floods. Wherever possible, the water capacity of each area is quantified using a distributed network of sensors and satellite imagery. "We use inexpensive, mobile and reusable infrastructures for this. We also involve local citizens in this entire process in order to tackle flood management in cities together. This can help cities reduce floods, health risks and damage," he said, and encouraged the public: "In addition to clearing our streets of cars: let's clear our streets from flooding!" Valentin Rudloff worked through the night with Alexandre Leduc and Athanasia Nikolaou.

"The Flowmetrics idea inspired us to motivate citizens to take responsibility and be part of the solution – a whole new approach that we would like to discuss with the team," Regina Gnirss said. The jury therefore offered the winners two opportunities: a technical discussion with experts from Berliner Wasserbetriebe, so that feasibility

and follow-up can be assessed, and a meeting with experts from the Ecologic Institute. "Here we can look at the solution from different angles and see how feasible it is, not just from a technical point of view," Andrea Cominola explained.

The Climathon is a worldwide 24-hour climate hackathon. Climate-KIC GmbH and Urban Impact organized the event with several partners in Berlin.

FAB:UNIverse 2019

November 6, 2019
Einstein Center Digital Future

The FAB101 project hosted the Fab:UNIverse 2019 event at the Einstein Center Digital Future (ECDF) on November 6, 2019. Setting up and operating publicly accessible fab labs, (maker) spaces and similar laboratories in a university context is associated with numerous challenges. To this end, an increasing number of representatives of such places have been exchanging information at the annual Fab:UNIverse event since 2017.

In 2019, the organizers also offered opportunities for networking and discussion for university (Fab) labs and presented the results of the FAB101 research project in the form of a manual for academic maker-spaces, which then could be discussed with the approximately 80 participants.

World Frontiers Forum (WFF): Digital human identity

November 8 – 9, 2019
Factory Berlin

Personalities from culture, politics, science and industry from 23 countries came together at the World Frontiers Forum (WFF) on November 8th and 9th at Factory Berlin – including representatives of the ECDF. Prof. Dr. Odej Kao, Prof. Dr. Florian Tschorsch, Prof. Dr. Max von Grafenstein and Sophie Marquitan discussed the topic "Digital Human Identity" with the other participants.

In his keynote, Prof. Dr. Florian Tschorsch provided insights into his research area of anonymous Internet communication. At WFF, he investigated the question of what we can do to strengthen anonymous identities on the Internet. The Tor network is, in his opinion, the best existing solution to establish anonymity online. "As a computer scientist, I have a special, very limited view of digital identities. It was clear to me that the concept of identity can be viewed much more comprehensively and, for example, that self-understanding and cultural influences are also taken into account. In the two days of the WFF, however, I became very aware of the dimension again and the various contributions and discussions always challenged me to think beyond my discipline," he says.

University Startup Factory meets Industry

November 12, 2019
Einstein Center Digital Future

The event University Startup Factory meets Industry: EdTech/TalentTech on November 12, 2019 at the ECDF brought together innovative founders with established stakeholders from the education sector and industry. Together, the potential of digital innovations was explored and possible cooperation projects identified.

Whether clever tools and concepts for teaching design, training, know-how sharing and further education platforms or intelligent support for HR management – the start-ups presented will help to strengthen the skills of the 21st century and promote talent in the future. In order to do so, they are looking for partners.

The participants received an overview of the innovative products and business models of the HR and EdTech start-ups from Freie Universität Berlin, Technische Universität Berlin, and Humboldt-Universität zu Berlin. Afterwards, valuable contacts were made with potential partners for pilot projects.

F-LANE Demo Day 2019

November 21, 2019
Einstein Center Digital Future

On November 21, the Demo Day of F-LANE, the Vodafone Institute Accelerator for Female Empowerment, took place together with Impact Hub Berlin and the Social Entrepreneurship Academy at the Einstein Center Digital Future. The participants had the opportunity to meet representatives of modern technology ventures that make a difference for girls and women worldwide. The five selected finalists, who presented their contributions in short pitches, had previously participated in a six-week funding program in Berlin. Here they received targeted support from experienced experts to further develop their idea and their business model.

For the fourth time, the Vodafone Institute called on international female founders to apply for the F-LANE funding program with their business ideas. With around 280 start-ups from 62 countries, the interest in a place with the F-LANE accelerator was greater than ever. Start-ups and social ventures from India, Ghana, Nigeria, Great Britain, and Germany had prevailed this year.

10 Year Anniversary "Forschungsforum Öffentliche Sicherheit"

November 25, 2019
Einstein Center Digital Future

On November 25, 2019, the Forschungsforum Öffentliche Sicherheit celebrated its tenth anniversary at the ECDF. The objective of the Freie Universität Berlin based institution is to prepare and convey scientific knowledge in civil security research for the specialist public and politics.

The research forum has established itself as the central point of contact for security research in Germany for these groups: In the past ten years, well over 1,000 experts from politics, authorities and organizations with security tasks, science and business have taken part in the workshops organized by Forschungsforum Öffentliche Sicherheit. At the ECDF, the Forschungsforum Öffentliche Sicherheit in the Future Security Lab presents hands-on research. Realistic scenarios and practical solutions are discussed here.

Representatives from politics, science, and the public came to the festive event at the ECDF to celebrate "Gemeinsam in die Zukunft schauen" (Looking into the future together) – with hands-on security research, virtual reality, serious gaming, a mobile lab, simulations, a poster session, greetings, and lectures.

IGF 2019: Data Governance for Smarter City Mobility

November 25 – 29, 2019
Estrel Congress Center, Berlin

The United Nations Global Internet Governance Forum (IGF) was held in Germany for the first time in 2019. With the focus on "One World. One Net. One Vision", researchers and politicians from all over the world discussed the central legal, political, social and technical issues of the Internet. ECDF Professor Max von Grafenstein, together with the Alexander von Humboldt Institute for Internet and Society (HIIG), organized a workshop on "Data Governance for Smarter City Mobility", in which the following questions were discussed: How should data in Smart Cities be regulated to promote the creation and provision of effective, innovative and sustainable mobility and transport services to citizens, while respecting their right to data protection and privacy and other fundamental rights? How can data be (re)used so that various public and private intelligent mobility services, innovations and fair competition can be provided in this sector? How can the data be managed in a way that is consistent with the goals of sustainable development?

Book Launch "Digitaler Kapitalismus" (Digital Capitalism)

December 2, 2019
Einstein Center Digital Future

On December 2, 2019, ECDF Professor Philipp Staab presented his new book "Digitaler Kapitalismus" (Digital Capitalism), published by Suhrkamp Verlag, at the ECDF.

Philipp Staab examines digital capitalism from different perspectives in order to define it more precisely. He demonstrates how digital monitoring and valuation practices are increasingly penetrating ever more areas of the economy, exacerbating social inequality. What is specific to digital capitalism, according to Staab, is the formation of "proprietary markets": whereas in the past it was important to produce things and sell them at a profit, in the age of plenty, it's about ownership of the markets themselves.

Following the presentation, there was an interview with Prof. Dr. Manuela Bojadžijev and Prof. Dr. Heinz Bude. Bojadžijev is deputy director and deputy head of the department "Integration, social networks and cultural lifestyles" at Berlin Institute for Integration and Migration Research (BIM). Since 2015, she has been a professor for globalized cultures at Leuphana University Lüneburg and since 2018 vice director of the BIM. Bude has been a professor of macrosociology at University of Kassel since 2000.

World Café on Research in the Digital Age

December 10, 2019
Einstein Center Digital Future

On December 10th, as part of the Educational Experts Seminar 2019, ECDF Executive Board Member Prof. Johann-Christoph Freytag, PhD, welcomed 25 German and American executives from universities and university departments to the "World Café on Research in the Digital Age" at the ECDF.

The seminar was organized by Fulbright Germany in cooperation with the Stifterverband für die Deutsche Wissenschaft and the Hochschulforum Digitalisierung in Berlin with the support of the Impact Hub. The seminar is part of the official "Year of German-American Friendship". The participants exchanged views on the following questions and aspects in four table groups:

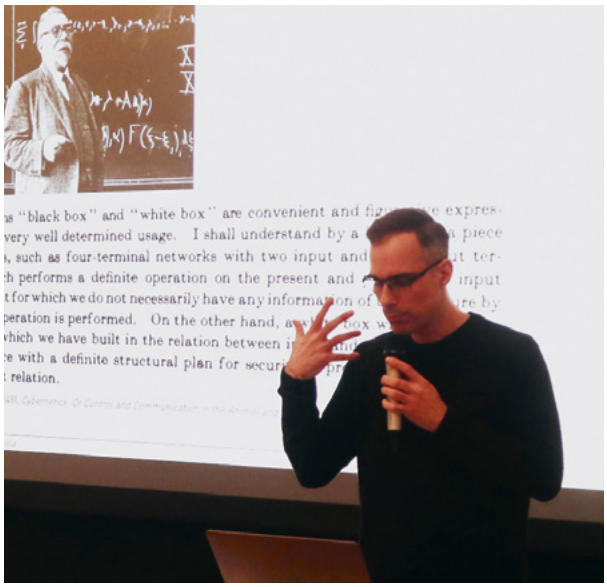
// Research Practices & Research Methodologies – What does research mean in the digital age?
// One's Practice is the Other's Theory – can we create a Common Language between Researchers & Computers Scientists?
// Research Infrastructures & Data Management – a Digital New World
// Access to Knowledge: Proper Resources at your Fingertips?

Trans / Feminist Hacking – Spaces, Communities, Practices

December 12 – 13, 2019
Einstein Center Digital Future

Trans/feminist hacking is a hybrid, nomadic and constantly changing practice, embodied by diverse communities. People living on different continents exchange ideas, concepts, positions and attitudes in order to enhance their knowledge with their local mindset and historical experience.

During the "Trans/Feminist Hacking – Spaces, Communities, Practices " symposium, which was initiated and organized by ECDF Professors Michelle Christensen and Florian Conradi, the participants' reflections, experiences and positions on trans/feminist hackspaces, communities and practices were discussed and explored in order to identify the opportunities and current challenges as well as patterns between groups and ultimately formulate common lines of thought. The participants took up the challenge of how these insights can be articulated and how they can be implemented through art and design, open source development, community building, science, and activism.



Lecture series: Applied Cybernetics

December 19, 2019
Einstein Center Digital Future

On December 19, 2019, Prof. Dr. Dr. Thomas Fischer gave a lecture at the ECDF on the topic "The concept of variety in theory and practice by W. Ross Ashby". He is a professor in the architecture and design department of Xi'an Jiaotong – Liverpool University Suzhou in China.

The event is part of the lecture series: "Applied Cybernetics – On the frictions concerning the mate[real] ization of cybernetics systems" and was organized by the Department of Media Studies at Humboldt-Universität zu Berlin and the Institute of History and Philosophy of Science, Technology, and Literature at Technische Universität Berlin.

The 30 participants then had a lively discussion about Ashby's development of the concept of variety in theory and practice, with special attention to a number of experimental devices developed by Ashby.

/ SCIENCE COMMUNICATION

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

SCIENCE COMMUNICATION

Digital transformation affects all areas of our lives. The goal of the ECDF is to involve all people in this digital change and to contribute to shaping a common vision for tomorrow's society. We want to involve people with different backgrounds in the discourse: about technologies, about the goals of digitalization and about questions that concern the basic principles of society today. Science Communication at the ECDF is therefore of great importance.

This knowledge transfer between research and society takes place via media reports, our newsletter, our website and on our social media channels as well as through events. We actively involve the various actors and stakeholders – researchers, partners, political and social institutions, citizens, business and the media – in this process.

An essential component of our communication efforts is the new website. After the previous website was no longer adequately able to meet the growing requirements of the ECDF, the re-launch took place at the beginning of 2019. Both our partners and interested citizens can find all the important information about the ECDF there and can get in touch with us. Whether detailed profiles of our professors and their research projects and collaborations, whether information for the media or the network of the ECDF – the website offers a comprehensive overview. In the "News" section, we publish new research projects and follow-up reports on events and cooperation online.

In the "Events" section, we provide information about current formats such as workshops, in which the public or a specialist audience can participate. Since spring 2019, we have been sending the ECDF newsletter with updates to our network on a regular basis. On our Twitter channel (currently more than 1,750 followers), we also provide information on current topics related to the ECDF on an almost daily basis.

Events are a central part of the ECDF. Whether it's workshops, conferences or hackathons, seminars, lectures or exhibitions – our location in the heart of Berlin and the attractive premises also made it possible for the ECDF to host a variety of exciting digitalization events in 2019. Around 3,000 people took part in more than 70 events in 2019.

As the number of ECDF professors increased, so did the number of events they organized. Our partners initiated various events. In addition, the ECDF itself develops formats that prove to be a successful vehicle for networking with our partners and the interested public. Events that have already been established, such as the ECDF Industry Forum (see pages 96 and 97) and the Pairing Research Talks, have been supplemented by new formats, such as the "Forum Bits & Bäume".

The internal section of our website is one of the instruments of communication among the members of the ECDF. There, important information is made available to them. The website also features a booking system for the use of the Co-Working area and event spaces.

Finaly, the monthly Brown Bag Meeting is the platform which provides the professors opportunities to socialize and exchange ideas.

/ COMMITTEES AND GOVERNANCE

/ EXECUTIVE BOARD / SCIENTIFIC ADVISORY BOARD / AMBASSADORS AND FELLOWS / INDUSTRY PARTNERS / MANAGEMENT OFFICE / PUBLIC-PRIVATE-PARTNERSHIP

EXECUTIVE BOARD

The ECDF Board is responsible for the strategic development and scientific orientation of the research areas, for the coordination and support of the cooperation activities, for the allocation of funds within the ECDF as well as for the scientific research program including decisions about changes to the overarching research agenda that involve the inclusion or removal of research topics.

The committee also decides on the admission of additional members such as Ambassadors, Fellows, Associated Members or Principal Investigators.

The Board also reviews and decides on the addition of new professorships and donors to ensure that additional research directions are in line with the overall vision of the ECDF.

Its members draw up the ECDF's statements on various topics such as open access, digitalization in education or guidelines on equal opportunities.

The Executive Board consists of a total of eleven Members and is composed as follows:

// The Speaker,
// Four Executive Board Members who hold a professorship at one of the participating institutions (TU Berlin, FU Berlin, HU Berlin, UdK Berlin, Charité) and are not financed by ECDF funds ("Area Speakers"),
// Four Board Members who hold ECDF professorships and are co-speakers in one of the areas.
// A Board Member who holds a professorship at one of the participating universities of applied sciences,
// A Board Member responsible for gender diversity delegated by the State Conference of Women's Representatives at Berlin Universities and University Hospitals (Landeskonferenz der Frauenbeauftragten der Berliner Hochschulen und Universitätsklinika des Landes Berlin, LaKoF),
// The Managing Director, who participates in all meetings in an advisory capacity.

The Executive Board usually meets monthly. Together with the international Scientific Advisory Board (SAB), the Executive Board Members implement the governance and quality assurance strategy and define KPIs and milestones in order to continuously review and control the center's vision and mission.

Members of the Executive Board

Prof. Dr. Odej Kao	Chairman, Speaker of the Einstein Center Digital Future	Professor for Complex and Distributed IT Systems, Technische Universität Berlin
Prof. Dr. Dr. Felix Balzer	Speaker, Innovation Area "Digital Health"	ECDF Professor for E-Health and Shared Decision Allocation
Prof. Dr. David Bermbach	Speaker, Core Area "Digital Infrastructure, Methods and Algorithms"	ECDF Professor for Mobile Cloud Computing
Prof. Johann-Christoph Freytag, Ph.D.	Speaker, Core Area "Digital Infrastructure, Methods and Algorithms"	Professor for Databases and Information Systems, Humboldt-Universität zu Berlin
Prof. Dr. Daniel Hromada	Speaker, Innovation Area "Digital Society"	ECDF Professor for Digital Education
Prof. Dr. Gesche Joost	Speaker, Innovation Area "Digital Society"	Professor for Design Research, Berlin University of the Arts
Dr. Christine Kurmeyer	Representative delegated by the State Conference of Women's Representatives at Berlin Universities and University Hospitals (LaKoF)	Representativ of the Federal states assembly of Representatives for Gender Equality in Higher Education (LAKOF)
Prof. Dr. Alexander Löser	Representative of the participating Universities of Applied Sciences	Professor for Database Systems and Text-based Information Systems, Beuth University of Applied Sciences Berlin
Prof. Dr. Christian Meske	Speaker, Innovation Area "Digital Industry and Services"	ECDF Professor for Digital Transformation and Strategic Information Management
Prof. Dr. Axel Radlach Pries, MD	Speaker, Innovation Area "Digital Health"	Professor for Physiology and Dean / Member of the Executive Board, Charité – Universitätsmedizin Berlin
Prof. Dr. Jochen Schiller	Speaker Innovation Area "Digital Industry and Services"	Professor for Computer Systems and Telematics, Freie Universität Berlin

SCIENTIFIC ADVISORY BOARD

The Members of the Scientific Advisory Board (SAB) are internationally renowned experts who work in the field of digitalization with a focus on one or more ECDF research areas. As of October 2018, the SAB consists of eight members, that meet at least once a year to review the progress, advise the ECDF on its future development and comment on the professional and scientific development of ECDF Professors. Moreover, the Members of the SAB help to promote cooperation with other research institutions and organizations and to shape the formulation of medium and long-term objectives with respect 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	Deputy Chair of the Scientific Advisory Board, Saarland University, Institute for 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. Joel Dudley, PhD	Icahn School of Medicine at Mount Sinai, Institute for Next Generation Healthcare, USA
Prof. Dr. Juliane Fluck	University of Bonn, ZB MED, Germany
Prof. Dr. Hans Hansson	Mälardalen University, Director of Mälardalen Real-Time Research Center, Sweden
Prof. Dr. Iwona Miliszewska	University of Technology Sydney, Head of School, Information, Systems and Modelling, Australia

MANAGEMENT OFFICE

The Management Office coordinates the cross-center activities and supports the Executive Board in the implementation of measures for management, promoting young talent, equal opportunities and open acces. It is responsible for internal and external communication processes as well as press and public relations and coordinates the various interdisciplinary formats and events with politics, industry, and society. The Management Office is also responsible for administrative matters such as the financial and contract management of the ECDF, and thus for structural cooperation between the participating universities and research institutions.

The Management Office staff consists of:

// Managing Director: Amaya Steinhilber
// Public Relations and Development: Simone Harr
// Events and Cooperation: Tim Kawalun
// Interdisciplinarity and Open Labs: Friedrich Schmidgall
// Doctoral Program and Teaching: Nina Reinecke (since July 2019, before that Nadja Wisniewski)
// Finances: Anja Hertel
// Secretariat: Ursula Menzel
// Student Assistant: Romina Artero

The Management Office is a key element in ECDF's operational and strategic development. It is not only the administrative backbone, but also provides the necessary organizational support to create the unique environment of the ECDF. The team combines a wide range of expertise and acts flexibly to meet the needs of the various players. Finally, it acts as a central communication element and bundles all knowledge sources.

The structure of the office reflects the concept of the ECDF as a dynamic scientific institution capable to evolve. For all tasks not covered by the office – such as legal issues, building management, appointment procedures and contract management – the office cooperates closely with the participating universities and receives comprehensive support from the respective departments of TU Berlin as the host university as well as from the other participating universities.

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.

More than 20 companies are involved in the initiative. Over the course of the project, the companies will be investing more than twelve million euros for the purpose of funding the professorships. 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 Wohnungsbaugesellschaft mbH, Roche Pharma, Santander Consumer Bank AG, Siemens AG, Viessmann Werke GmbH & CO KG, and Zalando SE.

The state of Berlin adds 50 Cents per Euro raised from privately financed companies – the so-called "Matching Funds".

In addition, the Federal Ministry of Labor and Social Affairs (Bundesministerium für Arbeit und Soziales, BMAS) and the Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) each finance one professorship.

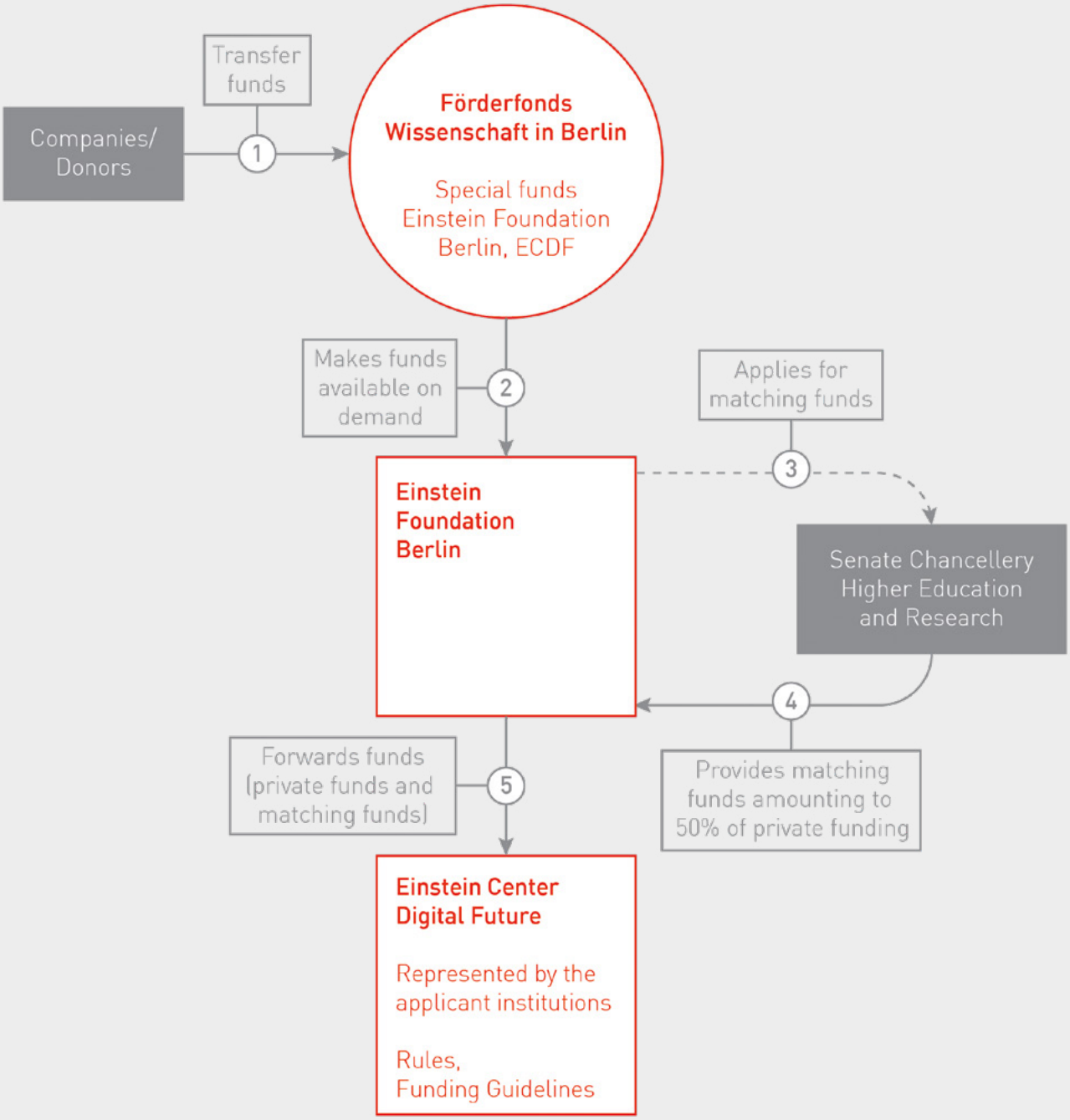
Additional associated partners are the Berlin Institute of Health (BIH), the German Research Center for Artificial Intelligence (DFKI), Fraunhofer FOKUS, Fraunhofer Heinrich Hertz Institute (HHI), Fraunhofer Institute for Reliability and Microintegration (IZM), the German Aerospace Center Berlin (DLR) and the Physikalisch-Technische Bundesanstalt – Institut Berlin (PTB).

Funding is funneled by the Einstein Foundation Berlin. It receives the corporate donations via the Stifterverband and applies for the matching funds at the State of Berlin. As a 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.

The total amount of public and private funds available in the 2019 financial year was 3,270,551.35 Euros.

Private endowment funds in 2019 totaled 1,513,968.01 Euros. Public donations amounted to 1,756,583.34 Euros, including matching funds of 77,583.34 Euros.

PUBLIC-PRIVATE-PARTNERSHIP

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