EINSTEIN CENTER DIGITAL FUTURE — ANNUAL REPORT 2020

EINSTEIN CENTER
Digital Future

ANNUAL REPORT 2020

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/ DIGITAL FUTURE BEGINS

FOREWORD

ECDF/PR/Christian Kielmann

Dear readers,

The Einstein Center Digital Future (ECDF) launched in 2020 with exciting ideas, major interdisciplinary projects, and a lot of tailwind. ECDF scientists had been invited to numerous international conferences in the US, the UK, India, and the Czech Republic. We had major events planned such as the Long Night of the Sciences and Girls Day with the Minister of State for Digitalization Dorothee Bär. Kick-off events for externally funded projects had been organized and were intended to launch the scientists' research work. But as with all people and institutions around the world, the coronavirus pandemic has presented us with major challenges.

The ECDF quickly adapted to the new circumstances and demonstrated the potential that the research center has, even in such a difficult situation. In addition to developing online formats, the key question for the center was: What can scientists and researchers at the ECDF contribute to Covid-19 research and the public conversation? Sociologists, medical researchers, design researchers, and economists have explored topics such as the changing world of work (working from home), developments in economic performance and consumer behavior, and social change in their research projects, publications, and articles. The pandemic had a significant effect on the progress of digitalization. The demand for the expertise of ECDF scientists during the pandemic was – and is – reflected in the many TV programs, radio interviews, and newspaper and online articles.

A number of virtual ECDF events looked at the coronavirus and its implications, including the #AI4care Datathon, which focused on issues such as Covid-related challenges in elderly care. The ECDF Industry Forum explored the changing world of work in times of digital transformation and social distancing.

2020 also showed how important the ECDF is as a professional springboard for young scientists: In the fall, professors Daniel Fürstenau, Sergio Lucia, and Setareh Maghsudi embarked on the next step in their careers and accepted appointments at prestigious universities. At the same time, two additional professorships were filled, and we initiated the vital selection process for the continuation of ten ECDF Professorships.

In this annual report, we take you on the ECDF's journey through 2020. We report on research projects, people, international collaborations, events and initiatives, and show how we can shape the (digital) future.

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

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EINSTEIN CENTER DIGITAL FUTURE

//ABOUT US

The Einstein Center Digital Future (ECDF) is a significant and successful milestone in digitalization research for Berlin's universities and the university hospital Charité – Universitätsmedizin Berlin. Since the center opened on 3 April 2017, leading scientists have been conducting research in the core area of Digital Infrastructures, Methods and Algorithms, as well as in the innovation areas of Digital Health, Digital Society and Digital Industry and Services. Berlin universities have been able to position themselves at the forefront of digitalization research in Germany thanks to the ECDF and other successful initiatives in our network, such as the Weizenbaum Institute for the Networked Society – the German Internet Institute, as well as the BIFOLD – Berlin Institute for the Foundations of Learning and Data.

The ECDF is a project based on a large public-private partnership (PPP) with partners from industry, academia, and politics. The center is hosted by Technische Universität Berlin (TU Berlin) and the participating institutions are Charité-Universitätsmedizin, Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin University of the Arts. Numerous respected non-university research institutions (BIH, DLR, FOKUS, HHI, IZM, MDC, PTB, ZIB) are also involved in the center, along with the Beuth University of Applied Sciences, HTW Berlin – University of Applied Sciences, the Federal Ministry of Education and Research, and the Federal Ministry of Labor and Social Affairs. More than 30 companies are participating in the initiative.

The center is planned to run for six years and was approved by the Einstein Foundation Berlin (ESB) in September 2016. The ECDF has received funding of over 38.5 million Euros. Funds are provided by private industry (approx. 1/3), the participating non-university research institutions (approx. 1/5), and the state of Berlin.

More than 40 additional ECDF Professors have now taken up their posts at Berlin's universities and Charité – Universitätsmedizin. Since it was launched, the ECDF has been as an important driver for digitalization research in Berlin. The professorships are designed to be interdisciplinary and involve research at the intersection of different fields. The ECDF is a cross-university hub for research and support for digital structures in science, industry, and civil society. Instead of new individual initiatives, the ECDF links digitalization research in Berlin, trials new forms of collaboration, and focuses on innovative interdisciplinary cutting edge research and highly trained young scientific talent. The professors strengthen digitalization research in Berlin and make an important contribution to innovative topics such as blockchain technologies, mobile cloud computing, cryptocurrencies, data and open science, as well as online platforms.

For the Einstein Foundation Berlin and the Senate Chancellery – Higher Education and Research, it is particularly important to establish the ECDF in Berlin as a city of science. With this in mind, the Senate Chancellery announced ten tenured ECDF Professorships early on in the project. The selection process for these positions was launched in 2020. Selection takes place over two rounds due to the wide range of appointment dates. The first round was aimed at all ECDF Professors having taken up their positions before winter semester 2018/19. In this round, five professors were selected. More than 30 top-class international scientists had prepared comparative expert opinions for the candidates. The final ranking is calculated based on the assessments of the international reviewers, the members of the Scientific Advisory Board, and the Executive Board. The second selection round is scheduled for 2021.

The ECDF also plans to apply to the ESB for follow-up financing for a maximum of five years. Such funding can be applied for by Einstein centers financed by a public-private partnership, when they meet certain conditions, as well as by centers financed exclusively through public funds.

2020

DOSSIER: COVID-19

How is the coronavirus pandemic changing our working world? What impact does it have on our society? Professors at the ECDF have been addressing these and other questions since the beginning of the pandemic. As an interdisciplinary center for digitalization research, we want to research the pandemic and its effects. In the following dossier, we offer a selection of projects, initiatives, and events. We also present highlights from coverage on TV, radio, the internet, and print media, where ECDF scientists contributed as experts.

SELECTED RESEARCH PROJECTS

The pandemic is affecting all kinds of people's lives and workplaces around the world. Researchers at the ECDF have explored the effect of wearing a mask on physical distancing, how water consumption has changed during lockdowns, and how students use online information about Covid-19. In this section, we present selected research projects.

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VISIONS OF THE POST-COVID SOCIETY

Research project
Prof. Dr. Philipp Staab, Prof. Dr. Felix Biessmann, Dr. Pola Lehmann

The project examines whether new sources of political legitimacy emerged in the wake of the Covid-19 crisis as a result of heavy political interference in public life and the economy. The researchers use machine-learning algorithms to map the evolution of political discourse on social media platforms before, during, and after the crisis in order to identify new or changed demands articulated by citizens on these platforms. The findings can inform academic and public debates about the transformative potential of the current crisis and inform policymakers about evolving sources of democratic legitimacy.

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IMPACT OF THE PANDEMIC ON THE USE OF SMART HOME DEVICES

Survey
Prof. Dr. Rita Streblow

Nowadays, almost every household uses smart home devices. In a smart home, several devices are linked together in a sophisticated network. These can include lights, speakers, heating, and TVs. This allows users to remotely control their living environment; it can also automatically adjust to the needs of the users.

ECDF Professor Rita Streblow worked with a group of students from TU Berlin in the summer semester 2020 to look at issues such as the impact of the coronavirus pandemic has had on the attitude of users towards smart home devices. In the lecture „Smart Home", they examined the use of and attitudes toward networked devices in the smart home. The students also developed and conducted an online user survey. The aim was to learn more about the use and proliferation of smart home devices. There were 33 questions in the survey. These included questions on the demographic data of the participants and a number of closed questions on aspects of the smart home. As well as asking about expectations of smart devices and their use, the students also included questions on the importance of indoor comfort in terms of thermal, acoustic, visual, and olfactory considerations.

A total of 117 people from all over Germany took part in the survey. 81.2% of the participants were aged between 18 and 34, with the majority of respondents living in rented accommodation, with their parents, or in a shared apartment.

93.1% of respondents saw the achievement of climate change goals as important, and 65.5% considered digitalization to be necessary for this. 53.4% of respondents said that they did not yet have a smart home device in their household. The greatest barriers to the use of smart home devices were cost, a lack of trust in providers with regard to data protection, and too little added value or no need. The level of information about smart devices and their application was rated as average. 22.4% of respondents were not prepared to invest in smart home devices at all. The willingness to pay for operating costs was even lower. 29.9% said that they should not cost anything to run and 47% were prepared to spend up to a maximum of €20. The greatest added value of smart home devices was seen as greater living comfort and more entertainment options. In terms of indoor comfort, air quality was rated the most important aspect followed by indoor temperature. Improved emergency response systems for the aging population were also seen as relevant.

For 61.2% of the respondents, the pandemic has led to an increased use of digital media. The majority of respondents, however, did not look further into smart home devices as a result. 11.2% of respondents wanted to be more self-sufficient in their energy use during the pandemic.

Based on these findings, the students concluded that the technical solutions opened up many possibilities and that this was a period of change. However, communicating the applications in a clear and understandable way and keeping users on board was a major challenge.

"In the lecture, we looked at different aspects of smart homes and put buzzwords like Internet of Things and Machine Learning into context. The survey helped us reflect on technical considerations and question the different benefits of the various applications and how best to involve the users. The students also received inspiration in the form of a guest lecture from industry, which looked at user-centered design through personas and user stories," says Rita Streblow.

"We looked at different aspects of smart homes and put buzzwords like Internet of Things and Machine Learning into context. The survey helped us reflect on technical considerations and question the different benefits of the various applications and how best to involve the users." STREBLOW

“YOU ARE NOT ALONE” – THE OPPORTUNITIES AND CHALLENGES OF COLLABORATIVE ENGAGEMENT WHEN DEALING WITH ONLINE INFORMATION ABOUT COVID-19

Adobe Stock/Olezz

Experiment and analysis
Prof. Dr. Elisabeth Mayweg,
Dr. Maria Zimmermann, and Claudia Lefke

The coronavirus pandemic has seen many universities switch to online teaching. Alongside the changes which directly affect teaching and learning, students must deal with what is inherently a very challenging situation: They need to digest a large amount of online information about the pandemic in order to stay as informed as possible. And they also have to contend with online information that can lead to confusion, emotionalization or misinformation.

The research project „You are not alone – Opportunities and challenges of collaborative engagement among university students when dealing with online information about Covid-19” was conducted by ECDF Professor Elisabeth Mayweg, Dr. Maria Zimmermann, and Claudia Lefke. It was based on psychological approaches to online collaboration and investigated whether collaboration with peers can reduce emotional stress and aid critical engagement with evidence when dealing with conflicting information about Covid-19. In an online experiment, university students were presented with contradictory texts about the Covid-19 test that contained up-to-date scientific information. They were asked to reflect on how they handled conflicting information and emotions either individually or collaboratively via online chat. The experiment was conducted in April 2020 at the beginning of the lockdown in Germany.

Preliminary findings from the analysis of the data suggest that an effective way to cope emotionally as well as cognitively with conflicting information might be to process it with others (rather than alone). Deeper analysis will show which specific strategies the students used in dealing with Covid-19 information. “Based on these results, we will draw conclusions about what to consider in the future to help students deal with conflicting and emotionally stressful information in digital environments,” the researchers reported. The experiment will be published in a scientific journal in due course.

THE EFFECT OF WEARING FACE MASKS ON COMPLIANCE WITH PHYSICAL DISTANCING IN THE COVID-19 PANDEMIC

Adobe Stock/Drazen

Randomized field study
Prof. Dr. Anastasia Danilov

The coronavirus pandemic has had a significant impact on everyday life. The idea for this research project arose from the current pandemic and the public debate on the use of face coverings. Working with a team of co-authors, ECDF Professor Anastasia Danilov investigated the effect of wearing face masks on maintaining physical distancing between individuals in public spaces.

In the first quarter of 2020, there was a debate around whether masks helped people comply with rules or, conversely, discouraged compliance by making people feel safer. In a randomized field study, the research team investigated the distance between the (unsuspecting) subjects and the people with and without masks in a line in front of stores. The results of the study show that individuals keep a significantly greater distance from people wearing a face mask than from an unmasked person. In an additional survey experiment (N=456), it was found that masked persons are not perceived as more contagious or ill. Instead, they are perceived by the other individuals as wanting to maintain a greater distance from other people.

This result suggests that in situations where wearing a face mask is voluntary, the mask serves as a social signal of preferred greater distance. This preference is respected by other individuals.

These results provide strong evidence against the claim that wearing a mask creates a false sense of security that would negatively affect physical distancing. The study results have contributed to the debate on effective infection control measures and compliance with social distancing rules.

The project is now complete. The paper has been in the second round of peer review in the Journal of the Economic Science Association since the summer: Seres, G., Balleyer, A., Cerutti, N., Danilov, A., Friedrichsen, J., Süer, M. (2020) , CRC TR 190 Discussion Paper no. 253. The discussion paper has been cited seven times, including by publications in high-profile journals such as Proceedings of the National Academy of Science (e.g., Howard et al. 2021).

COVID-19: IMPACTS ON WATER AND ELECTRICITY CONSUMPTION

Adobe Stock/Igor

Study
Prof. Dr. Andrea Cominola, Mario Roidt, Christopher M. Chini, and Ashlynn S. Stillwell

When Covid-19 reached Europe in the spring of 2020, it had a massive impact on our daily lives. Nearly all European countries implemented quarantine and lockdown-like measures to contain the spread of the pandemic. These measures also had an impact on the European economy and its electricity consumption. In a recent study, ECDF Professor Andrea Cominola and fellow researchers Mario Roidt, Christopher M. Chini, and Ashlynn S. Stillwell examined the short-term changes in the European water footprint of thermal electricity and the associated impacts on virtual water trade during the pandemic. The results of the study were recently published.

"The main objective of our research collaboration was to gain a better understanding of the sensitivity of the electricity-water nexus in the European power grid to large-scale behavioral changes compared, for example, with technological improvements and the introduction of different energy mixes," says Andrea Cominola. The researchers first examined whether Europe as a whole showed changes in its electricity generation after the introduction of quarantine and lockdown-like measures. They calculated the time series of daily electricity consumption from 1 January 2020 to 19 April 2020 and analyzed its deviation from the average values observed in the same period between 2016 and 2019. They then calculated the consumptive water footprint of thermal power plant operations in Europe and its changes during the lockdown measures introduced due to Covid-19.

The associated virtual water trade was then completed using electricity trading data published via the European Network of Transmission System Operators for Electricity (ENTSO-E) transparency platform. ENTSO-E publishes various electricity data sets with hourly or sub-hourly time resolutions for all European countries at national level. This study used the last five years of data sets on consumption and generation aggregated by type and physical flows in 25 European countries, in particular the five countries with the highest absolute number of Covid-19 cases on 15 March 2020, namely Italy, Spain, France, Germany, and Switzerland.

As a result, the researchers found that the consumptive water footprint of thermal power plant operations in Europe during the Covid-19 lockdowns decreased compared to the average of the last four years. Reduced electricity demand accounts for 16% (0.29×106m^3/day) of the decrease, while the remainder is attributable to changes in the electricity generation mix toward less water-intensive technologies, mostly renewables. Virtual water transfer associated with electricity was also affected: Italy, a Covid-19 hotspot, reduced its water footprint by 8.4% and its virtual water imports by 70,700 m^3/day. Germany and France slightly reduced their domestic water footprint of electricity but increased their virtual water imports.

"These findings improve our understanding of the dynamics in the electricity-water nexus in Europe. This can support the design of future adaptive planning and management strategies aimed at ensuring the resilience of critical European networks and infrastructure systems," Andrea Cominola concludes.

„The main goal of our research collaboration was to gain a better understanding of the sensitivity of the electricity-water nexus in the European power grid to large-scale behavioral changes, for example, compared to technological improvements and the introduction of different energy mixes." COMINOLA

The study has been published in Environmental Science & Technology Letters and is freely available.

Mock Drop/TU Berlin

WEB APP CALCULATES THE POTENTIAL RISK OF INFECTION VIA AEROSOL PARTICLES

Web app
Prof. Dr. Martin Kriegel, Prof. Dr. David Bermbach

Aerosols laden with SARS-CoV-2 are thought to be a major contributor to the spread of the coronavirus pandemic. The German Federal Ministry of Health underlined that ventilation was an effective preventive measure when it extended its guidelines, encapsulated in the acronym AHA (which in German stands for distancing, hygiene and face coverings), to become AHA+L. The additional L stands for ventilation (Lüften). Prof. Dr. Martin Kriegel, head of the Hermann Rietschel Institute at TU Berlin (HRI), has now developed a calculation model with the support of the Robert Koch Institute, the Charité – Universitätsmedizin Berlin and a Berlin health authority.

The model, which was devised in cooperation with ECDF Professor David Bermbach, makes it possible to predict a potential risk of infection via aerosols indoors. Ventilation measures, the number of contacts, and the duration of time spent in an indoor space can be evaluated and adjusted with regard to their preventive potential.

It is not yet known how many reproducible viruses are on aerosol particles and how many of them need to be inhaled to actually trigger Covid-19. These data are difficult to determine and have still not been fully researched for other infectious diseases, such as influenza (flu). There is still some uncertainty from a medical point of view regarding the risk of infection with SARS-CoV-2 via aerosol particles. However, during a pandemic, it is critical to contain the spread of the virus and find effective preventive measures.

"Our model provided four key insights: Firstly, the risk of infection can be reduced very effectively by increasing access to virus-free air. Secondly, the length of time an infected person spends with healthy individuals has a critical impact on the likelihood of contracting Covid-19. This is true even with good ventilation or filtered air," says Martin Kriegel. "Thirdly, limiting the number of contacts is very useful for pandemic containment. And fourthly, all three of the above measures can minimize the rate of infection via aerosol particles."

In order to make the new model accessible to the public, the HRI developed a website in collaboration with Prof. Dr. David Bermbach from the Department of Mobile Cloud Computing at TU Berlin and the ECDF. Interested parties can use the site to make a simplified assessment of the risk of infection via aerosol particles in a specific situation by entering easily accessible data such as room size, number and activity of people, and quality of ventilation.

ECDF/PR/Friedrich Schmidgall

ECDF PRODUCES PARTS FOR CORONAVIRUS PROTECTIVE EQUIPMENT

Desktop manufacturing
Micro Factory

Many people had their first experience with face coverings during the coronavirus pandemic. For hospital and nursing staff, on the other hand, these have long been part of their everyday work. In the treatment of Covid-19 patients in particular, FFP3 masks are also used, which must fit securely and air-tight and are often worn for many hours at a time. But one thing is the same for everyone: After a while, the pressure from the thin elastic bands behind the ears leads to irritation and can leave painful pressure marks.

However, a small aid can make them significantly more comfortable to wear: You can place an extension of the elastic bands round the back of the head and relieve pressure on your ears, preventing them from bending and causing irritation or pressure. Since the mask extensions are easy to produce, many people are making them at home and supporting doctors and nurses with their own designs that can be 3D-printed.

In cooperation with Rebecca Tschorsch, a specialist in anesthesiology at Charité – Universitätsmedizin Berlin, the ECDF Micro Factory is supporting the project with its existing infrastructure and expertise. Building on the work of Lam Wai Mars and Suraky, who have made their 3D printable templates freely available, Friedrich Schmidgall, head of the ECDF Micro Factory, has developed his own model for mask extensions. "After receiving feedback from clinical users at Charité, I made minor adjustments. The key advancement is that our model can be produced with a laser cutter," he explains.

Producing the mask extensions with a laser cutter is much quicker than with a 3D printer. Another advantage is that you can process thin, tear- and break-resistant material (e.g. polypropylene) using a laser cutter. "This makes the mask extensions lightweight, flexible and robust," says Friedrich Schmidgall.

You can download plans for producing the mask extensions with a laser cutter from the ECDF website. These mask extensions can also be made without a laser cutter, e.g. from old plastic folders or other flexible material.

EVENTS

Coronavirus and Covid-19 were also addressed in various ECDF online events. At hackathons, symposia and conferences, participants looked at the impact of the pandemic on carers and the healthcare system, the world of work and the African maker community, among others. In this section, we present a selection of these events.

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Online Datathon #AI4Care

The coronavirus has shown how vulnerable our health-care systems are to crises. This is where the care sector can play an enormous role. The aim of the online Datathon #AI4Care on 31 July 2020 was to develop ideas to make health systems more resilient and to overcome the care crisis using AI. ECDF Professors Daniel Fürstenau (Digital Transformation and IT Infrastructures, Freie Universität Berlin until 09/20) and Felix Biessmann (Data Science, Beuth University) took part in the datathon alongside various partners including Hacking Health, N3XTCODER, Vision Health Pioneers and industry experts such as mit-pflege-leben and Insitu. The competition winners were able to develop their project with the support of N3XTCODER and Vision Health Pioneers. The datathon was aimed at project teams and individuals, including data scientists, care and health experts, patients, hackers, developers, designers, digital marketers, and changemakers working at the intersection of AI and care.

Florian Conradi

AFRICAN MAKERS AGAINST COVID-19

29 May 2020
Online

How have makers in West Africa responded to the coronavirus pandemic? More than 40 people – including makers, open science activists, students, and researchers from West and East Africa – met in May 2020 for the digital roundtable on African Makers Against Covid-19 – Exploring Open Source Responses to a Global Crisis. The online event brought together stakeholders to discuss methods, inventions, potential solutions and current challenges.

The event was initiated by ECDF Professors Michelle Christensen and Florian Conradi (Open Science, TU Berlin) in cooperation with Africa Open Science & Hardware (Gameli Adzaho), the Weizenbaum Institute and in dialogue with GIZ representatives in Togo and Ghana.

"We need an overarching coordinated response to the coronavirus pandemic which involves all actors, with important contributions from makers and grassroots movements in civil society," says Michelle Christensen. Given the financial and infrastructural constraints and challenges, the role of bottom-up solutions to this crisis was more important than ever. "Maker spaces around the world are using do-it-together approaches to develop personal protection and medical equipment," reports Florian Conradi. Sewing machines, 3D printers, and other tools are used to design and manufacture things like face coverings and shields, touchless hand-washing stations, thermometers, and fans. The roundtable was attended by representatives from the IoT Network Hub in Ghana, SeeSD in Senegal, EcoTec-Lab in Togo, Vilsquare Makers' Hub in Nigeria, Kumasi Hive in Ghana, and Mboalab in Cameroon. "We are seeing lots of potential in the open source and do-it-together movements, especially during the pandemic. People are acting locally at the same time as being part of a global open knowledge network," says Michelle Christensen

ECDF/PR/Felix Noak

„We are seeing lots of potential in the open source and do-it-together movements, especially during the pandemic.", CHRISTENSEN

(VIRTUAL) ECDF INDUSTRY FORUM #5

8 June 2020
Online

How far have companies come in transitioning to digital processes? What additional challenges do we face in our day-to-day work as a result of the pandemic? These issues were the focus of the first online edition of the ECDF Industry Forum. "You won't believe us, but we have been planning the topic of today's Industry Forum for over a year now." With these words, Prof. Dr. Odej Kao, ECDF Speaker, welcomed the 35 participants to the fifth edition of the forum. However, the fact that the forum took place online for the first time due to the coronavirus pandemic was of course not planned from the outset.

The short talks were opened by ECDF Professors Christian Meske and Philipp Staab, who spoke about the "Advantages and disadvantages of changing approaches to work and online networking". "Crises – especially economic crises – can drive digitalization. From the mid-1990s to 2000, there was a huge amount of investment in this field and in the commercial internet, for example, through infrastructure expansion in the form of submarine cables," said Staab. How relevant this digital infrastructure is to our systems is now becoming apparent as it allows for a certain amount of autonomy in the way we work. However, this has its limits when it comes to networking. "Informal aspects of the job, such as bumping into a colleague in the kitchen, are no longer possible," Staab said. Christian Meske also spoke on the topic of autonomy: "The more autonomous people feel in their working environment, the better they perform." However, without this sense of a connection with colleagues and line managers, the increasing ability to shape your working practices when working from home can also lead to isolation in the long run. Communication and collaboration technologies such as enterprise social networks (ESNs) can play a key role here. These allow staff to simplify onboarding processes, cut out red tape and keep up interactions across hierarchies and departments.

The short talks were followed by two field reports from the business world. Sven Haedecke (Cornelsen Verlag) provided some "Insights into the digitalization of schools and learning at home". He stressed that current constraints on social life have led to major challenges, especially in education, due to the short-term need to switch to learning at home. "We've seen how important school is as a social environment," said Haedecke. At Cornelsen, on the other hand, the move online has gone well. "We have made information and materials available on our website quickly and largely free of charge. These include eBooks, interactive exercises, worksheets and learning aids. We have had high visitor numbers and great interest," says Haedecke.

Thomas Hugendubel (Roche Pharma AG) spoke next on the topic of „Working during the Corona Pandemic: Lots to do. No one in the office." He reported from the perspective of a pharmaceutical company that, in addition to switching to online processes, also

„The more autonomous people feel in their working environment, the better they perform." MESKE
"Informal aspects of the job, such as bumping into a colleague in the kitchen, are no longer possible." STAAB

had to perform difficult tasks due to its involvement in the containment of SARS-CoV-2. "Our colleagues have been developing tests at record speed to detect SARS-CoV-2 infection or the presence of antibodies. That meant, of course, that there was a lot to do," says Hugendubel. But in spite of this, the shift to working from home went surprisingly well. "This has worked well for us as the quality of work has remained high," said Hugendubel.

After these insights from a business perspective, ECDF Professor Daniel Fürstenau and master's student Barbaros Erönü presented their current research project "Digital Agility". They are examining the correlation between how mature a company's technological resources are, its digital agility and internal agility factors.

It was clear from the level of participation and the open exchange of views following the short talks that the ECDF Industry Forum works well online – "even though, of course, we hope to welcome you back to the ECDF in person as soon as possible," as moderator Tim Kawalun stressed at the end of the event.

twitter.com/AnneWillTalk

CLAUDIA SPIES
15.03.2020 // ARD

"ANNE WILL: THE CORONA-VIRUS CRISIS: HOW DRASTIC DO THE MEASURES NEED TO BE?"

www.zenith.me/de

AYAD AL-ANI
25.03.2020 // ZENITH MAGAZIN

"CORONAVIRUS, SURVEIL-LANCE AND THE GLOBAL SOUTH: TRUST IS BETTER"

www.klimareporter.de

TILMAN SANTARIUS
29.03.2020 // KLIMAREPORTER

"A GIANT LEAP TOWARDS DIGITAL"

www.spiegel.de

PHILIPP STAAB
30.03.2020 // SPIEGEL

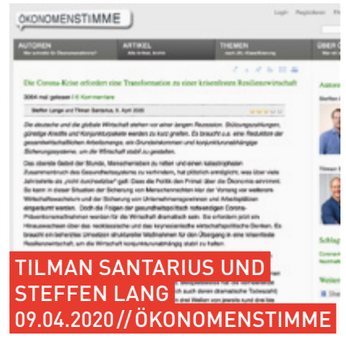
"CORONA CRISIS: 'WE CAME OUT AS KANTIANS: EVERY LIFE COUNTS'"

www.spiegel.de

PHILIPP STAAB
02.04.2020 // SPIEGEL ONLINE

"SOCIOLOGISTS ON THE TIME OF CORONA: PEOPLE WILL BE GLAD WHEN THEY ARE ALLOWED BACK IN THE OFFICE"

www.oekonomenstimme.org



TILMAN SANTARIUS UND STEFFEN LANG
09.04.2020 // ÖKONOMENSTIMME

"CORONA CRISIS REQUIRES TRANSFORMATION TO A CRISIS-RESILIENT ECONOMY"

www.tagesspiegel.de

DANIEL FÜRSTENAU
31.03.2020 // TAGESSPIEGEL

"HOW THE PANDEMIC IS DRIVING DECENTRALIZED WORK"

twitter.com/Ayad_Al_Ani

AYAD AL-ANI
01.04.2020 // RADIOEINS RBB

"SOCIAL CHANGE THROUGH CORONAVIRUS"

www.zeit.de

TILMAN SANTARIUS UND STEFFEN LANG
02.04.2020 // ZEIT ONLINE

"CORONAVIRUS EPIDEMIC: LESS WORK, LESS CONSUMPTION"

twitter.com/Ayad_Al_Ani

AYAD AL-ANI
08.04.2020 // RADIOEINS RBB

"CORONA: THE SITUATION IN AUSTRIA"

www.franceculture.fr

FELIX BALZER
09.04.2020 // FRANCE CULTURE

"COVID-19: IN FRANCE, ITALY, SPAIN AND GERMANY: HOW DOCTORS ARE FIGHTING THE DISEASE

www.zdf.de

AYAD AL-ANI
04.05.2020 // ZDF VOLLE KANNE

„CORONA APPS: SOLUTION OR DATA NIGHTMARE"

MEDIA COVERAGE

Scientists have become more present in the media during the pandemic – be it in talk shows, newspaper interviews, or radio features. According to a survey by the Allensbach Institute for Public Opinion Research, Germans have a more positive view of science today than they did before the coronavirus pandemic.

In particular, the credibility of research has increased considerably. Around 1300 members of the public participated in the survey at the beginning of June 2020. During the pandemic, intensive care doctors, virologists, epidemiologists, and ventilation experts have been especially in demand. But sociologists and economists also make an important contribution to the discourse. We present a selection here.

www.3sat.de

PHILIPP STAAB
29.06.2020 // 3SAT NANO

"CORONA AND THE FUTURE OF WORK"

www.fluter.de

PHILIPP STAAB
16.09.2020 // FLUTER

"WE HAVE A PROBLEM WITH MEANINGLESS WORK"

www.hr-inforadio.de

PHILIPP STAAB
11.12.2020 // HR-INFO NETZWELT

"AMAZON, MICROSOFT, FACEBOOK AND CO. – HOW TECH COMPANIES ARE PROFITING FROM THE CORONAVIRUS CRISIS"

/ PROFESSORSHIPS

/ 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 NETWORKED-ATTACHED SYSTEM ARCHITECTURES / DIGITALIZATION OF THE WORKPLACE / TRUST IN DIGITAL SERVICES / DATA SCIENCE AND ANALYTICS / DIGITAL SELF-DETERMINATION / WEARABLE COMPUTING / DIGITAL EDUCATION

ECDF/PR/Felix Noak

RESEARCH AT THE ECDF

Research into digitalization brings together ECDF researchers from a wide range of disciplines from medicine and sociology to physics and design. Since opening in April 2017, the ECDF has been the center for digitalization research in Berlin, enabling a cross-disciplinary perspective on social change and related discourse. 2020 has put digitalization even more into the spotlight and shown how diverse the opportunities and challenges in this field of research are.

In 2020, several new interdisciplinary projects started at the ECDF. For example, ECDF Professors Timm Teubner and Felix Biessmann investigated the influence of transparency of AI-based decision support systems on people's trust in AI (see page 37). ECDF Professors Rita Streblow and Max von Grafenstein won the ideas competition run by the German Federal Ministry for Economic Affairs and Energy (BMWi) for the digitalization module in the Energy in Buildings and Neighborhoods research area (see page 41).

Some research projects were completed in 2020 or are still ongoing: The app produced by the SimRa – Safety in Bicycle Traffic project, which is headed by Prof. Dr. David Bermbach, is now available in several other regions including Leipzig and Munich (see page 49). The BBBlockchain and StadtManufaktur research projects are both able to present initial results (see pages 50 and 51).

In 2020, two new ECDF Professors took up a position at their respective universities: Prof. Dr. Tabea Flügge has been Professor of "Digital Technologies for the Reconstruction of Complex Facial Defects" at Charité Universitätsmedizin Berlin since 1 March 2020. In April, Prof. Jussi Ängeslevä took up the „Internet of Things" professorship at the Berlin University of the Arts (see pages 31 and 32).

Three junior professors have also taken the next step in their careers and accepted appointments at top universities. As Associate Members, they remain connected with the ECDF: Prof. Dr. Daniel Fürstenau has moved to the Copenhagen Business School in Denmark; Prof. Dr. Sergio Lucia accepted a position at TU Dortmund University; and Prof. Dr. Setareh Maghsudi joined the University of Tübingen (see page 33). This means that there are currently (as of 31 December 2020) 37 professors at the ECDF, of which nine are women and 28 men. In this section, you can read a full list of appointments in chronological order up to the end of 2020, along with bios of the professors appointed in 2020 and an introduction to joint projects.

LIST OF APPOINTMENTS

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. Christian Meske	Digital Transformation and Strategic Information Management	FU Berlin, School of Business and 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	Digitalization of the Working World	TU Berlin, Faculty VI – Planning Building Environment	04/01/2018
Prof. Dr. Jan Christoph Nordholz	Secure and Trustworthy Network-Attached System Architectures	TU Berlin, Faculty IV – Electrical Engineering and Computer Science	04/01/2018
Prof. Dr. Dr. Felix Balzer	E-Health and Shared Decision Allocation	Charité – Universitäts-medizin Berlin	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 (University of Applied Sciences)	07/01/2018
Prof. Dr. Max von Grafenstein, LLM	Digital Self-Determination	Berlin University of the Arts (UdK)	08/01/2018
Prof. Dr. Berit Greinke	Wearable Computing	UdK Berlin, Institute for Product and Process Design	08/01/2018
Prof. Dr. Daniel D. Hromada	Digital Education	UdK Berlin, Faculty of Design	08/01/2018
Prof. Dr. Felix Biessmann	Data Science	Beuth University of Applied Sciences Berlin	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 Teaching and Learning	HU Berlin, Faculty of Cultural, Social and Educational Sciences	10/01/2018
Prof. Dr. Tilo Schwalger	Data Assimilation in Neuroscience	TU Berlin, Faculty II – Mathematics and Natural Sciences	10/01/2018
Prof. Dr. Sangyoung Park	Smart Mobility Systems	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	10/16/2018
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	01.02.2019

Name	Denomination	Institution	Start Date
Prof. Dr. Philipp Staab	Sociology of the Future of Work	HU Berlin, Faculty of Cultural, Social and Educational 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	08/01/2019
Prof. Dr. Florian Conradi	Open Science	TU Berlin, Faculty I – Humanities	08/01/2019
Prof. Dr. Emmanuel Baccelli	Open and Secure IoT Ecosystem	FU Berlin, Department of Mathematics and Computer Science	08/22/1209
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 Philosophy	10/01/2019
Prof. Dr. Björn Globisch	Terahertz Sensors	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

Name	Denomination	Institution	Start Date
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, Fakultät III – Prozesswissenschaften	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
Prof. Dr. Tabea Viktoria Flügge	Digital Networking of Buildings, Energy Supply Systems and Users	Charité – Universitätamedizin Berlin	03/01/2020
Prof. Jussi Ängeslevä	Societal Aspects and Challenges of Industrial Internet of Things	Berlin University of the Arts	04/01/2020

Alumni

Name	Denomination	Period at ECDF	New Position
Dr. Sebastian Köhler	Methods for Digital Phenotyping	06/01/2018 – 10/31/2019	Information Architect, Ada Health
Prof. Dr. Daniel Fürstenau	Digital Transformation and IT Infrastructures	12/01/2017 – 09/30/2020	Professor at Copenhagen Business School, Denmark
Prof. Sergio Lucia	Internet of Things for Smart Buildings	05/01/2017 – 09/30/2020	W2-Professor of Process Automation Systems, TU Dortmund University
Prof. Dr. Setareh Maghsudi	Control of Convergent Access Networks (CCAN)	08/01/2017 – 09/30/2020	Professor of Decision Making at Eberhard Karls University Tübingen

Pending Appointments

Denomination	Institution	Expected Starting Date
Digital Engineering 4.0	TU Berlin, Faculty V – Mechanical Engineering and Transport Systems	03/01/2021
Dental Health System	Charité – Universitätsmedizin Berlin	Winter Semester 2021/2022
Digital Trial Outcomes	Charité – Universitätsmedizin Berlin	Winter Semester 2021/2022

ECDF/PR/Felix Noak

PROF. DR. TABEA FLÜGGE

Digital Technologies for the Reconstruction of Complex Facial Defects

Prof. Dr. Tabea Flügge focuses primarily on digital imaging and computer-assisted treatment planning in oral and maxillofacial surgery. She has been a professor at the ECDF and Charité – Universitätsmedizin Berlin since March 2020.

Born in Berlin, she studied dentistry at Charité – Universitätsmedizin Berlin and completed her training in oral surgery at the university hospital in Freiburg. Tabea Flügge worked at the Clinic for Oral and Maxillofacial Surgery at Charité – Universitätsmedizin Berlin during her dental training. Her work focuses on the reconstruction of complex facial defects. These patients have experienced trauma or malignant disease, and need parts of their face and skull, sometimes including their teeth and masticatory system, to be gradually reconstructed. The aim is to restore the patient's quality of life through normal speech and eating.

Medical imaging is used to reconstruct the diverse structures of the facial skull and the masticatory system. Tabea Flügge worked on imaging as part of her "Habilitation", which she also completed at the University of Freiburg. During treatment, the anatomy is represented in 3D using optical and X-ray-based methods, paving the way to recovery. In her research to date, Flügge has identified the imaging modalities that meet the special requirements of oral cavities and has highlighted the areas in which digital technologies have limitations. She has developed her research questions primarily from clinical practice and focuses on translation. Flügge's research focus is on the application of magnetic resonance imaging in dentistry. This makes areas accessible for imaging that were previously not accessible with X-ray based imaging.

The next step, in her view, is to automate the individual steps in planning treatment based on anatomical data and using algorithms that can help the individual practitioner to arrive at a successful therapy.

How does data collected in medicine and other fields overlap? What are the concepts used across disciplines for this data in the context of digitalization? Which methods from other disciplines can be used to answer our questions? Tabea Flügge and her colleagues from the ECDF are addressing these and other questions.

Privat

PROF. JUSSI ÄNGESLEVÄ

Internet of Things

Jussi Ängeslevä is a designer, artist and educator. Since April 2020, he has been a professor for Internet of Things at the ECDF and Berlin University of the Arts (UdK). Ängeslevä works on new media, with a focus on digital materials and interaction design.

His career has been interdisciplinary, involving art and technology, science and industry: he has created intuitive interactive spatial experiences for museums and commercial clients and conducted research into the experiential qualities of different interaction technologies. “The media installations I make for public spaces have to be immediately and intuitively understandable to newcomers,” he says. This often works best when the idea of the perceived interface is tightly coupled with the technological sensing system that controls it. The more up-to-date the hardware, the better. “As a passionate hacker, I strive to find ways to use what is already there and build on it with something new, ideally with minimal effort and maximum impact,” he explains.

In his research at the ECDF, he will analyze the Internet of Things, focusing primarily on digitally augmented everyday objects – how these relate to us as individuals and users, how we interact, associate meaning with these objects, and make them integral parts of our everyday lives. “Experimental, aesthetic and narrative elements will play a central role as I approach the subject from a design perspective,” he says.

For Ängeslevä, experimental, iterative design and prototyping can help understand how to design the interconnectedness of everyday objects. “As we shift between technical, functional, narrative and aesthetic representations of networked objects, we can speculate about the future possibilities and desirability or meaningfulness of such things. When objects are enriched with digital behavior, we don’t just use them, we have a relationship with them through interaction,” he says. Through design exploration, speculation, and the creation of working prototypes, his work focuses on the sense-making possibilities and strategies of such digital-analog things.

Instead of looking at the optimization potential of smart cities, smart buildings or the industrial internet, Jussi Ängeslevä wants to focus not only on how networked everyday objects can be designed to automate, simplify and optimize our lives, but also on how digital behavior can grow into personal meanings and relationships with objects in the short and long term.

Jussi Ängeslevä is looking forward to collaborating with other professors at the ECDF: “The Center provides a fantastic network to work together with the experts of different fields addressing the challenges of designing everyday networked objects.”

ECDF/PR/Felix No[illegible] (2), TU/PR/Susanne Cholodniki (1)

ALUMNI

Since its launch in 2017, the Einstein Center Digital Future (ECDF) has aimed to support excellent young researchers in digitalization at the beginning of their academic career and throughout their professional development. The research center acts as a promoter and door opener for its young researchers. Inevitably these talented researchers spark the interest of other institutions and organizations. While we are of course sorry to see them go, we are also delighted that in 2020 no less than three ECDF Professors were able to use the research center as a career springboard.

Prof. Dr. Daniel Fürstenau took up a position at the Copenhagen Business School, Denmark, in October 2020. Previously, he carried out research as a junior professor in Digital Transformation and IT Infrastructures at the ECDF and Freie Universität Berlin. “I have long been interested in the constantly growing influence of IT systems on economic processes and structures,” says professor Daniel Fürstenau. “I began my research on structures in companies. One example was a recycling company and its well-established IT landscape, where newly emerging processes led to several unauthorized IT systems, so-called Shadow IT. I am interested in how these influence innovation capability and economic parameters such as efficiency.”

After more than three years as a junior professor of Internet of Things for Smart Buildings at the ECDF and TU Berlin, **Prof. Dr. Sergio Lucia** also took the next step in his career step. He accepted a position at TU Dortmund University and took over the Chair of Process Automation Systems on 1 October 2020. His time in Berlin was very formative for him and his research. “The ECDF has given me the opportunity to transition from a young researcher to a fully independent junior professor,” he says. Sergio Lucia is looking forward to starting as a W2 professor with tenure track to W3 at TU Dortmund University. “My research group will explore the intersection of control engineering, numerical optimization, machine learning and other digitalization strategies for creating the sustainable and efficient processes of the future,” he says.

Prof. Dr. Setareh Maghsudi moved to the University of Tübingen on 1 October 2020. From August 2017 to September 2020, Setareh Maghsudi headed the department for Control of Convergent Access Networks at the ECDF and TU Berlin as a junior professor. After completing her bachelor’s degree in Electrical Engineering in Iran, she finished her master’s degree at Kiel University in Digital Communications before moving to TU Berlin for her PhD. She then completed a postdoc both in Canada for one year and at Yale University in the US as part of a DFG postdoctoral fellowship.

We are delighted that Daniel Fürstenau, Sergio Lucia, and Setareh Maghsudi remain connected with the ECDF as Associate Members.

RESEARCH PROJECTS

Digital transformation is affecting almost all areas of our lives, and the new research projects at the ECDF are just as diverse: Prof. Dr. Philipp Staab's research includes the interactions between politics, business and research brought about by AI technologies and the possible consequences for the German economic system (see page 37). The Green Consumption Assistant, developed by Prof. Dr. Tilman Santarius and Prof. Dr. Felix Biessmann in cooperation with the search engine Ecosia, aims to show consumers the impact of their purchasing decisions on the climate and the environment (see page 34). In 2020, planning began on the Digital Urban Center for Aging & Health (DUCAH), which was initiated by principal investigator Prof. Dr. Dr. Thomas Schildhauer and Prof. Dr. Dr. Felix Balzer. The center will enable scientists to carry out research on the relationship between digitalization, urbanization, and health (see page 46). The research projects also include collaborations such as the Digital Economic Development in (North) Africa with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). In this project, Prof. Dr. Timm Teubner and Prof. Anastasia Danilov are studying the local platform economy in Tunisia.

Some research projects developed further in 2020: The app produced by the SimRa – Safety in Bicycle Traffic project, led by Prof. Dr. David Bermbach, is now available in other regions, for example in Leipzig and Munich (see page 49). The BBBlockchain and StadtManufaktur research projects are both able to present initial results (see pages 50 and 51). Also in 2020, ECDF Professors successfully submitted research proposals to the German Research Foundation (DFG), federal ministries, the EU and private foundations and companies.

Following on the next pages, we present a selection of research projects, collaborations, and initiatives that ECDF Professors have worked on during 2020.

ECDF/PR/Christian Kielmann

IDE3A

International alliance for e-learning, e-mobility and e-research

Several ECDF Professors are pooling their expertise in ide3a – an international alliance for digital e-learning, e-mobility and e-research in academia. The goal is to create a virtual campus to promote e-learning, e-research and e-mobility. The project brings together Prof. Dr. Andrea Cominola (ECDF, TU Berlin) and Prof. Paul-Uwe Thamsen (TU Berlin, ECDF Principal Investigator) as well as researchers from the Norwegian University of Science and Technology, Cracow University of Technology, Politecnico di Milano, and Dublin City University. The Hasso Plattner Institute in Potsdam is an associate partner.

The project aims to enhance the "student journey" by expanding the digital service infrastructure for student exchange and for transnational teaching and research, as well as through digital elements such as online courses. During the coronavirus pandemic, it has become clear how important digital applications are in teaching, research and administration: "In terms of content, we will focus primarily on the interdisciplinary, innovative topic of 'Critical Infrastructure and Digitalization' and offer four teaching modules per year in blended learning and blended mobility format. We will supplement these with digital gamification applications," explains Prof. Dr. Andrea Cominola, project supervisor and professor for Smart Water Networks at the ECDF and TU Berlin.

In addition to live events, in which students at the partner universities can participate online, there will also be an in-person exchange of students.

"We will focus on promoting short-term mobility measures," adds Prof. Dr.-Ing. Paul Uwe Thamsen, who is also supervising the project and is Head of the Chair of Fluid Systems Dynamics at TU Berlin: "Students are often put off studying abroad because of financial obstacles or the risk that it will take them longer to complete their studies. We therefore want to develop courses with a duration of up to three months." In addition, the ide3a university network plans to switch from paper-based to digital administrative processes in student mobility. In addition to the two project supervisors, the project consortium also includes Prof. Dr. Sergio Lucia, Prof. Jochen Rabe and Dr. Lauritz Thamsen.

ECDF/PR/Felix Noak

„The project is a great opportunity for our professors to demonstrate their skills in digital teaching." KAO

In ide3a, ECDF Professors contribute their research in engineering, computer science and urban planning. "The project is a great opportunity for our professors to demonstrate their skills in digital teaching and student mobility," says Prof. Dr. Odej Kao, ECDF Speaker. The German Academic Exchange Service and the Federal Ministry of Education and Research are funding the project. ide3a has received 3 million Euro in funding covering the period up to 2023.

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THE POLITICAL ECONOMY OF ARTIFICIAL INTELLIGENCE

How does artificial intelligence influence politics, business and research?

Artificial intelligence (AI) technologies are highly proficient in recognizing language, objects, and patterns; they have found their way into many areas of daily life. In his new research project "The Political Economy of Artificial Intelligence – From Fiction to Sociotechnical Reality?", ECDF Professor Philipp Staab examines the impact of AI policy on business and academia.

Staab is certain that AI will have a decisive impact on the next few years and decades: "The key players from politics and business seem to agree that AI is one of, if not the, key growth area of the future. Occupying a leading position in this area is also seen as the basis for democratic self-determination and geopolitical power." Studies promise high productivity increases and economic growth but warn of technological dependency and geostrategic dynamics in favor of the leading digital corporations from China and the US.

Germany and Europe are generally considered to be lagging behind international competition. This situation alone has created a clear sense of momentum around AI, which may lead to a new and much more political capitalism, Staab explains. Many countries have set up their own AI industrial strategies and economic development programs and are investing billions in the expansion of national AI innovation systems; Germany and the EU are also focusing on active industrial policy and technological restructuring.

The project will empirically investigate technical and political negotiation processes in the development of artificial intelligence in Germany and Europe: "We will analyze the interactions between politics, business and science brought about by AI technologies, as well as the possible consequences for the German economic system, by integrating theoretical approaches from the sociology of technology, innovation theory, and political economy," Staab explains.

ECDF/PR/Felix Noak

„The key players from politics and business seem to agree that AI is one of, if not the, key growth area of the future.“ STAAB

The project uses various methods: In the first part, German-European AI technology policy measures are identified through document analysis and interviews, and then are examined with regard to developing new state capacities for action. In the second part, the project will explore the network of relationships between the key players in the AI innovation system through network analysis. Staab then plans to conduct a comparative case study of four business collaborations between industrial and ICT companies to analyze the underlying market dynamics in the AI context and the relationship between the two sectors as a precondition for policy development. The project is receiving 438,000 Euro in funding from the DFG.

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NEW STUDY: TRUST IN AI SYSTEMS

Assistive AI systems have become part of our everyday lives: In the medical field, for example, artificial intelligence (AI) supports the evaluation of X-ray data; in industry, it detects defective components through image recognition. The accuracy of the AI's decisions is comparable to that of a human expert. However, currently there is not the right level of trust in the AI's decisions in order to use them responsibly. Too much trust can lead to imprudent decisions; too little trust can ignore valuable knowledge.

In a behavioral experiment, ECDF Professors Timm Teubner and Felix Biessmann worked with Philipp Schmidt from Amazon to investigate the influence transparency of AI-based decision support systems had on human trust in AI. In the experimental economic study, they had 200 participants classify short texts as "positive" or "negative". There was a reward for each correctly classified text. An AI was also available to the participants, which also provided an assessment. Transparency was systematically varied in different experiment groups. The AI "explained" its decision by firstly highlighting the most relevant words in the text (e.g. "wonderful" for a positive rating) and secondly by giving the confidence of the prediction (e.g. 65%).

"In recent years, the AI research community has focused on making AI decisions more transparent in order to increase trust. However, the extent to which this has actually had an effect has not yet been well researched," explains ECDF Professor Timm Teubner. "Contrary to the widely held belief that transparency is always beneficial, transparency measures did not contribute to confidence in AI. In fact, participants relied significantly less often on the AI and deviated in their assessment from the AI assessments – and were then wrong more often," reports Prof. Dr. Felix Biessmann. In terms of AI confidence, the following became clear: "If the AI was correct but attached too much uncertainty to its prediction, participants often did not follow the AI's suggestion," Biessmann continued.

The right level of trust also means not following false AI predictions. "The results suggest that people make up to six times more text classification errors when they follow incorrect AI predictions than when they ignore correct AI predictions. So too much trust in wrong AI suggestions was far worse than ignoring the right AI suggestions," says Prof. Dr. Timm Teubner. The study has been published in the Journal of Decision Systems.

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RESEARCH PROJECT ANALYZES GIG WORK PLATFORMS IN THE EU

A study examines how people perceive digital transformation

Uber, Deliveroo, Airbnb – in the gig economy, these online platforms are used to quickly acquire services from self-employed or partially employed people. In their new research project "Does the macro level matter? A comparative analysis of institutional structures and gig work platforms across countries of the EU 28", ECDF Professor Stefan Kirchner and Prof. Jürgen Beyer (University of Hamburg) are examining how gig work platforms function in different European countries. The DFG is providing the project with 574,983 Euro for its first phase.

The gig economy is a large research field. Which platforms are you looking at in your research? *Kirchner:* We are focusing on gig platforms for transportation, meal delivery and accommodation services, each of which are familiar examples of digital, location-based, paid services. These are often referred to as "gig work". Gig work is well known across Europe, in particular due to the activities of prominent platform companies such as Deliveroo and Airbnb.

What is special about your research approach? *Kirchner:* While some research assumes that gig work platforms simply avoid regulation, other established approaches assume that because certain countries shape economic activity, they should also influence gig work. At present, however, we know comparatively little about whether and how countries and their institutional frameworks are relevant to paid work on gig platforms in many European countries. To fill this research gap, we want to examine gig work platforms comparatively in many European countries. We are analyzing the mechanisms that countries use to determine the limits and opportunities of gig work platforms.

What methods do you use to do this? *Kirchner:* In addition to qualitative and comparative historical methods of process tracing, we are using a new method for country comparisons. This uses crowdsourcing platforms to assign data collection as a paid service to individuals in each of the countries studied. The data collected in this way will be fed into a country dataset and analyzed using quantitative methods. The qualitative and quantitative results map the linkages between national institutional frameworks and gig work platforms, and reveal the patterns and mechanisms that define these linkages.

The project is part of the interdisciplinary DFG priority program Digitalization of Working Worlds. What contribution does it make to the program? *Kirchner:* The project is one of a total of 15 subprojects in the DFG program (SPP 2267), which will together advance digitalization research over the next three years. The project contributes directly to the overarching goals of the priority program by examining the general question of whether, and in what ways, the macro level is relevant for the digitalization of working environments. Working with the other projects and disciplines, the project offers the opportunity to significantly advance interdisciplinary basic research, and to bring together research strands that are currently often taking place in parallel.

What do you take from the study for your research? *Kirchner:* Overall, the results give a good overview of the current state of digitalization from the perspective of people in Germany. We need this, along with many other empirical studies, to better understand the current state of digital transformation.

Overall, we do not have enough results from quantitative research regarding the many aspects of current developments. On the one hand, technological development is so rapid that large-scale investigations can hardly keep up. On the other hand, social science research has so far only benefited to a very limited extent from the large amount of data that is generated by digitalization. With a few exceptions, it has been virtually impossible to conduct basic research with existing resources and recognized empirical methods. There is a lot more work to be done in order to continuously analyze digitalization.

„Working with the other projects and disciplines, the project offers the opportunity to significantly advance interdisciplinary basic research." KIRCHNER

TU/PR/Christian Kielmann

GREEN CONSUMPTION ASSISTANT

Consumer goods such as clothing, furniture, and food are major contributors to climate change and global pollution. In the future, they could be labeled in a way that makes it easier to see what impact our purchasing decisions have: "Consumer goods lead to high CO2 emissions, energy use and resource consumption, not only in producing them but also in their use, transport and disposal," says Tilman Santarius, ECDF Professor and project supervisor. Artificial intelligence (AI) could contribute to greater environmental and climate protection.

ECDF/PR/Felix Noak

„The interdisciplinary research environment enables us to work across our disciplines on ideas for the digital future." BIESSMANN

This is exactly where the Green Consumption Assistant (GCA) comes in. Its aim is to support people to consume more sustainably by displaying the real-world impact of consumer decisions when they search for products using the Ecosia search engine. These impacts include CO2 emissions, manufacturing conditions and footprint. It also provides information and links to more sustainable alternatives. These include not only products that are produced in a more environmentally and socially just way, but also repair, lending and sharing options so that consumers do not have to buy products in the first place.

In addition, Ecosia's map function highlights places where people can consume sustainably, such as vegetarian restaurants, open workshops, rental stations and second-hand stores.

As a basis for the GCA's recommendations, a comprehensive database of globally discoverable sustainability information on products and services is being built using machine learning techniques and is available in open source. Making the extensive database openly available can inspire others to develop new digital business models and launch startups. As a first step towards a large ecosystem of high-quality sustainability data, the GCA can lay the foundation for numerous new research and development projects.

The idea behind this interdisciplinary project originated at the ECDF. "The interdisciplinary research environment enables us to work across our disciplines on ideas for the digital future," explains Felix Biessmann. "With the Green Consumption Assistant, Tilman Santarius and I can combine our expertise in sustainable digitalization and machine learning." The Assistant could have a big impact, because human consumption is a major driver of climate change and environmental degradation. If the project is successful, millions of consumers will interact with the GCA via the Ecosia search engine every day – in over 30 countries.

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DIGITALIZATION OF THE ACCOMPANYING RESEARCH PROJECT "ENERGIEWENDE-BAUEN"

The accompanying research project "Energiewende-bauen" (transforming the energy system) was launched on 1 October 2020. Its aim is to support the work of all projects funded by the German Federal Ministry for Economic Affairs and Energy (BMWi) in the Energy in Buildings and Neighborhoods research area. The project has interdisciplinary research teams working across five different modules: monitoring and documentation, networking and knowledge transfer, buildings, neighborhoods, and digitalization. The project identifies trends, technology, and tools that can play an important role in the building sector in the future.

The consortium is led by ECDF Professor Rita Streblow alongside ECDF Professor Max von Grafenstein and the Institute for Ecological Economy Research (IÖW). It won the ideas competition in the digitalization module. Over the next four years, the consortium will examine the wide range of technology research and model projects in terms of their technical, regulatory, and environmental aspects. The key commonalities and procedures will be summarized in a standardized application schema in the form of a knowledge platform. "We are delighted that our consortium was successful in the digitalization module of the Energiewendebauen ideas competition. Working with our partners, we want to develop a systematic overview of this area and the relevant findings by building an interdisciplinary picture of all projects. We also want to support the transfer of these findings into practice," says Streblow.

As well as cross-evaluating and summarizing results, the consortium is examining the use of digital twins and machine learning, data governance, privacy through technology design and data sufficiency, user-related barriers and non-technical success factors, as well as the sustainability assessment of digital applications.

Privat

„We are delighted that our consortium was successful in the digitalization module of the Energiewendebauen ideas competition." STREBLOW

Professor Max von Grafenstein also stresses the importance of the interdisciplinary nature of the project and the challenges and opportunities it presents: "The real contribution of this project lies in its strong interdisciplinary collaboration. Interdisciplinary research is about adjusting the research questions, concepts and methods of one discipline to the questions, concepts and methods of the other disciplines in such a way that you generate integrated solutions which would not have been possible had you just treated the disciplines separately. These are exactly the kinds of solutions that we urgently need in making a success of the energy transition and the digital transformation of the building and local neighborhoods sector."

Berit Greinke

TEXTILES AND SOUND: PEOPLE, MACHINES, AND MUSIC

Conductors communicate nonverbally with musicians through their movements. Musicians are guided through the piece by a mixture of standardized instructions and personal performative variations – depending on the style of the conductor. Because of these peculiarities, conducting is an interesting use case for clothing that is equipped with motion sensors – so-called "textile wearables". They enable the wearer to control electronic music via body movements and gestures. In an interdisciplinary research project, ECDF Professors Felix Biessmann (Beuth University of Applied Sciences), Berit Greinke (University of the Arts) and Emmanuel Baccelli (Freie Universität Berlin) investigated the use of e-textile sensors and gesture recognition technologies to capture the movements of an orchestra conductor. Based on this, they produced a custom interactive suit that was used as a musical tool in a live performance by the Verworner-Krause Chamber Orchestra (VKKO) in the fall of 2020.

Over a period of weeks, they carried out a detailed analysis of the movement sequences of the conductor Claas Krause. "The suit recognizes Claas Krause's gestures and can thus generate sound effects – almost like a wearable instrument," explains project supervisor professor Berit Greinke. AI was also used in the creative computing tool "Wekinator". "The tool captures and interprets the data from the electronic sensors using machine learning. In our case, it is used for gesture recognition," says Felix Biessmann.

One can also make readjustments using AI to account for the fact that electronic textiles are less reliable than standardized sensor technology. Textiles change, absorb moisture and stretch, and when they do the data received from the electronic textiles also changes. "With the help of machine learning algorithms, new training data can be imported again shortly before or during the performance," Biessmann explains. "Thanks to our techniques for the ultra-low power Internet of Things, we can connect the electronic textile sensors to each other and deliver sensor data in real time over the network. It only requires a small battery, which makes small form factor possible," explains Emmanuel Baccelli.

ECDF/PR/Felix Noak

"The conductor becomes part of the performance through the suit, and the suit alters and manipulates the sound." GREINKE

The VKKO consists of a string quartet, a wind ensemble, and a jazz rhythm section, combining these sounds with live electronics. The boundary between acoustic and AI-manipulated music is fluid and not always clear to the audience. "The conductor becomes part of the performance through the suit, and the suit alters and manipulates the sound," says Greinke. More wearables are to follow, starting with a trumpet player, a cellist, and a vibraphonist.

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DIGITAL ECONOMIC DEVELOPMENT IN (NORTH) AFRICA

Making data protection understandable

The ECDF and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) have launched a joint research project. The goal is to create a pan-African network of digital centers; physical hubs and networks that bring together innovation, technical expertise, participation, IT knowledge, research, and entrepreneurship under one roof, while promoting the participation of civil society in digital transformation.

The researchers will investigate the local platform economy and job creation opportunities in the Tunisian and North African industrial and administrative sectors. The digital centers will also promote European-African exchange on cutting-edge digital research and serve as a forum for discussion and exchange on social aspects of the digital transformation.

The project is carried out by an interdisciplinary team of experienced researchers and project managers, bringing together the expertise of the Trust in Digital Services chair at TU Berlin and Organizational Economics and Future of Work at HU Berlin. The project supervisors are ECDF Professors Prof. Dr. Timm Teubner and Prof. Dr. Anastasia Danilov.

The team was fully onboarded in July 2020, and a number of initial focus areas have already been defined in close collaboration with GIZ stakeholders, including exploring the current status of the local platform economy and mapping relevant digital skills in the Tunisian labor market.

"What are the potentials and risks of using digital technologies in Africa, and specifically in Tunisia? What changes can be expected in the local labor market as a result? What role does trust play in e-commerce in Tunisia compared to the Western world? We want to answer these and other interdisciplinary research questions with our research," explains Professor Timm Teubner, ECDF Professor and project supervisor.

The overall project sponsor is the German Federal Ministry for Economic Cooperation and Development (BMZ). The project is part of its Special Initiative on Training and Job Creation for sustainable growth and employment in Africa. The first phase of the project lasts through 2022, and stakeholders plan to provide regular updates on the project's progress.

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AI-EMPOWERED SUSTAINABLE URBAN MOBILITY PLATFORM (AISUM)

Rental bikes, electric scooters, car sharing: urban mobility is going through a huge transformation. New mobility services are increasingly being integrated into the urban environment – it's called smart mobility. This process offers opportunities to reduce harmful emissions, as new mobility services can complement local public transport and reduce car traffic in towns and cities. However, it is also associated with risks, mainly due to the lack of control and integration of new and old urban transport modes.

Lotte Ostermann

„People living in cities need mobility services that are as comprehensive, reliable, and convenient as possible while also having access to sustainable low-noise and low-emission urban transportation.“ MIHALJEVIĆ

Early studies on e-scooters and other sharing services, for example, indicate that they currently do not contribute to a resource-saving transformation of urban mobility, but instead lead to higher environmental pollution due to surplus capacities and waste.

"People living in cities need mobility services that are as comprehensive, reliable, and convenient as possible while also having access to sustainable low-noise and low-emission urban transportation. Through our project, we want to bring these two things together in a mobility platform," explains project supervisor and ECDF Professor Helena Mihaljević.

The combination of real-time data from numerous sharing services and the public transport network on a user-optimized smart mobility platform offers the opportunity to combine both needs for the first time. Cities need mobility platforms that enable them to connect and manage old and new mobility services while meeting social and environmental criteria. With this in mind, AISUM was linked up to the Jelbi project run by the Berliner Verkehrsbetriebe (Berlin transport authority – BVG). The mobility platform already combines public transport and new, private sector mobility services and is to be enhanced using functionalities from sustainable artificial intelligence (green AI). The project brings together the data streams of various mobility providers on one platform and evaluates them using machine learning. For this purpose, various so-called green AI use cases are designed and prototyped. The project, which ran from 1 April to 31 August 2020, was funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and is a joint project involving ECDF, HU Berlin, TU Berlin, BVG, and SAP.

Infra Lab Berlin

INFRALAB – OPEN DATA FOR PUBLIC INFRASTRUCTURE

The ECDF is committed to the idea of Open Data, which provides more collaboration and transparency. Some public institutions already share the data they collect; for public and quasi-public companies, the situation is somewhat different. Valuable information can be generated by combining different public data, therefore it is essential to have access to it.

InfraLab Berlin is a long-term co-working & co-creation project run by the Berlin infrastructure companies Berlin Waste Management (BSR), the Berlin transport authority (BVG), the Berliner Wasserbetriebe (BWB – water utilities), GASAG (GASAG & NBB – gas and electricity providers), Stromnetz Berlin (grid operator) and Vattenfall Wärme Berlin (heating). All the companies are public or quasi-public, and they collect and use data that can be categorized as PSI data and have significant value when made public and available for reuse. In the research project InfraLab: Open Data for Public Infrastructure and the Social Construction of Risk, ECDF Professors Rebecca Frank and Max von Grafenstein are looking to understand how people who work with data in public utilities understand risk in relation to their data and how they think about open data in the context of their work.

"The goal of the project is to understand the challenges that organizations in the public sector can encounter when thinking about how to disclose data. We are also interested in decision-making processes related to risks associated with open data, which can be particularly important for public and/or critical infrastructures," explains Rebecca Frank. By the end of 2020, they had finished collecting data for the project. This included 18 in-depth semi-structured interviews with individuals who manage or work with data from BSR, BWB, Stromnetz Berlin, and Vattenfall. The interviews focused on people's personal definitions of Open Data, understanding of risk, and social, organizational, ethical, economic and/or technical challenges related to Open Data.

The project plans to publish peer-reviewed journal articles and conference papers on information science and governance. Prof. Frank and Prof. von Grafenstein are also working with other ECDF researchers to plan the next phase of this research, which will focus on efforts within InfraLab-affiliated organizations to catalog and classify data for sharing. InfraLab Berlin is funding the project with 5000 Euro.

DUCAH/PR

DIGITAL URBAN CENTER FOR AGING & HEALTH (DUCAH)

Do new technologies help older people to better cope with their everyday lives? How do we ensure individual data control and user sovereignty across the board so that, for example, data donations can be used for medical research? In 2020, the planning phase began for the Digital Urban Center for Aging & Health (DUCAH). This interdisciplinary research center sees itself as an accelerator for economic, technical, urban and social innovation for preventive health and dignified aging. Scientists at the center conduct research at the interfaces of digitalization, urbanization, and health – in urban neighborhoods, care contexts, and hospitals. With its interdisciplinary focus, the center aims to ensure that diverse perspectives are heard.

The Einstein Center Digital Future (ECDF) is one of the founders, along with the Foundation for Internet and Society and the Alexander von Humboldt Institute for Internet and Society (HIIG). The ECDF is represented by principal investigator Prof. Dr. Dr. Thomas Schildhauer and Prof. Dr. Dr. Felix Balzer, who helped initiate the project. A wide range of ECDF scientists are making key contributions to advancing research at DUCAH, including Felix Balzer, as well as professors Felix Biessmann, Leonid Goubergrits, Max von Grafenstein, Berit Greinke, Christian Meske, Philipp Staab, Rita Streblow, and Florian Tschorsch, along with ECDF associate Daniel Fürstenau and ECDF fellow Adam Wolisz.

The ECDF primarily contributes to the new Digital Urban Center for Aging & Health through its expertise in digital infrastructures, methods and algorithms, digital health, digital society and digital industry and services. The planned research projects will focus, for example, on the use of artificial intelligence in nursing, wearables for heart failure, and platforms in nursing.

“Medicine is constantly changing, and there will be many innovations in the future. Digitalization and telemedical support are opening up completely new treatment options. It can also be an opportunity for more patient autonomy,” explains Felix Balzer. “With DUCAH, we want to reduce people’s fears of these digital changes and get them excited about the benefits and opportunities, but also take their views into account when implementing changes. The aim of DUCAH is to provide residents, caregivers, relatives, and doctors with better support in using digital technologies in a humane, ethical, and sustainable manner. By carrying out scientific analyses and transferring them into practice, we plan to develop prototypes that will continue to receive scientific support,” Schildhauer explains.

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OPEN TRAFFIC COUNT

Open platform for privacy-compliant traffic counting through image recognition

New machine learning techniques make it possible to count cars, bicycles, and pedestrians on the road in real time, at low cost and while respecting data privacy. However, researchers have not yet carried out sufficient empirically valid and meaningful evaluations of these systems in everyday urban life. The research project OpenTrafficCount, led by Prof. Dr. Helena Mihaljević, is testing the application of a counting system consisting of open source components developed at various locations in the Berlin metropolitan area. These include the Wilhelmstraße/Dorotheenstraße intersection in front of the ECDF. In coordination with the Berlin traffic authorities, the results are compared with samples of manual traffic counts.

The system being tested is low cost and privacy-compliant, can be used for a variety of applications, and uses real-time evaluation. It could be used in urban planning and by businesses, but also by civil society (e.g. Citizen Science). With this system, temporary changes in the traffic can be analyzed in a relatively uncomplicated way: the effects of construction sites can be examined, and hazard areas can be observed in more detail. The data is collected in a cloud database in compliance with data protection regulations and made available via standard channels for public administration, business, and civil society under a free license.

The project is part of CityLab Berlin run by the Technologie Stiftung Berlin and is funded through the mFUND research initiative of the Federal Ministry of Transport and Digital Infrastructure (BMVI). Through mFUND, the BMVI has been funding research and development projects related to digital data-based applications for Mobility 4.0 since 2016. In addition to financial support, mFUND helps bring together stakeholders from politics, business, and research through various event formats and by providing access to the data portal mCLOUD.

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REGULATING THE SHARING ECONOMY: A FIELD PERSPECTIVE

Prof. Dr. Stefan Kirchner has been working with Elke Schüßler on examining the principle of the sharing economy. In their article "Regulating the Sharing Economy: A Field Perspective," they note that the sharing economy must be viewed as a field in which multiple actors interact. How power dynamics and sustainable alternatives develop depends on how the broader field of the sharing economy functions as a whole.

The sharing economy is the term used by economists to describe the principle of collaborative use of goods through sharing, swapping, lending, renting, and giving, as well as providing access to services. More and more people around the world are becoming interested in this idea, which is often based on attitudes that are critical of consumption and growth. Ownership is often seen not only as unnecessary, but as a burden. Critics, however, are increasingly highlighting the downsides of the sharing economy, which result from the inadequate regulation of competition, labor, and taxes in its profit-driven sector.

In their article, ECDF Professor Stefan Kirchner and co-author Elke Schüßler argue that regulatory solutions for the sharing economy depend on understanding the way it is organized. Digitalization undermines existing regulations through fundamental organizational shifts in locations, work inputs, and responsibilities for outputs. The authors map out the field of actors that are or could be involved in regulating the sharing economy. They highlight a special role not only for digital platforms acting as market organizers, but also for a variety of other public and private actors such as standard-setting organizations, social movements, trade unions, organized buyers and sellers, established companies, or policy makers.

Kirchner and Schüßler stress that an understanding of sharing economy markets as fields not only captures their highly organized nature but can also help unravel the interactions and power dynamics that unfold between different actors dealing with various regulatory issues related to the sharing economy. The authors see "Uberization" as the next stage of development away from the modern business with its global supply chains. They underline the regulatory challenges associated with the even more individualized and dispersed way in which sharing economy markets are organized, and also discuss the new regulatory opportunities offered by digital technology.

ECDF/PR/Felix Noak

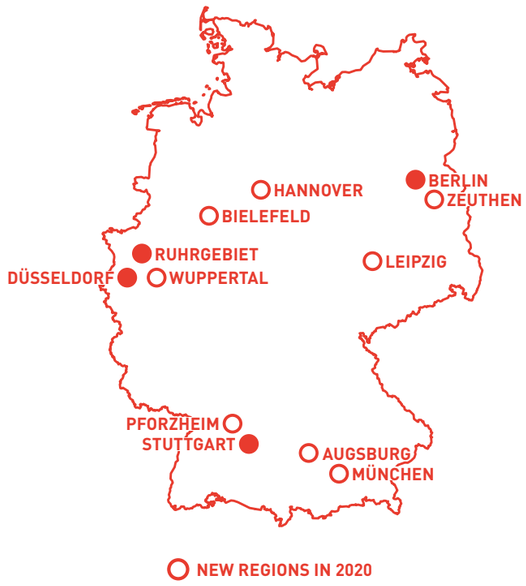
UPDATE: SIMRA – SAFETY IN BICYCLE TRAFFIC

What are the most dangerous situations for cyclists? This was the starting question for the SimRa research project, which began in 2019. In accordance with data protection laws, the project has been collecting data on the locations in the city that are often dangerous for cyclists and on how these locations pose a hazard. The project, which is led by Professor David Bermbach, also identifies whether there are build-ups at specific points in time or places and where the main cycle traffic flows are. This is all done using an app with GPS data and acceleration sensors. The analyzed data and findings are to be used to initiate sustainable changes in cycle traffic.

SimRa started in 2019 as a local project in Berlin, and in 2020 several new regions have been added where cyclists can use the app. SimRa is now present in cities such as Munich, Leipzig, Bielefeld, and Hannover, as well as more rural areas such as the Eichwalde/ Zeuthen/Schulzendorf region.

Even during the first coronavirus lockdown in spring 2020, Berlin residents continued to cycle, and there was only a small decrease in uploaded rides. Many people switched to bicycles to avoid the overcrowded public transport system, and SimRa and the idea behind it became increasingly well known: In March, it was featured in the radio program "WDR 5 Quarks – Wissenschaft und mehr" (Quarks - Science and More).

In August 2020, the first findings from the app in Berlin were evaluated, and SimRa received nationwide coverage through articles in Die Zeit and Märkische Allgemeine newspapers. The researchers analyzed more than 17,000 journeys and produced an interactive incident map: The map allows users to click on specific street sections and intersections and view recorded incidents. The incidents where users had near-misses included vehicles overtaking too closely, oncoming road users, car doors being opened suddenly, and obstacles that had to be dodged.



UPDATE: STADTMANUFAKTUR

How can new digital tools help drive the transport revolution? Can you run a rooftop farm with wastewater? How do scientists and interested citizens, policymakers, and businesses come together to find solutions to climate change, innovative construction methods, new mobilities, and social cohesion? StadtManufaktur has set itself the goal of solving urban challenges through collaboration between research and practice.

The project is an initiative of TU Berlin, the Zentrum Technik und Gesellschaft (ZTG – 'Center for Technology and Society') and the ECDF. The researchers work closely with CityLAB Berlin, an experimental laboratory for the city of the future. ECDF Professor Jochen Rabe (TU Berlin) is working with fellow ECDF Professors Helena Mihaljević (HTW Berlin) and Max von Grafenstein (UdK Berlin) on the project. The first results were presented in 2020; in particular, the Neu-Hohenschönhausen pilot project was effective at demonstrating possible scenarios for urban transformation. Going forward, the goal of StadtManufaktur is to generate and communicate knowledge about transformation and close the gap between researchers and partners from policymaking, business, culture, and civil society.

A particular achievement was the completion of the initial StadtManufaktur project Last Mile New Neighborhood. The project developed various prototype tools that can be used in the development of urban transformation processes. "The design of the first and last mile can be an important factor in people's decision not to use their private car or even not to buy one in the first place. Cities and municipalities must promote walkability and accessibility in their neighborhoods, for example by improving infrastructure, establishing mixed-use zones, and providing alternatives for particularly long distances," explains Helena Mihaljević. In this way, it is in the public interest to understand how far residents of a neighborhood have to walk before boarding a bus or train. How does this depend on the day, time and where they live? And what route do they take?

Adobe Stock/chaj

UPDATE: BBBLOCKCHAIN

BBlockchain is an online participation platform based on blockchain technology. The project has been explored as a new option for digital citizen participation that is complementary to analog formats in urban development processes. It is funded by the six state-owned housing companies degewo, Gewobag, GESOBAU, HOWOGE, Stadt und Land, and WBM. The ECDF is represented by professors Florian Tschorsch and Jochen Rabe.

The research project involved developing a participatory app based on blockchain technologies. The project and the app have been in use in Kietzer Feld in the Berlin district of Köpenick since October 2019 and in Bülowstraße 90 (Bülow90) in Schöneberg (also in Berlin) since February 2020. Citizens were able to use the app to have a direct and real say in how certain changes should look in their neighborhood. The aim was to explore whether transparency and trust in planning processes can be increased by blockchain technologies and the extent to which BBBlockchain could enable direct participatory decision-making.

Initial evaluations of the project showed that the option to vote via app instead of in person meant new participants were reached. 70% of the participants in Schöneberg stated that they had not taken part in public participation events before. More citizens also participated in Kietzer Feld. The project also showed that binding voting processes are only possible when the housing associations do not yet have the corresponding corporate structures. In general, participating citizens had confidence in the BBBlockchain; approximately 45% felt more involved in the planning and building process, and half were more positive about the housing company afterwards.

AWARDS

ECDF PROFESSORS ARE RECOGNIZED FOR THEIR RESEARCH

In 2020, ECDF Professors received a number of national and international awards for their excellent research work. We present a selection here.

//EARLY CAREER RESEARCH EXCELLENCE

Prof. Dr. Andrea Cominola was awarded the Early Career Research Excellence (ECRE) award by the International Environmental Modelling and Software Society (iEMSs) in September 2020.

//BATTLEDIM 2020

In September 2020, the international research team Leakbusters won third place in BattLeDIM 2020, an international competition on leak detection and localization in water supply networks. ECDF researchers **Ivo Daniel** and **Prof. Dr. Andrea Cominola** took part in the competition along with colleagues from the Machine Learning Group at Technische Universität Berlin and North Carolina State University. The research team developed a high-resolution, pressure-based method for leakage detection and localization in water distribution networks (WDNs) and tested it against the benchmark dataset provided for BattLeDIM. "Our method consists of two modules that work sequentially. The first module detects leaks by processing pressure data observed at different sensor nodes in a WDN and by analyzing pressure differences between node pairs," explains Ivo Daniel.

//EXCEPTIONAL PERFORMANCE IN DIGITAL TEACHING

In summer 2020, **Prof. Rebecca Frank, PhD** was recognized by the Department of Philosophy at Humboldt-Universität zu Berlin for her excellent work in digital teaching. This special award for an exceptional teaching performance during the first virtual semester of the pandemic (summer 2020) meant a reduction in fees for the 2020-21 fall semester.

//BEST POSTER AWARD

Prof. Dr. Leonid Goubergrits participated in the Leopoldina Symposium 2020 on Telematics, eHealth, and High-Definition Medicine. Posters submitted for the symposium were evaluated by an independent panel of judges. The three best posters were awarded prize money and subsequently published in the Nova Acta Leopoldina. Leonid Goubergrits's poster on the Impact of Valve Morphology, Hypertension and Age on Aortic Properties in Patients with Coarctation took first place.

//SENIOR FELLOWSHIP

Prof. Dr. Daniel Hromada was awarded one of four Senior Fellowships for Innovation in University Teaching by the Stifterverband in 2020. The fellowship, which comes with funding of EUR 25,000, was awarded to the ECDF Professor for his project "Teacher.solar: open source/ hardware toolbox for CO2-neutral online outdoor teaching". 179 applications were received in answer to the question "How can teaching at universities be developed and improved?" 17 of these concepts were ultimately selected for fellowships. The goal of the program is to motivate teachers to develop innovative concepts that enhance their own teaching while also inspiring others across the higher education landscape. This is intended to attract young people to universities and strengthen research and teaching. In addition to receiving financial support, the fellows also have the opportunity to exchange ideas and network with the 133 awardees in the funding network over the last ten years. In the teacher.solar project, Prof. Dr. Daniel Hromada will work together with students from the Berlin University of the Arts to design and test a solar-powered digital artifact that uses e-ink, along with an open source suite for outdoor online learning (OOL). "I am very pleased to receive this award because it allows me to bring together the classical Aristotelian concept of peripatetic teaching with state-of-the-art electrophoretic, portable, CO2-neutral digital technologies," says Daniel Hromada. As part of the project, students will design their own copies of the OOL toolbox.

//BEST SHORT PAPER IN TRACK AWARD

The paper "Understanding the Affordances of Conversational Agents in Mental Mobile Health Services", written by **Prof. Dr. Christian Meske**, **Ireti Amojo**, and **Devinder Thapa**, was selected as Best Short Paper in Track at the International Conference on Information Systems 2020 (ICIS 2020, IS in Healthcare track) and nominated for the award for the best short paper of the conference.

In addition, the joint ICIS paper by **Prof. Dr. Timm Teubner**, **Maik Hesse**, **Otto Lutz**, and **Marc T.P. Adam** titled "Gazing at the stars: How signal discrepancy affects purchase intentions and cognition" was awarded Best Short Paper in Track at the International Conference on Information Systems 2020 (ICIS) in the Sharing Economy, Platforms and Crowds track, and was nominated for the Best Paper Award at the overall conference.

//BUSINESS ADMINISTRATION RESEARCHER RANKING

Prof. Dr. Timm Teubner placed well in two categories in the WirtschaftsWoche Business Administration Researcher Ranking for 2016 to 2020: Among researchers in business administration in Germany, Austria and Switzerland, he ranks 76th and thus belongs to the top 2.3%. In the ranking of young researchers, Teubner makes it into the Top 40 among the under 40s. Every two years, WirtschaftsWoche honors the strongest researchers in business administration and economics. "I am very happy about my two placements in the rankings. My research focuses on trust in digital services and is very practice-oriented. This ranking in WirtschaftsWoche will hopefully make my research more visible outside academia," says Timm Teubner. The ranking takes into account publications over the past five years at German-speaking chairs and Fraunhofer and Max Planck Institutes. It is compiled on behalf of WirtschaftsWoche by the KOF Swiss Economic Institute at ETH Zurich and the Düsseldorf Institute for Competition Economics. The bibliometric web portal Forschungsmonitoring is used as the data source. Weighting is based on the quality and reputation of the journals: A published piece in one of 22 top international journals earns a full point; after that there is a sliding scale down to a minimum of 0.025 points.

//HIGHLY COMMENDED PAPER AWARD

Prof. Dr. Timm Teubner, **David Dann** and **Christof Weinhardt** have been awarded the Highly Commended Paper accolade from the Emerald Literati Awards for their paper "Poster child and guineapig - insights from a structured literature review on Airbnb".

INTERNATIONAL ACTIVITIES – Global cooperation in times of Social Distancing

In 2020, the coronavirus pandemic had a massive impact on the international exchange of researchers between the ECDF and institutions in Europe and overseas. Many trips to conferences, evaluations, and guest stays had to be cancelled due to travel restrictions. While conference participation was still possible in January and February 2020, the situation had changed drastically by the end of March. After a brief period of paralysis, researchers developed new digital ways to hold conferences, develop collaborative research proposals and write publications. Here is our selection:

//BELGIUM: COMPUTERS, PRIVACY AND DATA PROTECTION CONFERENCE (CPDP)

Prof. Dr. Max von Grafenstein attended the Computers, Privacy and Data Protection (CPDP) International Conference in Brussels, Belgium, in January 2020. The event looked at data protection and artificial intelligence. The goal was to lay the ground for a discussion on a broad range of ethical, legal and policy issues around new technologies and data analysis. Max von Grafenstein gave a presentation with **Régis Chatellier** on "GDPR – Data Protection Icons and Transparency: Where do we stand?". The panel brought together various stakeholders to take stock of emerging initiatives around data protection icons and identify next steps for more effective transparency in this area.

//GREECE (VIRTUAL): IEEE INTERNATIONAL CONFERENCE ON INTELLIGENT TRANSPORT SYSTEMS (ITSC)

At the IEEE International Conference on intelligent Transport Systems (ITSC) in September 2020, **Prof. Dr. Sangyoung Park** presented his research on "State Estimation for Attack Detection in Vehicle Platoon using VANET and Controller Model", along with **Prof. Soumyajit Dey** (IIT Kharagpur), Philipp Kremer (TU Berlin) and **Ipsita Koley** (Indian Institute of Technology Kharagpur). The ITSC is the main annual conference of the IEEE Intelligent Transportation Systems Society. The conference focuses on intelligent transportation systems that promote new developments in theory, analytical and numerical simulation and modeling, experimentation, advanced deployment and case studies, and laboratory and field operational test results.

//UK (VIRTUAL): /ACM INTERNATIONAL CONFERENCE ON UTILITY AND CLOUD COMPUTING

Jonathan Hasenburg and **Prof. Dr. David Bermbach** attended the IEEE/ACM International Conference on Utility and Cloud Computing 2020 in Leicester, UK, in December 2020 (virtual). They presented their research work on "DisGB: Using Geo-Context Information for Efficient Routing in Geo-Distributed Pub/Sub Systems". UCC2020 is the leading IEEE/ACM International Conference on Utility and Cloud Computing. Cloud computing has firmly established itself as an indispensable tool for the digital age. Users of cloud services expect and rely on sufficient computing power and availability of data and media. Services must also be accessible across a range of devices. IEEE/ACM is an international forum for leading researchers, experts, and users in this important and growing field.

// UK (VIRTUAL): CONFERENCE ON LANGUAGES, COMPILERS, AND TOOLS FOR EMBEDDED SYSTEMS (LCTES)

In June 2020, **Prof. Dr. Sangyoung Park** – working with **Nadja Heitmann** and **Samarjit Chakraborty** – presented his research paper "Towards Building Better Mobile Web Browsers for Ad Blocking: The Energy Perspective (WiP Paper)" at the Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES) in London, UK (virtual). LCTES provides a link between researchers in programming languages and those working on embedded systems engineering. Researchers and developers in these fields deal with many similar problems but have different backgrounds and use varied approaches. LCTES aims to introduce researchers and developers from both communities to relevant work and interesting questions from each other's fields, and to provide a forum where they can exchange ideas.

//UK/AUSTRIA: RESEARCH COLLABORATION

Prof. Dr. Anastasia Danilov is working with colleagues from the University of Bath, UK, and the University of Vienna, Austria, on Affirmative Action and Sabotage. She is planning a publication on "Affirmative action policies and behavior in promotional tournaments - An experiment", working with **Professor Subhasish Chowdhury** (University of Bath) and **Professor Martin Kocher** (University of Vienna), who was appointed Austrian Minister of Labor in January 2021.

//GLOBAL EXPERIMENTAL LIVE-LAB DESIGN STUDIO 2020

Prof. Jussi Ängeslevä participated in the Global Experimental Live-Lab Design Studio 2020 together with his students. Eight art and design universities from Australia, Mexico, South Africa, and the USA, among others, came together online over a period of twelve weeks with the aim of "Designing for an Uncertain and Unknown Future at the Global Scale". Using a variety of design methodologies, students worked together on solutions that addressed the situation brought about by the pandemic, whereby technology acts as mediator for much of our daily lives. Faculty members from participating universities led the studio, which brought together students from around the world. "Suddenly, the distance between us in this very international project was the same as if we were studying at home because everything took place on screen. The only difference was the time zones and the fantastically diverse team," says Jussi Ängeslevä.

//INDIA (VIRTUAL): INTERNATIONAL CONFERENCE ON INFORMATION SYSTEMS (ICIS)

Prof. Timm Teubner's research group was represented by **Maik Hesse** at the International Conference on Information Systems 2020 in India (virtual) in September 2020. Maik Hesse shared research findings such as "Signal discrepancy affects purchase intentions and cognition within the online platform economy". The research paper "Gazing at the stars: How signal discrepancy affects purchase intentions and cognition" was jointly produced by Otto Lutz, Marc T.P. Adam, Maik Hesse, and Timm Teubner.

//NETHERLANDS: RESEARCH COLLABORATION

In a joint interdisciplinary research project, **Prof. Dr. Anastasia Danilov** is working with social psychologist **Prof. Dr. Olga Stavrova** from Tilburg University in the Netherlands to investigate how performance when working from home can be improved by increasing self-control. In 2020, they designed and programmed a randomized study. The researchers plan to conduct the study in 2021.

//PHILIPPINES: DELEGATION VISIT

On 15 January, Tim Kawalun and Friedrich Schmidgall welcomed 28 representatives from various Philippine ministries and governmental organizations to the ECDF. The visit was organized by the Development Academy of the Philippines, and the guests were given an overview of interdisciplinary digitalization research during a tour of the Robert Koch Forum. The visitors were particularly impressed by prototypes presented in the Demo Room and the Micro Factory.

// PORTUGAL (VIRTUAL): INTERNATIONAL CONFERENCE ON SMART GRIDS, GREEN COMMUNICATIONS AND ENERGY-AWARE IT TECHNOLOGIES (IARIA))

Prof. Dr. Sangyoung Park and **Prof. Dr. Andrea Cominola** presented their paper "When Privacy Protection Meets Non-Intrusive Load Monitoring: Trade-off Analysis and Privacy Schemes via Residential Energy Storage" at the International Conference on Smart Grids, Green Communications and Energy-Aware IT Technologies (IARIA) in Lisbon, Portugal (virtual). The conference was held from 27 September to 1 October 2020.

//SWITZERLAND: AUTOMATIC CONTROL LAB

In February 2020, **Prof. Dr. Sergio Lucia** gave a seminar on "Probabilistic validation of deep learning-based MPC

controllers" at the Automatic Control Lab in the École polytechnique fédérale de Lausanne (EPFL), the Swiss Federal Institute of Technology Lausanne. His presentation focused on probabilistic validation techniques that can be used to calculate safe states or general performance guarantees. This can be used in conjunction with constraint tightening techniques. He demonstrated the potential of his proposed approach using simulation results from a number of linear and nonlinear examples.

//CZECH REPUBLIC (VIRTUAL): ACM/SIGAPP SYMPOSIUM ON APPLIED COMPUTING

Martin Grabow, **Prof. Dr. David Bermbach**, and **Erik Wittern** presented their research paper on "Benchmarking the performance of microservice applications" at the ACM/SIGAPP Symposium on Applied Computing. The 35th ACM/SIGAPP Symposium was hosted (virtually) in Brno, Czech Republic from 30 March to 3 April 2020..

//USA (VIRTUAL): IEEE INTERNATIONAL CONFERENCE ON COMPUTER DESIGN (ICCD)

In October 2020, **Prof. Dr. Sangyoung Park** took part (virtually) in the IEEE International Conference on Computer Design (ICCD) in Connecticut, US, along with **Swanathan Narayanaswamy** and **Samarjit Chakraborty**. They presented their work on the "Design-Time Optimization of Reconfigurable PV Architectures for Irregular Surfaces." The IEEE International Conference on Computer Design covers a wide range of topics in research, design and implementation of computer systems and their components. The ICCD's multidisciplinary focus makes for an ideal environment for developers and researchers to discuss practical and theoretical work involving systems and applications, computer architecture, verification and test, design tools and methods, circuit design, and technology.

//USA: HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCE (HICSS)

In early January 2020, **Prof. Dr. Timm Teubner** and **Maik Hesse** presented two papers on their research on trust, reputation transferability and social interaction in the platform economy at the Hawaii International Conference on System Sciences (HICSS) in the US. HICSS is the longest-running conference in the field of information systems and technology. The first HICSS conference was held at the University of Hawaii back in 1968. HICSS is the number one IS conference in terms of Google Scholar citations. "Participating in international conferences like HICSS is really important to us because they are an ideal platform for us to present and discuss our research topics. Sharing ideas and information with colleagues from around the world is particularly important and valuable – just as the pandemic demonstrated soon after the conference," says Teubner.

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„Participating in international professional conferences like HICSS is really important to us because they are an ideal platform for us to present and discuss our research topics." TEUBNER

Fredrik Persson

THE NEW SWEDISH RESEARCH CENTER DIGITAL FUTURES IS BASED ON THE ECDF MODEL DIGITAL FUTURES

In October 2020, the new research center Digital Futures was inaugurated in Stockholm, Sweden. The initiative is a collaboration between KTH Royal Institute of Technology, Stockholm University and RISE Research Institute of Sweden (RISE). The center aims to address societal challenges through digital transformation. The establishment of the center was inspired by the ECDF. The two research institutions in Berlin and Stockholm are working together closely. Prof. Dr. Kristina Höök, who is a member of the ECDF Scientific Advisory Board, is one of the initiators of Digital Futures in Stockholm.

Like the ECDF, its Swedish counterpart is also interdisciplinary. "Digital Futures taps into all areas of digitalization. Cooperation is a key factor. It's not just about technical solutions: we need more perspectives. And that's what Digital Futures will bring," said Sigbritt Karlsson, president of KTH, at the opening. At the heart of Digital Futures is its strategic research program. This is about harnessing scientific excellence in order to deliver on its vision. Innovation and development are about renewal, recruiting and developing talented young researchers, exploring the unknown, and testing novel ideas. Connecting communities will support this process – not just in terms of linking up different scientific disciplines, but also bringing together industry and the public sector with academia. Cross-cutting communities promote interdisciplinarity and diversity, which enables broader perspectives. This, in turn, creates opportunities for identifying synergies and patterns that will enable research to address a range of societal challenges.

Karl Henrik Johansson is the director of Digital Futures. He stressed that digitalization can create a more resource-efficient and sustainable society, while at the same time presenting some of the greatest scientific and technological challenges of our time. "There is still a lot to do in terms of AI, cloud solutions and integrity when it comes to self-driving vehicles, the manufacturing industry, and healthcare. We are therefore bringing together the key competencies from across different specialisms to address our biggest societal challenges," he said.

For Jochen Schiller, member of the ECDF Executive Board, the collaboration with Swedish colleagues is very important. "We both benefit from positive, as well as negative, experiences in building an interdisciplinary center. In particular, attracting the brightest international minds always presents a major challenge. We also plan to facilitate comprehensive disciplinary and interdisciplinary exchange and close cooperation in delivering a networked center with all its various formats, which should contribute to enabling exchange – especially with civil society, business and policymakers – on all areas of digitalization," he says.

ECDF/PR/Felix Noak

SCIENTIFIC EXPERTISE
Discourse involving policymakers, the public

The importance of scientific expertise became very clear during the coronavirus pandemic. Professors at the ECDF are seen as go-to resources for governments, associations and nongovernmental organizations at the federal and state levels on topics related to digital transformation. Here we present a selection of activities:

//STATE ADVISORY BOARD ON DIGITALIZATION

Prof. Dr. Odej Kao is a member of the new Berlin State Advisory Board for Digitalization. The high-caliber committee was constituted in a video conference on 2 December 2020 at the invitation of Education Senator Sandra Scheeres. The mission of the State Advisory Board is to develop a comprehensive "Strategy for Schools in the Digital World", drawing on the diverse expertise of the Advisory Board members. The aim is to redesign all areas of Berlin's education system and administration so that they are well placed to meet the opportunities and requirements of the digital age. This follows on from the digital strategy already developed by the Senate Education Administration. The work of the State Advisory Board for Digitalization is divided into several areas: A central point is to think about the educational and administrative requirements together. After all, the comprehensive digitalization of Berlin's education system is by no means limited to equipment issues. A comprehensive strategy includes digital teaching and learning and media education, as well as the digitalization of administrative processes, data security and needs-based training programs. Sandra Scheeres, Senator for Education, Youth and Family Affairs, says "Our society is going digital, at an ever-increasing speed, and in more and more areas of our lives. Berlin's education system also needs a comprehensive digitalization strategy. We want to further develop a strategy of this kind that is suitable for everyday use in schools, with the support of the experts from the State Advisory Council for Digitization. We can also draw on considerable preliminary work from my Senate administration. My main concern now is to bring together the educational and administrative applications." Prof. Dr. Christian Thomsen, Spokesman of the State Advisory Board for Digitalization and President of Technische Universität Berlin, explains "Berlin is on the right path by establishing this board. We have been able to recruit people who bring a wide range of professional experience to the table, but who also have a great deal of expertise in digitalization in the education sector. Our goal is to support digitalization in schools in an advisory capacity, especially during the pandemic phase. We want to help create a more modern school for both students and teachers. There is a real need for action in this area, but there are also many people who want to get involved." Prof. Dr. Odej Kao is looking forward to working with the State Advisory Board for Digitalization. "The digitalization of education plays an important role at the ECDF. We conduct interdisciplinary research on impacts, solutions, and technologies. We are exploring questions such as of how communication is changing and how digital didactics can be applied in a meaningful way. We also develop digital learning formats that can be implemented sustainably. I want to bring this expertise to the State Advisory Board for Digitalization."

//SMART CITY BERLIN STRATEGY ADVISORY BOARD

In September 2020, the Governing Mayor of Berlin, Michael Müller, launched the Smart City Berlin Strategy Advisory Board and appointed Prof. Jochen Rabe as one of its members. The board, which is made up of four representatives from the city's research, business and public administration sectors, will support and provide input on the strategy development funded by the Federal Ministry of the Interior as part of its Smart City call for proposals. This is a first important step in involving city society in the future development of digital infrastructure and pilot projects. "With the support of the Federal Ministry of the Interior, we will be launching important projects for the future over the next few years to make Berlin a more liveable and smart city. I would like to thank everyone who is contributing their time and knowledge to support the process and I look forward to working with them," says Michael Müller, Governing Mayor of Berlin. Jochen Rabe is excited to be part of the advisory board and underlines the large pool of knowledge at the ECDF related to the smart city. "Our interdisciplinary approach is exactly what is urgently needed for sustainable integrated urban development. I am therefore very happy to be a member of the Smart City Berlin Strategy Advisory Board and at the same time to have the ECDF and my many wonderful colleagues as a unique source of inspiration and expertise in making Berlin even smarter," he says. The establishment of the Strategy Advisory Board is the first formal step in implementing the Model Project Smart City, the capital's successful application to the Smart City call for proposals from the Federal Ministry of the Interior. Funding was approved on 8 September 2020. The State of Berlin will provide around six million Euro over the next seven years with the aim of making Berlin a smart city. It will also receive funding of around eleven million Euro from the Federal Ministry of the Interior for this period.

//EXPERT PANEL DIALOG PLATFORM SMART CITIES

The Smart Cities dialogue platform is a panel of experts set up by the German government to discuss the opportunities and risks of digitalization from the perspective of urban development. Digitalization is seen as a means of promoting public well-being and meeting the goals of integrated, sustainable urban development. The Smart Cities dialogue platform brings together around 70 experts from cities, districts and municipalities, local government associations, the federal states and various federal ministries, research organizations, business, trade and social associations, along with civil society. As an expert advisor to the German Federal Ministry of the Interior, Building and Community (BMI), **Prof. Jochen Rabe** evaluates smart city model projects.

//EXPERT COMMISSION OF THE FEDERAL GOVERNMENT

As a member of the Expert Commission on the Third Gender Equality Report of the German Federal Government, **Prof. Dr. Timm Teubner** and his colleagues from the commission used 2020 to investigate what needs to change so that women and men have equal opportunities in the digital economy. "The research question requires a high degree of interdisciplinarity. Each of us has a different research focus, which has led to exciting findings," explains Timm Teubner. In addition to business informatics, experts from business administration, economics, law, sociology, computer science and education were also represented. The Expert Commission works on a voluntary and independent basis. It consists of eleven scientists working in different fields (economics, law, computer science, social sciences) on the most important aspects of digitalization. In 2021, the Expert Commission will submit its completed report to Federal Minister Franziska Giffey.

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/ ASSOCIATE MEMBERS AND VISITING SCHOLARS

LIST OF ASSOCIATE MEMBERS

Since its launch, the ECDF has been very interested in looking beyond its own scientific horizons and incorporating external expertise into its research into digitalization. An effective way of achieving this is to appoint respected German and international scientists and researchers as associate members. They add valuable research perspectives to the ECDF portfolio.

Name	Research area	Institution	Associate Member since
Prof. Dr. Peter Hildebrand	Biophysical spectroscopy, imaging, computer simulation	Leipzig University	May 2018
Prof. Brian Kobilka	G Protein Coupled Receptors	Stanford University, USA	May 2018
Prof. Dr. Dr. Ayad Al-Ani	Change Management and Consulting	Stellenbosch University, School of Public Leadership, South Africa	February 2019
Dr. Julius Emmrich	Neurology and Neuroscience	Charité – Universitätsmedizin Berlin	August 2019
Dr. Samuel Knauss	Neurology and Neuroscience	Charité – Universitätsmedizin Berlin	August 2019
Prof. Dr. Janina Sundermeier	Business Administration, especially Digital Entrepreneurship and Diversity	Freie Universität Berlin	November 2019
Prof. Dr. Meike Hopp	Digital Provenance Research	Technische Universität Berlin	December 2019
Prof. Dr. in Silvia Polla	Archaeoinformatics	Freie Universität Berlin	June 2020

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PROF. DR. SILVIA POLLA

Archaeoinformatics

Prof. Dr. Silvia Polla has been an Associate Member at the ECDF since 2020. She is a professor of archaeoinformatics at Freie Universität Berlin and completed her doctorate in classical archaeology at the University of Siena (Italy) as part of the graduate school "The Cultures of the Roman Provinces. Euro-Mediterranean Interactions". During her studies, Silvia Polla trained and advanced her knowledge of scientific and computer-aided methods, i.e. archaeometry and archaeoinformatics. From 2005 to 2006, she was employed at the University of Trento (Italy) as a technical and scientific assistant. After two years in Switzerland, where she was a research associate in an interdisciplinary project at the Karman Center for Advanced Studies in the Humanities at the University of Bern from 2006 to 2008, she received a Junior Postdoctoral Fellowship at Excellence Cluster 264 TOPOI at Freie Universität Berlin. Since 2009 Silvia Polla has been working as a junior professor for archaeoinformatics at the Institute for Classical Archaeology at Freie Universität Berlin.

Her research focuses on archaeoinformatics and archaeometry, i.e. spatial analysis and modeling of ancient landscapes using GIS and remote sensing methods on the one hand, and natural science and bioarchaeology on the other. "I am also interested in the potential to link heterogeneous data from historical documentary sources, archaeological material culture and natural science data as part of a digital humanities approach," she says.

At the ECDF, she would like to contribute to the translation of research questions (from a humanities and classic perspective), for example through joint application-oriented labs. She also would like to help advance reflections on digital opportunities in research and teaching. "I am particularly interested in the possibility of developing collaborative projects in the field of data science and big data in archaeology," says Silvia Polla.

She sees great potential in the possibility for collaboration in interdisciplinary research at the ECDF. "I take an interdisciplinary and transdisciplinary approach, where archaeology represents 'past knowledge' and is therefore an important source of information for the present and the future – not least because of the potential for digitalization and analysis as well as the interoperability of digital heterogeneous data," she says

Frank Wojciechowski

PROF. DR. ALEXANDER GLASER

Visiting Scholar for Digital Peace-building

Professor Alexander Glaser has been a visiting scholar at the ECDF since summer 2020. His research involves technical and policy analysis in the context of international security, particularly in the context of nuclear disarmament and non-proliferation. Glaser describes his research itself as "science-oriented peace research."

Glaser grew up in Germany but has lived in the US for more than 15 years. After graduating with a degree in physics, he earned his doctorate at Darmstadt Technical University. While still in Darmstadt, he was part of IANUS, an interdisciplinary working group for peace research in the natural sciences and engineering at Darmstadt Technical University. Since 2005, he has been conducting research at Princeton University, initially as a research assistant and junior professor. Since 2009, Glaser has been a professor of mechanical engineering, aerospace engineering and international affairs, and since 2016 also co-director of the Science & Global Security program.

"My research is often about technology design and technology assessment. I look at developments in science and technology and the social developments that go with them. One big topic is the verification of international treaties, which often involves tricky decision-making situations: How can we verify that a state is actually disarming nuclear weapons without having to reveal technical secrets?" explains Glaser. In 2014, Glaser was named one of Foreign Policy magazine's 100 Leading Global Thinkers for his work in this area.

During his time at the ECDF, Glaser would like to delve deeper into the peace-building potential of digitalization. One question is how and whether new digital technologies can make a significant contribution to verification and monitoring, especially with the help of novel sensors and, ideally, with the active participation of the public (Open Citizen Science). Two other projects deal with the possibilities of virtual reality (VR). Experts and government employees can develop procedures for inspections and virtually test new technologies and instruments. In the virtual environment, scientific and abstract processes become more accessible. A VR documentary is also currently being created, which is supported by Arte among others and should be completed by the beginning of 2022.

Glaser is working with other scientists to develop concepts in "nuclear archaeology" to document and preserve the history of nuclear facilities. Analog records and digital data in a wide variety of formats – often more than fifty years old – play an essential role. The crucial question is how to guarantee the origin of this data and establish trust in its authenticity: "We hope this will make it easier to understand how much radioactive material was mined or produced at certain locations in the past. Currently, this is almost possible." Nuclear archaeology should provide clarity about the material that exists today and contribute to the verification of a world free of nuclear weapons.

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/ TEACHING AND THE ADVANCEMENT OF JUNIOR SCHOLARS

/ JOINT TEACHING / DIGITAL FUTURE LECTURE SERIES / HEIBRIDS

ECDF/Friedrich Schmidgall

JOINT TEACHING

The rapid onset of the coronavirus pandemic in the spring of 2020 led abruptly to major limitations and challenges for teaching at the universities participating in the ECDF. In-person teaching had to move online in a very short space of time, and exams could only take place with restricted attendance, if at all. All this meant that "normal" teaching operations were not possible for practically the entire year. It is therefore all the more remarkable that the joint teaching formats offered by ECDF researchers, some of which had been planned for a long time, could be implemented as virtual offerings – thanks to a huge effort on their part.

As in previous years, the Digital Future lecture series focused on data-driven digital transformation. It is explicitly aimed at students of all disciplines. In this way, the series contributes to interdisciplinary education at TU Berlin and beyond. The lectures provide an overview of methods and applications in the area of data-driven digital transformation. This is the first step to becoming data literate. In winter semester 20/21, ECDF Professors designed the program and gave an insight into their research. With a total of 13 presentations across all research areas, the participants were given an overview of the whole range of research into digitalization.

The series was organized by ECDF Professor Florian Tschorsch (Distributed Security Infrastructures, TU Berlin) (see interview on the next pages).

In the virtual HEIBRiDS Lecture Series, ECDF board member Prof. Johann-Christoph Freytag, PhD, gave a lecture on 9 December on the "Scalable Processing of Scientific Data in the Age of Data Science". Various ECDF Professors are involved in the series as supervisors of PhD projects.

Other professors from the Einstein Center Digital Future (ECDF) combine their expertise in the joint project ide3a. The German Academic Exchange Service (DAAD) is funding the research project led by Prof. Dr. Andrea Cominola (ECDF, TU Berlin) and Prof. Paul-Uwe Thamsen (TU-Berlin, ECDF Principal Investigator) as part of the International Mobility and Cooperation Digital (IMKD) program. The focus will be on the so-called "student journey", i.e. the cycle that students go through during their studies. In terms of content, the project focuses primarily on the interdisciplinary, innovative topic of 'Critical Infrastructure and Digitalization' and includes four teaching modules per year in blended learning and blended mobility format.

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INTERVIEW
DIGITAL FUTURE LECTURE SERIES

In winter semester 2020/21, the ECDF organized the third Digital Future lecture series with TU Berlin. Each week, selected speakers presented topics from their field of research that covered various aspects of digitalization and different scientific disciplines. In addition to moving online because of the pandemic, the 2020 series involved another first: The program was designed exclusively by ECDF Professors. Tim Kawalun spoke with initiator and organizer ECDF Professor Florian Tschorsch.

The Digital Future lecture series was held for the third time in winter semester 2020/21. How did the idea for the format come about?
Tschorsch: Digitalization is a cross-cutting issue, and data skills will be increasingly needed across all disciplines. The very fact that the ECDF exists is a confirmation of this. However, students often are not given a way-in and an overarching introduction to the topic. The lecture series is therefore on the one hand an attempt to understand the needs of the students and on the other, a contribution to interdisciplinary teaching.

The content of the lecture series is very interdisciplinary. Which target group is the event series aimed at and how did they respond to it?
Tschorsch: First and foremost, we are aiming this at students. However, we do not make any distinctions based on subjects or how far along the students are with their studies. All bachelor's and master's students are welcome. That said, unsurprisingly, we do see lots of students with a technical background, such as industrial engineering. But overall, we achieved what we set out to do: At the lectures, philosophy students talked to students from computer science and biology. The lecturers themselves were also diverse, and the presentations came from a wide range of disciplines and covered principles and trends, theory and practice.

How important are these kinds of cross-university and cross-disciplinary formats in teaching?
Tschorsch: In terms of the lecture series, we were able to provide an insight into a number of topics, perspectives and working methods – and whet the students' appetite for more. That helps them to think outside the box, but on its own, it is not enough. In order to teach digital skills in the required breadth and depth, the students need to be offered more. These interdisciplinary formats can help respond promptly to this need. A lot of the time, it is not possible to adapt study plans in a quick and uncomplicated way. For this reason, it is also important that universities offer a free elective, for example, as this is exactly the kind of mechanism that students can use flexibly for cross-disciplinary courses.

Due to the pandemic, the lecture series in winter semester 2020/21 could only be offered virtually. What impact did this have on the interaction between lecturers and participants?
Tschorsch: I think we dealt with the situation well. In most cases, the lectures developed into a kind of conversation between me and the lecturers, with me asking questions from the participants via the chat. It worked a bit like an interview or a podcast. The possibility to interact did unfortunately fall somewhat by the wayside, but we were able to achieve the learning objectives. In my view, we were only really missing that cluster of students that often forms around the speaker after a lecture.

What were the positives that came out of holding the event online?
Tschorsch: The advantage was that we were not limited physically by holding the event in a room at TU Berlin, which gave us more flexibility in the number of participants and also increased the reach. Because it was held online, we decided to open the lecture series to the public. This meant that international researchers and industry representatives could also take part. In total, we had 150 more sign-ups for the series.

What was the feedback from participants?
Tschorsch: The students and our guests responded very well to the lecture series. This was confirmed both by the course evaluation and the individual personal feedback I received. Students outside the field of computer science have subsequently asked me for a topic for a final thesis. I was able to either supervise them myself or refer them to colleagues. So the series has shown that there is clearly an interest and a need. Each year, about 150 students have successfully completed the course and have expressed a desire for further offerings of this kind.

Which of the many exciting lectures in the current semester do you remember most and why?
Tschorsch: My own, of course (laughs). I gave a lecture myself this year for the first time in the three years we have held the series. While we have always played a critical and questioning role in the series, it was important to me to represent the issue of data privacy and data security. But joking aside: The line-up over the three years has been first-class and diverse. In addition to ensuring a mix of disciplines, we have also always invited both up-and-coming young scientists and established researchers. This year, Helena Mihaljević provided an important critical contribution with her talk on bias and transparency in machine learning, which also generated a lot of discussion in the follow-up sessions. One constant over the years has been Timm Teubner, who launched the event with a talk on "How to become a Data Scientist in three Steps". But of course, I would like to thank all the speakers who made this series of events possible in the first place.

How have the lectures evolved since 2018?
Tschorsch: We started in very general terms with digital transformation and gave an overview of developments. We covered the basics of digitalization, such as digital systems and cloud computing, and then discussed various methods, applications and the consequences of digitalization. In the following years, we then placed an emphasis on data-driven digitalization, as this is where we believe there are misconceptions and the greatest need for clarification.

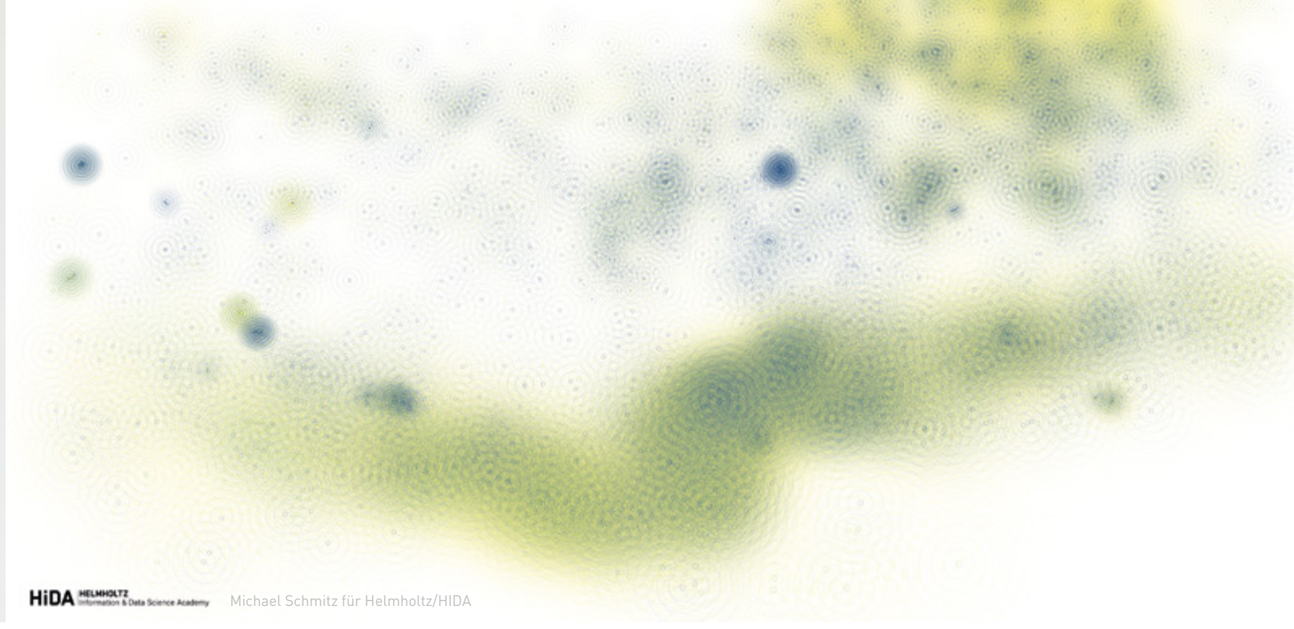
ECDF/PR/Felix Noak

„Data skills will be increasingly needed across all disciplines." TSCHORSCH

What plans do you have for future events?
Tschorsch: I think the lecture series has achieved its goals and it is time to plan the next steps. For me, what has been missing so far – and this is not only due to the pandemic – is more involvement of and exchange with the students. I'm imagining some sort of block course or summer school with hands-on elements. Thinking a little further, what is needed is a structured program that teaches digital and data literacy. Ideally, this should be offered to all students and available as an elective. In my view, however, it is not enough to recycle existing courses; tailor-made courses are needed. The lecture series is definitely a good example of that.

INTERVIEW: JANNES MÜNCHMEYER'S PHD IS ON THE FAST ASSESSMENT OF EARTHQUAKES

EDDY/PR/Felix Noak



HiDA HELMHOLTZ Information & Data Science Academy Michael Schmitz für Helmholtz/HIDA

The research data used for this graphical representation are for earthquakes in northern Chile in 2014 and include earthquake magnitude, time units, longitude, latitude, depth in kilometers, and earthquake magnitude measurement uncertainty. Jannes Münchmeyer used the data in his research, and the graphic was produced on behalf of the Helmholtz Information & Data Science Academy.

HEIBRIDS
HELMHOLTZ EINSTEIN INTERNATIONAL BERLIN RESEARCH SCHOOL IN DATA SCIENCE

Jannes Münchmeyer has been a HEIBRiDS PhD student since 2018; his topic is the fast assessment of earthquakes. His supervisors are Prof. Frederik Tilmann from the German Research Center for Geosciences (GFZ Potsdam) and Prof. Dr. Ulf Leser from the Humboldt-Universität zu Berlin. He talked to Nina Reinecke (coordinator of the HEIBRiDS research program).

You are a mathematician by training. What made you apply to HEIBRiDS, i.e. a PhD program that brings together data science and a natural science?
Münchmeyer: I studied math in my bachelor's and master's degrees, but I also took computer science as a minor in my bachelor's degree and did a lot of computer science in my master's degree. During my bachelor's, I was a student assistant at the Institute of Computer Science. First, I did classical bioinformatics at Ulf Leser's chair, i.e. gene regulatory networks, and then text mining with machine learning for processing biomedical texts. Then I realized that I didn't want to continue doing pure math, which is quite far from application, and machine learning is something I really enjoyed. Ulf Leser then recommended the HEIBRIDS program to me, which was just starting up. I looked at what was interesting to me from among the proposed projects. I wanted to work on a project with a clear set of data where we knew how the system itself worked and that had something to do with machine learning. That's how I ended up in Frederik Tilmann's project with 80 terabytes of earthquake data and large earthquake catalogues. How earthquakes work is understood physically. That was very appealing to me. After the three-day selection process that I was invited to, this project on the fast assessment of earthquakes was my clear preference.

Could you briefly describe your research topic for people who are neither seismologists nor computer scientists?
Münchmeyer: Earthquakes are major natural disasters that often cause great damage to people. We know a lot about earthquakes and a lot about wave propagation, but unfortunately we cannot yet say whether an earthquake will develop into a very large earthquake. In a very large earthquake, the actual earthquake rupture that sends out the waves lasts several minutes, but we don't know if it is possible to say how long the earthquake will last overall after five or ten seconds after the earthquake rupture begins, or perhaps only after the earthquake has already occurred. However, this question is essential in order to be able to warn people in time about the danger of the impending earthquake.

In Italy, for example, the largest quakes are only ten seconds long, but they can also be extremely destructive. I am trying to develop a model based on earthquake data from the last 30 years, and then apply it to new earthquakes to see at what point during the earthquake rupture our model correctly predicts how long the earthquake will last. Our question is: Is what we know about the earthquake after a few seconds enough to tell us how long and severe the earthquake will end up being? If we know that our model can do that safely after a few seconds, then we can use it to improve early warning systems.

How do you get the data you need for your research?
Münchmeyer: There are seismometer networks around the world that were set up by the Americans and the Soviet Union to look for signs of nuclear testing by the other power. This is very useful for us seismologists, and these networks continue to expand from a scientific perspective. The networks are available worldwide, record continuous data and deliver it to data centers. Seismologists came together around 20 years ago to talk about data standardization and settled on a data format. Now there are web services that I can use to query the measured values for each location and time. There are also earthquake catalogues, which state that an earthquake of such and such a magnitude occurred at this location and at this time. There is a great deal of globally measured data that is distributed in a standardized format to research institutions worldwide. We are fortunate there is a lot of freely available data, which – in the case of earthquakes – is rarely affected by data protection.

How do you divide your time between your two supervisors at GFZ Potsdam and Humboldt-Universität zu Berlin?
Münchmeyer: Before the pandemic, I spent four days in Potsdam at the GFZ and one day a week with the computer scientists in Adlershof. I have my own fully equipped workstation and computer at both locations. I thought it was good to have two workplaces, because at the GFZ I had a lot to do with seismology experts, but at HU I was dealing with computer scientists who had little experience with seismology and therefore had a completely different view of my project. There I could talk to people about my machine learning problems. So the one day at HU allowed me to keep one foot in this machine learning world.

Where do you see the advantage of HEIBRiDS over other doctoral programs?
Münchmeyer: There are two aspects that I particularly like: The first is the dual supervision, i.e. that you have one supervisor at a university and the other at a Helmholtz center. These two people contribute very different perspectives to the issues that come up. Frederik Tilmann knows seismology very well, of course, but he

can also ask, when it comes to statistics, whether the way I am doing something really makes sense. Ulf Leser has a completely different take on machine learning and related processes. When it comes to my future after my doctorate, it is also very helpful to be shown two different perspectives.

The second aspect is the HEIBRiDS cohort. I am not only embedded in the GFZ, where I would be relatively alone among very many seismologists, but also in the HEIBRiDS community, where I meet people from a broader spectrum. I get different ideas that way and can share new ideas with others. Therefore, I also have a little bit more understanding of how research and a PhD happens outside of my own group. If I were just doing a PhD in a normal research associate position, it would be much harder to get that outside-the-box view because I wouldn't be interacting as often with people from other institutes and other disciplines.

How has your research evolved since the pandemic, and what has been the personal impact of no longer being able to work in the field?
Münchmeyer: Overall, the pandemic has had surprisingly little impact on my research. I basically just sit in front of my computer in a different place now. But I had planned a stay abroad that couldn't take place. It has also changed how I interact with colleagues: There are people who I now meet virtually once a week in a much more structured way, and I now know much better what they are working on. But there are also colleagues, I haven't seen or spoken to in months. At HEIBRiDS, I always met the other PhD students every two weeks at the PhD Seminar or the HEIBRiDS Lecture, but that is no longer the case, of course. I still regularly meet with the ones who are closer to me thematically – at least online – and hopefully that will change again soon with the others

//HEIBRIDS GRADUATE SCHOOL

The ECDF has launched a joint graduate program in data science with the Helmholtz Association. Established in 2018, the Helmholtz Einstein International Berlin Research School in Data Science (HEIBRIDS) is an interdisciplinary program that trains young scientists in data science and other scientific disciplines at the same time. The goal is to train a generation of researchers who are exceptional data scientists and who understand the demands and challenges of disciplines where data science is a necessity.

LIST OF DOCTORAL PROJECTS

Name of doctoral candidate	Working title of the doctorate	Supervisors	Cohort
Thorren Gimm	Data-Driven Time-Dependent Multi-physics Simulation and Optimization of Electron Solvation from Nanodiamonds	Joachim Dzubiella (HZB) und Frank Noé (ECDF FU)	2020
Brian Groenke	A Data-Centric Workflow for Autonomous Monitoring of Arctic Land Surface Parameters	Julia Boike (AWI) und Guillermo Gallego (ECDF TU)	2020
Oleksii Martynchuk	Identification of Rock Falls in Mars Reconnaissance Orbiter Images Using Machine Learning	Jürgen Oberst (DLR) und Odej Kao (ECDF TU)	2020
Lusine Nazaretyan	Identification of Disease Causing Genetic Variants by Genome-Wide Predictions of Human Variant Effects	Martin Kircher (Charité) und Dieter Beule (MDC)	2020
Elizabeth Robertson	Building a Photonic Processor for Energy-Efficient AI	Janik Wolters (DLR) und Guillermo Gallego (ECDF TU)	2020
Hermann Julius Stolte	Dynamic Scheduling of Gamma-Ray Source Observations	Matthias Weidlich (HU) und Elisa Pueschel (DESY)	2020
Kevin Styp-Rekowski	Multi-Satellite Approach of Monitoring Atmosphere/Magnetosphere Space Weather Interactions	Odej Kao (ECDF TU) und Claudia Stolle (GFZ)	2020
Christian Utama	Explainable Artificial Intelligence and Trust in the Energy Sector	Christian Meske (ECDF FU) und Rutger Schlatmann (HZB)	2020
Nadja Veigel	Data Mining Dynamic Human Behaviours for Flood Risk Assessment in Coupled Human-Environment Systems	Andrea Cominola (ECDF TU) und Heidi Kreibich (GFZ)	2020
Xiaoyan Yu	Deep Learning with Sparse Annotations for the Analysis of Lung Tissue Microscopy Images	Dagmar Kainmüller (MDC) und Andreas Hocke (Charité)	2020

/ NETWORK

/ WEIZENBAUM INSTITUTE / ALEXANDER VON HUMBOLDT INSTITUTE FOR INTERNET AND SOCIETY (HIIG) / BERLIN CENTER FOR DIGITAL TRANSFORMATION / BERLIN PARTNER / CITY LAB BERLIN / BIH CHARITE CLINICIAN SCIENTIST PROGRAM / BERLIN INSTITUTE FOR THE FOUNDATIONS OF LEARNING AND DATA (BIFOLD) / ASSOCIATE MEMBERS / FUTURE SECURITY LAB / BERLIN OPEN LAB

DIGITALIZATION RESEARCH IN BERLIN
The ECDF research network

The ECDF has successfully built a comprehensive network of strategic collaborations with partners, further strengthening digitalization research in Berlin as a city of science. The ECDF is tackling the major challenge of digital transformation, working with research institutions, initiatives and businesses. In this section, we present a selection of these collaborations:

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

Researchers at the Alexander von Humboldt Institute for Internet and Society (HIIG) are investigating the development of the internet from a societal perspective in order to better understand the digitalization of all areas of our lives. This collaboration was further enhanced in 2020 – particularly through the establishment of the Digital Urban Center for Aging & Health (DUCAH), which was initiated by Prof. Dr. Dr. Thomas Schildhauer. The professor of electronic business at UdK Berlin is both principal investigator at the ECDF and Research Director at the Alexander von Humboldt Institute for the Internet and Society (HIIG). In addition to Prof. Dr. Dr. Felix Balzer (co-initiator of DUCAH), ten other ECDF Professors are involved in DUCAH (see page 46).

In addition to joint research projects, the ECDF initiated the event Sustainable Digitalization in Urban Areas with the Weizenbaum Institute and HIIG. This new event takes place as part of Berlin Science Week and combines the strengths of the three institutions in researching current issues in digitalization. Originally, the November 2020 event was planned as a large-scale, all-day conference at the Urania venue in Berlin. However, due to the pandemic, it took place virtually (see page 111).

//BIH CHARITE: DIGITAL CLINICIAN SCIENTIST PROGRAM

Charité – Universitätsmedizin Berlin and the Berlin Institute of Health (BIH) jointly organize the Digital Clinician Scientist Program (D-CSP). The program is led by Prof. Duska Dragun, Director of the BIH Biomedical Innovation Academy. It is primarily aimed at medical doctors who have experience of innovative research projects, technological challenges and data-driven medicine from their specialist training. A number of experts from Charité and the BIH will be involved in designing the program and recruiting and supervising the participants. They will be supported by partners from the Max Delbrück Center for Molecular Medicine (MDC), the Berlin Institute for Medical Systems Biology (BIMSB), the ECDF and the Bernstein Center for Computational Neuroscience (BCCN). Prof. Dr. Odej Kao (ECDF) is supervising Dr. Julius Emmrich and Dr. Samuel Knauss, who have been Associate Members of the ECDF since 2017.

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

In January 2020, the Berlin Institute for the Foundations of Learning and Data (BIFOLD) was launched as a flagship for cutting-edge AI as part of the AI strategy of the German government. This involved a merger of two existing AI competence centers at Technische Universität Berlin: the Berlin Big Data Center (BBDC) and the Berlin Center for Machine Learning (BZML). The goal of BIFOLD is to closely integrate research, education and

innovation with regard to big data and machine learning. In terms of its areas of work, BIFOLD pursues three major objectives:

// top level research in the areas of big data and machine learning and their interfaces,
// the development of technologies, tools and systems to firmly embed the topic of AI in academia and, research as well as in business and civil society
// train and educate the AI experts urgently required internationally.

Overlaps in personnel at the ECDF and BIFOLD help create synergies. The directors of BIFOLD, Prof. Dr. Volker Markl and Prof. Dr. Klaus-Robert Müller, are principal investigators at ECDF. In addition, Prof. Dr. Guiseppe Caire, Prof. Dr. Manfred Hauswirth, Prof. Dr. Odej Kao, Prof. Dr. Titus Kühne, Prof. Dr. Christof Schütte, and Prof. Dr. Thomas Wiegand are principal investigators at both ECDF and BIFOLD.

//BERLIN OPEN LAB

The Berlin Open Lab (BOL) is an experimental space for transdisciplinary research projects at the intersection of technology, society and art. It brings together researchers from different disciplines at the Charlottenburg campus to enable new forms of design. It has a dedicated lab for digital-based production, smart material interfaces and wearable computing, as well as a space for design research with augmented and virtual reality. It was initiated by the Berlin University of the Arts (UdK) in partnership with Technische Universität Berlin. The ECDF and the Weizenbaum Institute are close cooperation partners. ECDF Professors at UdK Berlin use the Berlin Open Lab for activities such as conducting experimental research. In 2020, the research team led by Prof. Dr. Berit Greinke investigated the use of e-textile sensors and gesture tracking technologies to track the movements of an orchestra conductor (see page 42). The ECDF Micro Factory supported the research group at the BOL in producing printed circuit board prototypes. These were subsequently used in a design concept by visiting scholar Pauline Vierne.

//BERLIN PARTNER

Berlin Partner offers business and technology support for scientific institutions in Berlin. The ECDF has had a close relationship with Berlin Partner since its inception. This collaboration bore fruit again in 2020. Participants at the ECDF Industry Day in January (see page 95) were able to learn about cooperation opportunities and activities with Berlin Partner at an information booth set up by the ICT, Media and Creative Industries cluster. These opportunities were used extensively by a number of ECDF researchers as well as our industrial partners. Representatives of Berlin Partner are also regular participants in ECDF events such as the Industry Forum and vice versa, of course. ECDF Professors are sought-after panelists at expert discussions organized by Berlin Partner. The two institutions also work closely on forming consortia for applications targeted at the Berlin science and research community.

//CityLAB BERLIN

CityLAB is a public experimental laboratory for the city of the future run by Technologiestiftung Berlin. The lab is home to a network of practitioners from public administration, civil society, academic and business start-ups, who work together on new ideas for a more livable Berlin. CityLAB combines elements from digital workshops, co-working facilities, and event venues to create a space where participation and innovation thrive together. ECDF Professors cooperate closely with CityLab in joint research projects as well as events. For example, Prof. Dr. Helena Mihaljević implemented the Open Traffic Count project (see page 47) in collaboration with CityLab. As part of the Summer School 2020, which focused on Data-Driven Urban Innovation, Prof. Jochen Rabe gave a presentation together with Max Rudolph on the Platform for Urban Exchange. They explored how the transformation of cities can be supported, communicated and discussed through data. They discussed this question using the Platform for Urban Exchange, which was developed as part of the CityLAB project StadtManufaktur (see page 50). The platform will be developed further both in analog and digital format based on the three urban development scenarios in Neu- Hohenschönhausen: "New Center", "Conversion" and "Redensification".

//BERLIN CENTER FOR DIGITAL TRANSFORMATION

The Berlin Center for Digital Transformation has been developed jointly by the Berlin-based Fraunhofer Institutes. Its research focus is on the Internet of Things, cyber physical systems, Industry 4.0 and 5G mobile communications. The center supports businesses in their digital transformation with technologies and practical solutions for an environment of increasing digitalization and networks. Priority areas include Mobility and the City of the Future, as well as Industry and Production. The Berlin Center for Digital Transformation also supports the implementation of secure cyber-physical systems as well as application scenarios for new 5G network technology. Four heads of the Fraunhofer Institutes (Prof. Dr. Manfred Hauswirth, Prof. Dr. rer. nat. Martin Schell, Prof. Dr.-Ing. Thomas Wiegand, Prof. Dr. Klaus-Dieter Lang) are principal investigators at the ECDF. Prof. Dr. Odej Kao, Chair of the ECDF Executive Board, is also a member of the center's scientific advisory board.

//WEIZENBAUM INSTITUTE

ECDF continued to develop its collaboration with the Weizenbaum Institute for the Networked Society in 2020. Further joint activities were pursued alongside the many existing overlaps in personnel: Prof. Dr. Michelle Christensen (TU Berlin), Prof. Dr. Florian Conradi (TU Berlin), 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). In addition to their activities at the ECDF, Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi jointly lead the research group on Critical Maker Culture at the Weizenbaum Institute. Working with their teams at both institutions, they have developed prototypes, published papers and organized events. In May 2020, for example, they initiated the African Makers Against Covid-19 digital roundtable in collaboration with Africa Open Science & Hardware (Gameli Adzaho), ECDF, and the Weizenbaum Institute – and in dialogue with GIZ Togo and GIZ Ghana (see page 19).

The German Internet Institute is a joint project from Berlin and Brandenburg funded by the Federal Ministry of Education and Research (BMBF). It conducts interdisciplinary and basic research into the transformation of society through digitalization and develops design options for policymakers, businesses and civil society. The aim is to better understand the dynamics, mechanisms and implications of digitalization. With this in mind, researchers at Weizenbaum Institute are investigating the ethical, legal, economic and political aspects of digital transformation. This provides an empirical basis for responsibly managing digitalization. In order to develop potential courses of action for policymakers, businesses and civil society, the Weizenbaum Institute brings together interdisciplinary problem-oriented basic research with the exploration of real-world solutions and public dialogue.

/ ROBERT-KOCH-FORUM

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

ECDF/PR/Friedrich Schmidgall

ROBERT KOCH FORUM
An interdisciplinary research and meeting space

The ECDF has created an inspiring space in the Robert Koch Forum in Berlin-Mitte where researchers can meet each other and the public, listen to one another, and develop ideas. These important meetings and exchanges take place both in the co-working area, in the event hall, in seminar rooms, in the Micro Factory, the Future Security Lab, or even over a cup of coffee in the Social Space.

In 2020, we were faced with the question: How can essential collaborative and interdisciplinary work continue if the Robert Koch Forum is closed due to the Covid restrictions? In this section, we explain how the House of Digitalization became an important base for collaboration, even in times of the pandemic.

//CO-WORKING SPACE

The co-working space on the 2nd floor has become a place for professors and their research assistants to work and meet. The opening of the Social Space in the fall of 2019 has made an important contribution to this. Places can be booked via the booking system in the ECDF website login area.

In the spring of 2020, the co-working space was one of the first areas in the Robert Koch Forum to be closed due to Covid containment measures. Once infection rates had dropped sufficiently in September, the TU Berlin crisis committee allowed the use of office space for around nine weeks under strict hygiene and distance requirements.

This showed just how important this space had become to researchers. Demand among the professors and their research groups was high after many of them had worked completely from home for more than seven months.

The space had to be converted in order for it to be used: Co-working areas and meeting rooms became individual offices. People had to register to use the rooms so that infections could be traced if necessary. Face coverings, disinfectants and distance markers have been part of everyday life in the ECDF ever since. Since mid-December 2020, the co-working spaces have been closed again due to rising infection rates nationwide.

//MICRO FACTORY

The ECDF Micro Factory offers scientists the opportunity to develop ideas and solutions outside of conventional research structures. They can get support when they want to try out concepts and investigate their potential and risks. The head of the Micro Factory is designer Friedrich Schmidgall. He regularly offers seminars on topics such as 3D Printing and an introduction to electronics. These are targeted at ECDF Professors, research assistants, doctoral students, and student assistants. In order to continue offering the seminars during the pandemic, Friedrich Schmidgall translated the on-site events into remote workshops. But it was essential to maintain the practical nature of the Micro Factory workshops. With this in mind, participants of the introduction to Arduino Microcontrollers in October 2020 received the necessary components in advance by mail. Over a video call, they used the components to build and program an interactive object.

//DEMO ROOM

The ECDF Demo Room offers research that people can touch and try out. Visitors can learn about current technological trends and research approaches. In the exhibition room on the second floor of the Robert Koch Forum, prototypes and research findings from the ECDF Network are on show. The diversity of the exhibits shows how traditional ways of thinking can be broken down and illustrates the ECDF's interdisciplinary approach. The Demo Room functions as an exhibition space, while at the same time constantly generating new questions about a whole of host of societal issues, about living together, culture, health, and about new forms of knowledge generation in a digital future. Alongside the Micro Factory, the Demo Room is another exciting location for delegations visiting the ECDF from Germany and abroad. The ECDF took the opportunity in 2020 to revamp the Demo Room. Other exhibits from current research projects were added, such as the app from the BBBlockchain research project (see page 51) and a multimedia installation that displays the data collected by the SimRa app in a 3D-printed city model (see page 49).

//TV STUDIO

Zoom meetings, online conferences, virtual hackathons: Since the start of the coronavirus pandemic, the vast majority of events have moved online – and the ECDF is no exception. In the fall of 2020, when it became clear that Covid-19 restrictions would continue to affect event operations for the foreseeable future, the ECDF started plans to create a TV studio in the Robert Koch Forum. The studio will ensure the delivery of high-quality and professional online and hybrid events. It was important to us to stay within the corporate design of the ECDF and to give participants the sense that they were in the large auditorium. Professors and partners of the ECDF can use the TV studio for their own events. From recording a keynote and streaming digital events to moderating a discussion from the TV studio, there are many possible uses.

Hagen Tischer

FUTURE SECURITY LAB

Visit the ECDF Public Security Research Forum online

The Future Security Lab of the Public Security Research Forum presents research findings around security to see, touch, and experience in realistic scenarios at the ECDF buildings. The lab also encourages reflection and discussion about how we perceive security technology in society, including its 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.

In 2020, the Future Security Lab faced major challenges due to the pandemic since the site was no longer accessible. In order to continue to present the latest developments in civil security research to researchers, policymakers and end users, the laboratory became accessible online and parts of it were made virtual. With this in mind, numerous cameras and microphones were installed and all existing scenarios were made accessible through hybrid displays. By means of video and graphic overlays and remote access to selected security projects, users were able to try out current software solutions through digital remote access and get to know, try out and discuss most of the content with the Public Security Research Forum.

In 2020, new scenarios were added the Technification of Security and on Extremism and Violence. The first of these scenarios deals with the increasing use of technology in the security sector, focusing on face recognition and predictive policing. The Extremism and Violence scenarios also include a range of projects. In addition, the Public Safety Research Forum held its first purely virtual workshop with selected experts and covered topics such as online extremism, extremism and empiricism, and experiences of violence by local politicians. The federal level was also involved through members of the Committee on Internal Affairs: Susanne Mittag (SPD), Renate Künast (Alliance '90/The Greens), Konstantin Kuhle (FDP) and Dr. André Hahn (The Left Party) joined Prof. Dr. Christopher Daase on the panel to discuss current federal policy perspectives on extremism and radicalization.

Working with colleagues in the ECDF, the task now is to actively design and develop research activities at the ECDF and expand the work of the Future Security Lab.

/ EVENTS

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

With more than 70 events and around 3000 participants in 2019, the ECDF started the 2020 event cycle with a lot of tailwind and a sense of euphoria. At the start of the year, the calendar of events for 2020 was already close to bursting. However, the rapid spread of the coronavirus thwarted plans at the ECDF, so that from the beginning of February and for the rest of the year almost no in-person events could take place at our premises in Berlin-Mitte. We are pleased to report that we were quickly able to move events online – both our own innovative formats and the numerous contributions from our researchers at virtual events organized by cooperation partners and institutions. Here we present a selection of the events from 2020.

ECDF/PR/Tim Kawalun

CONFERENCE

Annual Planning Retreat of the Senate Department for Economics, Energy, and Public Enterprises

9 January 2020
Einstein Center Digital Future

The ECDF 2020 event calendar kicked off with the annual planning retreat of the Digitalization Group (focus: digital strategy, digital agency), digital infrastructure (broadband/fiber-optic expansion/5G), digital economy (IoT, AI, blockchain, cyber security and 5G applications) and open data at the Berlin Senate Department for Economics, Energy and Public Enterprises. At the request of department head Sebastian Askar, ECDF board member Prof. Dr. Jochen Schiller informed the 13 participants about the status and activities of the research center at the start of the workshop. This resulted in a lively discussion, and a whole series of interesting common points of interest between the Senate Department for Economics, Energy and Public Enterprises and the ECDF. One of these points was the design and delivery of joint events, so that ultimately the retreat also laid the foundation for the staging of the joint Berlin Water Hackathon 2021, will take took place in January 2021.

Conference on Digital Innovations in Healthcare

15 January 2020
Einstein Center Digital Future

For the second event of the year, the ECDF welcomed high-ranking visitors. Federal Minister of Health Jens Spahn was one of the many guests at the Digital Innovations in Healthcare conference hosted by the Verband der Privaten Krankenversicherungen (German association of private health insurers). Participants from the realms of business and academia discussed the use of venture capital in shaping an innovative and digital healthcare system. Prof. Dr. Dr. Felix Balzer, ECDF board member and professor of E-Health and Shared Decision Allocation (Charité – Universitätsmedizin Berlin) was among the panelists. He gave an insight into the possibilities for digital innovation in the healthcare sector, giving the example of a hospital that would have the capability, through digital technologies, to uniformly view and evaluate patients' health data and enhance these with its own medical treatments.

ECDF/PR/Felix Noak

ECDF INDUSTRY DAY & NEW YEAR'S RECEPTION
21 January 2020

To officially ring in 2020 – and, of course, without any idea of the impending upheavals due to the coronavirus – the ECDF Industry Day took place on 21 January, followed immediately by the New Year's Reception. The aim of the match-making event, which was held in the morning, was to facilitate expert dialog on digitalization. In a poster session, the 70 participants began by gaining an overview of the current research projects of ECDF Professors. Following this, industry partners and ECDF Professors held one-on-one meetings to establish connections, identify further potential for cooperation, and jointly develop new project ideas.

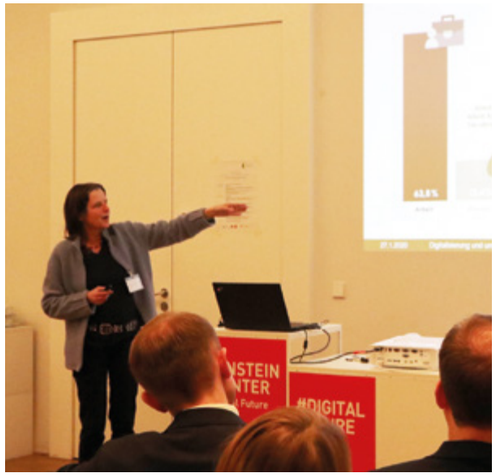
The New Year's Reception in the evening was an opportunity for participants to continue conversations in a relaxed atmosphere and raise a glass to a successful 2020. ECDF speaker Prof. Dr. Odej Kao thanked the attendees, including TU President Prof. Dr. Christian Thomsen and Prof. Dr. Dr. h.c. Günter Stock, Chair of Executive Board of the Einstein Foundation Berlin, for the excellent collaboration over the past year. In his address, he particularly stressed the commitment of ECDF researchers and the Management Office, who were great ambassadors for the center's interdisciplinary approach to research on digitalization. On a related note, after a short introduction from Prof. Dr. Gesche Joost, the spotlight turned to two ECDF research initiatives. Felix Biessmann, ECDF Professor of Data Science (Beuth University of Applied Sciences) presented the Green Consumption Assistant, a joint project with ECDF Professor Tilman Santarius (Socio-Ecological Transformation and Sustainable Digitization, TU Berlin), which helps people consume more sustainably by displaying the real-world impact of consumer decisions when they search for products using the Ecosia search engine. ECDF Professors Michelle Christensen and Florian Conradi (Open Science, TU Berlin) then introduced the research of the Critical Maker Lab, which they co-initiated. The lab is a transdisciplinary and transuniversity research site that promotes practical collaboration between researchers and civil society. Over snacks and drinks, the guests then continued their discussions about joint projects for 2020.

WORKSHOP

Workshop on Digitalization and IT Security in Buildings

23 January 2020
Einstein Center Digital Futur

Around 30 participants travelled to the ECDF on 23 January to take part in the workshop Digitalization and IT Security in Buildings initiated by the company Gegenbauer in cooperation with ECDF Professor Daniel Fürstenau (Digital Transformation and IT Infrastructures, Freie Universität Berlin). The aim of the half-day think tank workshop was to exchange views on the state of the art of digitalization research into IT security in and for buildings. The workshop was attended by representatives of ECDF donors such as the Berliner Sparkasse and ECDF Professor Florian Tschorsch (Distributed Security Infrastructures, TU Berlin), ECDF Fellow Prof. Dr. Adam Wolisz (TU Berlin), who also participated in the event, played a key role in the creation of the workshop.



ECDF/PR

Bits & Trees Forum #2

27 January 2020
Einstein Center Digital Future

There is currently a lot of discussion about the political framework for digitalization and climate action. The main subject of discussion is a digital tax, which would ensure digital corporations contributed to the financing of public services (a carbon tax or expanded emissions trading to reduce emissions that are harmful to the climate). In the second Bits & Trees Forum, "Ecological digital tax - Which political instruments make digitalization sustainable?", the two challenges of digitalization and climate were considered together. How can taxes help steer environmental action in the Digital Economy? Are ideas like the carbon tax sufficient, or do we need separate instruments? Participants addressed these and other questions at the workshop organized by the Institute for Ecological Economy Research (IÖW) together with the ECDF. They agreed that the existing variations of the digital tax do not yet have a specific effect in terms of steering environmental action. The international debate on unified tax legislation for multinational companies has not yet addressed the link between taxation and digitalization with the goal of sustainability.

Bundesregierung/ Lene Münch

Evening event on the Digital World of Work and Smart Medicine

30 January 2020
Federal Press Office

ECDF Professor Anastasia Danilov (Organizational Economics – Future of Work, HU Berlin) was one of the keynote speakers at the evening event on the "Digital world of work and smart medicine - AI and points of tension between academia, civil society and policy-making", which was organized by the Federal Press Office together with the Einstein Foundation Berlin. After Deputy Government Spokeswoman Ulrike Demmer had welcomed the 300 guests, Dorothee Bär, Minister of State for Digitalization, underscored the importance of digitalization in the German government's policies. In the subsequent panel discussion, Anastasia Danilov, State Secretary Björn Böhning and others discussed the possible monitoring of employees by AI systems and the lack of data on the use of AI in the world of work. The ECDF was also represented at the event with its own booth, where guests could get a hands-on impression of the center's diverse projects including SimRa – Safety in Bicycle Traffic project and the Future Security Lab.

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Florian Conradi

Panel discussion on Algorithms and the Reproduction of Social Inequality

12 February 2020
French Embassy Berlin

"Algorithms and the reproduction of social inequality – is artificial intelligence sexist?" This was the topic of the panel discussion at the French Embassy in Berlin, which included ECDF Professor Michelle Christensen (Open Science, TU Berlin). Technologies invented and manufactured by humans also generate biases in the field of AI, which are increasingly highlighted in studies and research. Often without the knowledge of their creators, algorithms contribute to reproducing and even reinforcing gender inequalities. This also contributes to people questioning the place of women in science. As a result, more and more researchers and activists are now addressing this issue and looking for solutions to close this gap in our digital world and enable better inclusion of women. The conversation was moderated by AC Coppens, and involved Michelle Christensen, French Ambassador Anne- Marie Descôtes, Isabelle Collet (University of Geneva), Nani Jansen Reventlow (Digital Freedom Fund), and Antonio Krüger (German Research Center for Artificial Intelligence).

ECDF/PR/Simone Harr

WOMEN IN STEAM KICK-OFF EVENT
4 February 2020

ECDF researchers launched the Women in STEAM initiative. Around 50 guests attended the kick-off event to discuss issues including equal opportunities in digitalization. The goals of the initiative are to highlight the achievements of women and to advance interdisciplinary research on digitalization – especially in STEAM fields (Science, Technology, Engineering, Arts, Mathematics). It will also help highlight career opportunities for young female academics. "We want to continue to drive the public discourse and advocate for more equal opportunities, diversity, and digital empowerment," said Prof. Dr. Elisabeth Mayweg. She launched the initiative at the end of 2018 along with Prof. Dr. Berit Greinke and Prof. Dr. Helena Mihaljević, who hosted the event.

Prof. Dr. Gesche Joost was enthusiastic about the initiative. She is a member of the ECDF board and professor for design research at UdK Berlin. "Diversity at the ECDF is very important to us," she stressed. During her presentation, she remembered her college days when she taught herself to program with HTML. Gesche Joost also encouraged the female scientists and researchers to get involved in decision-making bodies in academia, business, associations, NGOs, and faith organizations. "We should be more present on boards of directors and supervisory boards in order to give voice to diverse perspectives and represent our interests."

Prof. Dr. Aysel Yollu-Tok is Professor of Economics at the Berlin School of Economics and Law (HWR Berlin) and Chair of the Expert Commission on the German Government's Third Gender Equality Report. The initiative is particularly important to her, because the Gender Equality Report looks at what needs to change in order to develop the digital economy in such a way that women and men have equal opportunities to achieve their potential.

ECDF/PR/Felix Noak

„We want to continue to drive public discourse and advocate for more equal opportunities, diversity, and digital empowerment." MAYWEG

Prof. Dr. Corinna Bath looked back at the first STE(A)M initiatives. The professor of gender, technology and mobility at TU Braunschweig reported on the initial activities and the establishment of the Women in Science and Technology association in 1988. Interdisciplinary collaboration between STEM fields and the arts and humanities was particularly crucial to addressing the issue of equal opportunities.

Following the keynote presentations, the participants discussed events, collaborations, and projects. The guests were invited to discuss and note down their wishes, ideas, and suggestions on cards prepared by Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi.

Basecamp

Telefónica Deutschland's debate room and public affairs blog

13 February 2020
Basecamp Berlin Mitte

ECDF Professor Tilman Santarius (Socio-ecological Transformation and Sustainable Digitalization, TU Berlin) attended the debate room hosted by Telefónica Deutschland at Basecamp in Berlin-Mitte on 13 February. The fight against climate change and the digitalization of industry and civil society are the two mega issues at the beginning of the 21st century. But what is the relationship between sustainability and digitalization? Can digitalization help us save energy, use resources more efficiently and emit less CO2? Or does it act as an accelerator of climate change? Telefónica CEO Markus Haas hosted the debate on these questions with guests that included, alongside Santarius, the Parliamentary State Secretary at the Federal Ministry for the Environment (BMU) Rita Schwarzelühr-Sutter (SPD), the Fridays for Future activist Pauline Brünger, and the Global Sustainability Officer of Siemens Real Estate Rainer Kohns.

twitter.com/Berlininnovations

Talking Biography Series – A networking event for women scientists

17 February 2020
Berlin Institute of Health (BIH)

The "Talking Biography Series – A networking event for women scientists" aims to offer female academics at the beginning of their careers the opportunity to network with an established and preeminent researcher or someone working in the field of technology transfer. This open informal seminar which was initiated by the Equal Opportunities Office at the Berlin Institute of Health (BIH) covered topics such as career planning, negotiation skills, and entrepreneurship. On 17 February, ECDF board member Prof. Dr. Gesche Joost (UdK Berlin) attended the networking event, which is part of the FEMALE CAREER@BIH program. Joost gave the participants an insight into her research as well as projects in international research and development that she has played a key role in initiating. The projects are in the fields of human-computer interaction, wearable computing, and user-centered design and participation. Following the presentation, participants had the opportunity to ask questions and share their thoughts.

ZEUS 20

ZEUS 20 – 12th Central European Workshop on Services and their Composition

20 February 2020
Hasso Plattner Institute / Potsdam

Digital transformation is data-driven. While we use data to extract valuable information, it also raises serious data privacy concerns. ECDF Professor Florian Tschorsch (Distributed Security Infrastructures, TU Berlin) gave a keynote address on The Dream of Anonymous Data at the ZEUS – 12th Central European Workshop at the Hasso Plattner Institute (HPI). He discussed research findings on data anonymization and privacy-friendly data analysis. In particular, he demonstrated how to quantify re-identification risk and described how anonymization methods do not protect privacy. This creates a need to develop new approaches to data collection and protection, which were dealt with in the second part of the presentation. He closed by offering an outlook on future research directions in the data security sector. The event took a look at current educational projects at German federal and state level and took stock of the state of open education in Germany.

PRESENTATION

Business breakfast with German Association for Small and Medium-sized Businesses / Der Tagesspiegel

3 March 2020
BVMW

A business breakfast organized by Der Tagesspiegel newspaper and the German Association for Small and Medium-sized Businesses (BVMW) focused on changes in the world of work as a result of demographic developments and shifting values. ECDF Professor Anastasia Danilov (Organizational Economics – Future of Work, HU Berlin) opened the event with a keynote speech. She addressed the question: "How can we increase collaboration among employees and how do people respond to certain incentives and organizational structures?" This was followed by a panel discussion involving experts from the field of HR. The business breakfast marked the start of a series that was to be followed by three further events over the course of the year.

CONFERENCE

(Virtual) Bits & Trees Forum #3

23 April 2020
Online

The third Bits & Trees Forum was entitled "Durable, open, repairable and data-saving. Design options for sustainable hardware and software." While the first two editions were held as face-to-face events at the ECDF (for the report on the second edition, see page 96), the third edition was the first ECDF event to be held online as a result of the pandemic. The forum was primarily initiated by the Institute for Ecological Economy Research (IÖW) Berlin and ECDF Professor Tilman Santarius (Social-Ecological Transformation and Sustainable Digitization, TU Berlin). This time the participants explored the question of how hardware and software can be designed sustainably. After keynote speeches by Maximilian Voigt (Open Knowledge Foundation Germany) and Marina Köhn (German Environment Agency), the participants joined virtual dialogue workshops where they developed concepts and requirements for sustainable ICT across a number of thematic sessions. In the final panel discussion, Prof. Dr. Stefan Naumann (Environmental Campus Birkenfeld), Rita Schwarzelühr-Sutter (Parliamentary State Secretary at the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety), and Cathleen Berger (Mozilla Foundation) discussed the political framework needed to implement these sustainable ICT concepts.

CONVERSATION

#DigitalSociety (HIIG) "The crises of digital capitalism"

27 April 2020
Online

What is digital capitalism? How are digitalization and socio-economic crises related? And what can we learn from this about the post-Covid world? ECDF Professor Philipp Staab (Sociology of the Future of Work, HU Berlin) was invited by the Alexander von Humboldt Institute for Internet and Society (HIIG) and the Federal Agency for Civic Education (bpb) to discuss these questions as part of their lecture series on "Making sense of the digital society". In conversation with moderator Tobi Müller, he compared the digital capitalism of the present with the mercantilism of the 17th and 18th centuries. "Mercantilism predominates in a world without growth. So it was over the moment productivity increased significantly. In the context of the growth crisis of the present, mercantilism is returning in the form of digital trade monopolies," Staab said. In his conclusion, he stressed that neoliberalism has led to societies to sacrifice collective freedom in favor of individual consumer choice. In his view, the rediscovery of the concept of collective freedom is key to a functioning digital society.

HACKATHON

Healthcare Hackathon Kiel

4 June 2020
Online

ECDF Professor Felix Balzer (E-Health and Shared Decision Allocation, Charité – Universitätsmedizin Berlin) was one of the speakers at the Healthcare Hackathon Kiel organized by the University Medical Center of the Johannes Gutenberg-University Mainz. It was an interactive event held almost exclusively online. Balzer focused on three key challenges of e-health in his presentation: Firstly, he identified the meaningful use of data resulting from increased digitalization as one of the main fields of work for e-health given the increasing complexity of medical knowledge. The other two key challenges included the heterogeneous nature of the care and IT structures in our healthcare system and the increase in chronic diseases and multimorbidity. For the second year, the Healthcare Hackathon was held as a series of events together with the University Medical Center in Mainz and the Health Innovation Hub. Participants were able to view the lectures online via livestream. The patron of the event was Schleswig-Holstein's Minister of Health, Dr. Heiner Garg.

CONFERENCE

(Virtual) Bits & Trees Forum #4

15 June 2020
Online

Limiting the commercialization of the internet is a major challenge, as many digital business models are based on data trading and advertising. In addition, large tech companies such as Google, Amazon, Facebook, and Apple dominate the market, squeezing out non-commercial companies and influencing public opinion. The 4th Bits & Trees Forum organized by the Institute for Ecological Economy Research (IÖW) in cooperation with the ECDF was entitled "From Commerce to Commons – Creating an Internet for the Common Good". Participants explored potential solutions for limiting commercialization, power asymmetries and the formation of monopolies on the internet. They also discussed how commons-based and public benefit-oriented infrastructures and services can be supported. In addition to ECDF Professor Tilman Santarius (Socio-Ecological Transformation and Sustainable Digitalization, TU Berlin), ECDF was also represented by experts including Dominik Piétron (research assistant in the Sociology of the Future of Work Department, HU Berlin) who led an interactive session on Sovereign Digital Infrastructure.

ECDF/PR/Simone Harr

EXHIBITION

Start of StadtManufaktur Exhibition: Living Labs and Experiments in Urban Transformation

28 June 2020
Online

StadtManufaktur opened its doors with a digital exhibition. The initiative was founded by experts including ECDF Professor Jochen Rabe (Urban Resilience and Digitalization, TU Berlin) together with the Center for Technology and Society. The goal of StadtManufaktur is to solve complex urban challenges through collaboration between research and practice. ECDF Professors Helena Mihaljević (Data Science, HTW Berlin) and Max von Grafenstein (Digital Self-Determination, UdK Berlin) are also involved in the initiative. With the StadtManufaktur Berlin, TU Berlin is looking to enter into a new partnership with the city of Berlin. StadtManufaktur Berlin reconciles the transfer of research and development findings with research and development needs through mutual exchange and joint experimentation. The digital exhibition gave a first insight into scenarios, discourses and tools for urban transformation using the example of Neu-Hohenschönhausen, a StadtManufaktur pilot project initiated by researchers and other urban stakeholders.

CONFERENCE

IFAC 2020 World Congress

11 to 17 July 2020
Online

ECDF Professor Sergio Lucia (Internet of Things for Smart Buildings, TU Berlin until 08/20) was part of the National Organizing Committee (NOC) of the first IFAC World Congress 2020. As IT Chair, he was in the Working Group Local Berlin. The congress was held virtually due to the coronavirus pandemic. IFAC is the International Federation for Automatic Control. The main part of the congress consisted of 3,000 presentations across more than 250 virtual sessions. The program also consisted of a workshop day, on which a series of workshops covering a wide range of topics were attended by more than 750 participants. The congress also offered entertaining events such as the multilingual Girls in Control workshop, in which young female researchers explored the universe of control. In addition, participants were able to take part in a range of virtual social events.

CONFERENCE

RiSWP – A Smart Start to Your Water Career

14 July 2020
Online

The SWAN (Smart Water Networks Forum) kick-off event on 14 July was entitled Rising Smart Water Professionals (RiSWP). It brought together young professionals and students from around the world who were interested in smart solutions in the water sector. The event included a keynote address by Joone Lopez, General Manager of the Moulton Niguel Water District, and interactive roundtable discussions on topics such as AI, continuing education, the nexus of water, people and technology, climate change, and smart water implementation. ECDF Professor Andrea Cominola (Smart Water Networks/TU Berlin) was one of the mentors of the event, which gives participants an opportunity to exchange information in regular workshops on career options in the field of sustainable water supply.

WORKSHOP

SimRa – Virtual Workshop Berlin & Publication of First Results

3 and 4 August 2020
Online

The SimRa research project published its first results for Berlin in August 2020. Since the start of the project, 18,350 trips have been recorded and 17,358 (94.6%) have been analyzed. The data shows that streets used by cyclists with cars traveling in both directions and with parking spaces but without cycle paths are particularly dangerous. "The cyclists on these stretches of road are often overtaken very closely and at high speed. If drivers can't overtake, they usually drive up close behind the cyclists," reports ECDF Professor David Bermbach (Mobile Cloud Computing, TU Berlin). An interactive results map shows all road sections and intersections (the "highways" OMS type) for which there are either a) at least 50 trips or b) at least ten trips and a hazard score of 0.25 or more. Users can click on street segments and intersections on the map to view the recorded incidents. In their presentation, the researchers identified solutions for specific street sections and intersections. These were intended as a basis for discussion and not as an immediate recommendation for implementation.

PODCAST

#AskDifferent – the Einstein Foundation Podcast #4

20 August 2020
Einstein Stiftung

Tilman Santarius firmly believes that the digital transformation must be socially just and climate friendly. The ECDF Professor for socio-ecological transformation and sustainable digitization (TU Berlin) spoke in the podcast about how people should think about the role that science and industry – and ultimately all of us – play in this. In the podcast series #AskDifferent, researchers supported by the Einstein Foundation Berlin (ESB) talk about the small steps and big coincidences that have led to an extraordinary career. Twice a month, ESB uploads a new interview with a bright mind and lateral thinker. The interviews are conducted by journalists Nancy Fischer and Leon Stebe.

AWARD

DEEP TECH Awards 2020 Ceremony

27 August 2020
ALICE Rooftop & Garden

ECDF board member Prof. Dr. Jochen Schiller (Freie Universität Berlin) was on the jury for the DEEP TECH Award 2020. At the ALICE Rooftop & Garden, Christian Rickerts, State Secretary of the Senate Department for Economics, Energy and Public Enterprises, presented the awards to small and medium-sized companies with innovative, application-oriented software- and hardware-based solutions that are "made in Berlin". Since 2015, the Berlin Senate Department for Economics, Energy and Public Enterprises has been awarding the prize to Berlin-based companies and start-ups. The DEEP TECH Award is co-financed by the European Regional Development Fund (ERDF). Prizes are awarded for application-oriented and proven solutions as well as software- and/or hardware-based products that demonstrate a high degree of innovation and great potential for the future.

WEBINAR

Webinar on Measuring and Reducing the Gender Gap in Science

1 September 2020
Online

Measuring and Reducing the Gender Gap in the Mathematical, Computing, and Natural Sciences is a webinar from the Gender Gap in Science project. The free webinar, which was held on 1 September 2020, was hosted by the U.S. National Committee (USNC) for the International Union of Pure and Applied Chemistry (IUPAC). The Gender Gap in Science project is funded by the International Science Council and eleven partner organizations and aims to help narrow the gap between women and men in their scientific careers. It has developed three complementary approaches: a global survey of scientists, a study of publication patterns by gender, and a database of best practices to guide improvements. Moderator Mark Cesa led the webinar, which included a talk from ECDF Professor Helena Mihaljević (Data Science, HTW Berlin) about her contribution to the book on the gender gap in science "A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to Measure It, How to Reduce It?", which was published in June 2020.

WORKSHOP

IEEE Security & Privacy on the Blockchain (IEEE S&B 2020)

7 to 11 September 2020
Online

ECDF Professor Florian Tschorsch (Distributed Security Infrastructures, TU Berlin) acted as Program Chair of the IEEE Security & Privacy on the Blockchain symposium (IEEE S&B 2020), along with Tim Ruffing (BlockStream). The four-day workshop, which was initially postponed from June to September due to the pandemic and ultimately conducted entirely online, focused on a wide range of topics. Aspects addressed in the various sessions included the scalability of cryptocurrencies, achieving and valuing financial privacy in public blockchains, allowing access to blockchains to meet regulatory requirements, aligning honest behavior in blockchain ecosystems and smart contracts by applying game theory and mechanism design, and the critical analysis of various applications of blockchain in other domains.

Twitter.com/conventkongress (ZEIT Verlagsgruppe) (Screenshot)

Panel Discussion: Why Diversity is Essential to Digitalization in Business and Science

14 September 2020
Online

From 14 to 18 September 2020, the ZEIT publishing group organized the digital week "Zeit für [Wissen]" (Time for [Knowledge]). Prof. Dr. Dr. Ayad Al-Ani was a guest on the virtual panel on Digitalization in Business and Science. The ECDF researcher discussed the topic "Why diversity is essential to digitalization in business and science" along with Manuel J. Hartung (Head of Knowledge, DIE ZEIT), Annette Maier (Managing Director of Google Cloud), Prof. Dr. Claudia Peus (TU Munich), and Dr. Julia Sperling-Magro.

PANEL EVENT

Online Panel: Digital Collaborations with the "South"

5 October 2020
Online

On the one hand, digitalization and open science offer a plethora of opportunities for collaboration and a global academic landscape with weakened hierarchies and increased opportunities for researchers from the Global South. On the other hand, they also pose a challenge or even a threat, as digitalization could in practice lead to further marginalization of institutions and individuals due to global and local differences in terms of digital access. As part of the DAAD conference on "Moving target digitalization: re-thinking global exchange in higher education", the Berlin Center for Global Engagement (BCGE) of the Berlin University Alliance organized an online panel discussion on the question: What are the opportunities and challenges of digital collaboration in higher education with the Global South? ECDF Professor Michelle Christensen (Open Science, TU Berlin) took part in the panel discussion "Digital cooperation with the 'South': Chances and Challenges".

ECDF/PR/Simone Harr

LECTURE

Lecture: Using digitalization to benefit the climate

26 October 2020
Online

Prof. Dr. Tilman Santarius spoke about "Using digitalization to benefit the climate" in the lecture series organized by the Alexander von Humboldt Institute for Internet and Society (HIIG) and the Federal Agency for Civic Education. In his presentation, the ECDF Professor argued that digital and web policy discussions must be linked to the aim of transforming society in a socially just and ecologically sound way. Both sustainable and socio-ecological digitalization should therefore follow three guiding principles: Digital sufficiency, consistent data protection, and a focus on the common good. Tilman Santarius advocates for a soft digitalization, as a disruptive and one-sided capitalist-driven digital transformation could leave many people dependent and mean they can no longer find a place in society. He suggests that we should see digitalization as a toolbox, which must be adapted to our societal ideas and not the other way around.

CONFERENCE

(Virtual) Bits & Trees Forum #5

1 November 2020
Online

In November 2020, the Bits & Trees Forum discussion series addressed the question: "How many bits are needed for the energy transition? Design options for an intelligent, viable and sustainable energy system." The IÖW, TU Berlin, and the ECDF hosted the event. The energy transition is about shifting to an energy system that is based on fluctuating renewable energies. This will require us to use information and communication technology to ensure a balance between supply and demand. But there is a great deal of discussion around the various aspects of the digitalization of the energy system: Where are digital solutions useful and necessary? Do we need smart grids, smart ways to control consumption and smart generators? Can digitalization make our energy system more efficient and decentralized? Does this make it more resilient or more vulnerable? And how do we design digital energy systems in a fair way? At the 5th Bits & Trees Forum, participants discussed how we can address these issues through climate policy frameworks.

SCIENCE WEEK

Berlin Science Week Event on "Sustainable Digitalization in Urban Spaces"

1 November 2020
Online

"1 City – Countless Challenges – 3 Institutions of Digitalization Research – Many Opportunities". This was the strapline of the event organized by the ECDF, the Alexander von Humboldt Institute for Internet and Society (HIIG) and the Weizenbaum Institute for the Networked Society (WI) as part of Berlin Science Week 2020. The event addressed Sustainable Digitalization in Urban Spaces. Initially, three virtual workshops were held for researchers and representatives from politics, civil society and business. The workshop on Smart Neighborhoods led by ECDF Professors Andrea Cominola (Smart Water Networks, TU Berlin) and Tilman Santarius (Socio-Ecological Transformation and Sustainable Digitalization, TU Berlin) focused on the connection between buildings and infrastructural, social and ecological urban networks. The other workshops looked at the Data and Society Interface and Participation in a Digitized City. In the panel discussion that followed, Andrea Cominola and moderator Katja Weber, among others, discussed the question of how sustainable digitalization can be made possible in cities like Berlin.

LECTURE

Kick-Off of the Digital Future Lecture Series

2 November 2020
Online

"How to become a data scientist in 3 steps" was the title of the first lecture in the Digital Future series in the winter semester 2020/21 at TU Berlin. The lecture series takes place online via Zoom and is open to all students and interested members of the public. It is organized by ECDF Professor Florian Tschorsch. The lecture series covers various aspects of digital transformation and aims to provide a basic understanding of the topic. Each week, selected speakers present topics from their field of research that cover various aspects of digitalization and different scientific disciplines. In this way, the lecture series underscores the far-reaching significance of digital transformation. As in previous years, the lecture series focuses on data-driven digital transformation. This year, ECDF Professors will provide insights into their research. Participants will gain an overview of the methods and applications in data-driven digital transformation (see pege 78).

HACKATHON

Hello Diversity! Digital Ideation Hackathon

6 November 2020
Online

ECDF Associate Professor Janina Sundermeier (Freie Universität Berlin) played a key role in organizing a hackathon on Gender Equality in the Workplace. The digital ideation hackathon invited students and interested parties to work in teams on various gender equality challenges in order to develop new strategies, ideas and innovations. In addition, there was an engaging morning coffee panel involving activists, coaches, startup entrepreneurs and speakers who shared their gender equality experiences. The hackathon is funded by the Berlin University Alliance as part of its pre-call on Social Cohesion and is organized in cooperation with Freie Universität Berlin, HU Berlin and TU Berlin. The event was supported by a high-caliber program committee consisting of CoWomen, the Digital Entrepreneurship Hub and the European University Flensburg. Participants heard from a variety of speakers, activists, gender, culture and transformation coaches, who provide first-hand practical insights. In this way, they were able to create ideas and experiences together and generate combined innovative solutions for more gender equality in the workplace.

WORKSHOP

#DigiCap Live Talk on the Value of Public Goods in the Digital World

10 November 2020
Friedrich-Ebert-Stiftung/Online

Which role do public digital goods and infrastructures play in creating a resilient, sustainable, equitable and democratic society? What is the role of the state in this context, and where are the limits of state action? And what is the potential of civil society initiatives and alternative forms of organization?

These and other questions were discussed by ECDF Professors Philipp Staab (Sociology of the Future of Work, HU Berlin) and Tilman Santarius (Socio-Ecological Transformation and Sustainability, TU Berlin) in the Live Talk on The Value of Public Goods in the Digital World. The livestreamed conversation was part of the opening program of the virtual congress "#DigiCap: Digital Capitalism – How is the pandemic shaping our digital future?", which took place from 10 to 26 November. In the hour-long discussion, the two ECDF Professors touched on a number of subjects with moderator Tobi Müller including that the Covid crisis has illustrated how essential access to the internet and digital platforms and services is to our everyday lives.

WORKSHOP

Launch of the Interactive Data Feminism Workshop

19 November 2020
Online

On 19 November, the Interactive Data Feminism Workshop was launched. The workshop itself will be organized by ECDF Professor Prof. Rebecca Frank (Information Management, HU Berlin) in winter semester 2020/21. During the workshop, her team will draw on the book "Data Feminism" by Catherine D'Ignazio and Lauren F. Klein and explore feminist perspectives in library and information science over four sessions. The aim is to reflect and discuss feminism in information science (with a special focus on data science) and to provide a space for exchange about upcoming and future work. What perspective might be missing in a statistic? Whose point of view does a collection of information or technology reflect? What can be done in data and information science to become more inclusive? Whose voice is heard? The interactive workshop sessions are designed to encourage discussion on how to make conscious future decisions around information, data and computing based on critical reflection.

RADIO PROGRAM

"Matrix": Coronavirus as a Fork in the Road – Ayad Al-Ani on Utopias and the Lessons of Covid

20 November 2020
Online

From e-learning to tracing apps: Around the world, there have been and continue to be many different attempts to use digital tools to get to grips with the pandemic and everyday life. ECDF Associate Ayad Al-Ani explores how and to what extent data analytics and the use of artificial intelligence have become commonplace in our culture and how we might shape the culture of a post-Covid world. He takes a look at digital tools such as Covid apps and what can be learned from China, which even before Covid was seen as a frontrunner in digital transformation. This was the subject of the "matrix" radio program on 20 November, moderated by Sarah Kriesche.

twitter.com/ResearchGermany

InnoHealth China 2020 (Virtual) Conference

2 and 3 December 2020
Online

In early December 2020, the German Federal Ministry of Education and Research (BMBF) hosted the InnoHealth China 2020 virtual conference, part of the German R&D Tour. Prof. Dr. Dr. Felix Balzer (ECDF/Charité) took part as a panelist and discussed "The future of personalized and patient-centered healthcare with respect to eHealth and bioeconomy".

The German R&D Tour run by the InnoHealth China campaign provides an exclusive insight into the German healthcare research landscape. All participants of the virtual tour – Chinese scientists, entrepreneurs, and innovators – had the opportunity to visit the most innovative German research institutions, medical clusters, and companies in the fields of eHealth and bioeconomy and to network and exchange knowledge.

HIIG/Christian Grünvogel

Discussion: Joint Strategic Framework for the Capital Region

3 December 2020
Online

In December 2020, Prof. Dr. Jochen Schiller represented the ECDF at the online discussion event on Digital Transformation. Minister Kathrin Schneider, head of the Brandenburg State Chancellery, and State Secretary Christian Gaebler, head of the Berlin Senate Chancellery, welcomed stakeholders from science, business, and civil society to the roundtable to discuss digital transformation in the capital region and linkages between digitalization activities. The discussion was the fourth in a series of alternately organized digital events as part of the development of the Joint Strategic Framework for the Capital Region. The aim of the events is to facilitate exchange between the Brandenburg and Berlin departments and expert stakeholders.

WORKSHOP

Virtual Discussion: Folding Residency

10 December 2020
Online

The Pleated Electronic Textiles research project hosted a virtual discussion in December. In the project, ECDF Professor Berit Greinke and the wearable computing team at Udk Berlin and ECDF are working with four textile and fashion designers on developing folded electronic textiles. They focus on knitted, woven, pleated, and polymerized textiles, exploring material aesthetics, sensor placement, mechanical movement, and pleat size, making use of and promoting the possibilities of each of these techniques.

DISCUSSION

Panel discussion: The Invention of the Market and the Markets of the 21st Century

14 December 2020
Online

In December, ECDF Professor Philipp Staab took part in the Haus am Dom panel discussion on The Invention of the Market and the Markets of the 21st Century. The market as it is taught as a model in economics does not exist in practice; instead, each market is different and shaped by social processes, rules and laws. In the 21st century, markets face new challenges and need to be restructured. Digital monopolists are creating their own markets to the detriment of others. To slow down climate change, the costs of climate-damaging emissions must be factored in. And there is also the question of whether externalization, which comes at a cost to the environment and people, violates the law against restraints of competition. We need new rules for successful work in the future. The panel explored these questions against the backdrop of the major changes that are currently taking place. Philipp Staab was joined for the discussion by Prof. Dr. Lisa Herzog, University of Groningen, and Prof. em. Dr. Johannes Hoffmann, Goethe University Frankfurt.

/ SCIENCE COMMUNICATION

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

SCIENCE COMMUNICATION

Clearly presenting research projects and results to the outside world and including the various societal stakeholders in the conversation is a major concern for the ECDF, even during the pandemic. The importance of digital science communication has grown significantly in times of social distancing, cancelled face-to-face events and closed workshop rooms. The classic in-person events such as the Long Night of Science and Girls Day, where scientists exchange ideas and enter in dialogue with the public, were no longer possible. As a result, knowledge transfer inevitably shifted to the virtual realm. At the ECDF, this was particularly the case for events. From the end of March, representatives from science, politics, civil society, and business came together in virtual panel discussions, meetings, and workshops (see page 92 onward). Depending on the target group, online conferencing software such as Zoom, Gather.Town, and Big Blue Button were used.

At the same time, the ECDF also noted increased demand from the media for expertise from the scientific community during the pandemic. Medical doctors, sociologists, and economists from the ECDF are go-to discussion partners (see pages 22 and 23). There was also a noticeable increase in appearances on podcasts in 2020. Scientists from the ECDF were guests on various shows. Prof. Dr. Michelle Christensen and Prof. Dr. Florian Conradi spoke to Felix Kosok in November 2020 on the Off_Line podcast on the subject "How is technology changing us?". Off_Line is the podcast of the Hochschule für Gestaltung Offenbach (Hessen State University of Art and Design). The podcast regularly invites guests to discuss themes around art and design. In November 2020, Dr. Samuel Knauss and Dr. Julius Emmrich, associate members of the ECDF, were guests on the Talking Science – Wenn Wissenschaft auf Gesellschaft trifft (When Science Meets Society) podcast, which is produced by rbb and the Berlin University Alliance. The medical experts discussed innovations for a healthier world with Julia Visman. In December 2020, Prof. Dr. Philipp Staab was a guest on the podcast Jung und Naiv (Young and Naive). He spoke with Thilo Jung about digital capitalism. Jung und Naiv is a political interview podcast with a large audience.

The extensive overhaul of the ECDF website has paid off. It offers the interested public a good overview of current research projects, personnel, activities and events. The social media platform Twitter remains a good way for the ECDF to maintain contact with scientists, research institutions, journalists, and industry representatives and to keep expanding the network. Currently, 2,232 people follow the ECDF (as of 30 April 2021). Internal communication tools include the log-in section of the website, which provides ECDF members with important information. The monthly brownbag meeting of ECDF Professors and the Management Office has been held online since April 2020. Particularly during the pandemic, it has become an important platform for exchange and networking.

/ COMMITTEES AND GOVERNANCE

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

ECDF/PR/Felix Noak

EXECUTIVE BOARD

The ECDF Executive Board is responsible for the strategic development and scientific direction of the research areas, the coordination and support of collaborative activities, the allocation of funds within the ECDF, and the scientific research program including decisions on changes to the overarching research agenda involving the addition or removal of research topics. The board also decides on the admission of further members such as ambassadors, fellows, associate members, principal investigators, and visiting scholars.

The board also reviews and makes decisions regarding the addition of new professorships and funders in order to ensure that additional research directions are consistent with the overall vision of the ECDF. The members prepare the ECDF's statements on various topics such as open access, digitalization in education, and guidelines on equal opportunities.

The board consists of eleven members and is composed of:

// 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 through ECDF funds ("area speakers"),
// four Executive Board members, who hold ECDF Professorships and are co-speakers for one of the areas,
// one Executive Board member, who is a professor at a participating university of applied sciences,
// one Executive Board member, who is delegated by the State Conference of Women's Representatives of the Berlin Universities and University Hospitals of the State of Berlin (LaKoF),
// the managing director, who attends all meetings in an advisory capacity.

The Executive Board usually meets on a monthly basis. Due to the pandemic, the meetings have been held as online video conferences since April 2020. Together with the international Scientific Advisory Board (SAB), board members implement the governance and quality assurance strategy and define KPIs and milestones in order to continuously review and manage the center's vision and mission.

In 2020, Prof. Dr. Daniel Hromada (Professor of Digital Education, UdK Berlin) left the Executive Board at his own request as speaker for the Digital Society innovation area. In February 2020, Prof. Berit Greinke (Professor for Wearable Computing, UdK Berlin) was elected to replace him. In April 2020, the representative of the participating universities (HTW Berlin University of Applied Sciences and Beuth University of Applied Sciences Berlin) alternated. Prof. Dr. Alexander Löser (Professor of Data Science, Beuth University of Applied Sciences) was succeeded by Prof. Dr. Juliane Siegeris (Professor of Software Engineering, HTW Berlin) on the ECDF Executive Board.

Members of the Executive Board

Prof. Dr. Odej Kao	Chair and Speaker of the Einstein Center Digital Future	Professor for Complex and Distributed IT Systems, Technische Universität Berlin
Prof. Dr. Dr. Felix Balzer	Speaker for the innovation area "Digital Health"	ECDF Professor of E-Health and Shared Decision Allocation, Charité – Universitätsmedizin Berlin
Prof. Dr. David Bermbach	Speaker of the core area "Digital Infrastructure, Methods and Algorithms"	ECDF Professor for Mobile Cloud Computing, Technische Universität Berlin
Prof. Johann-Christoph Freytag, Ph.D.	Speaker of the core area "Digital Infrastructure, Methods and Algorithms"	Professor of Databases and Information Systems, Humboldt-Universität zu Berlin
Prof. Berit Greinke	Speaker of the innovation area "Digital Society"	ECDF Professorin für Wearable Computing, Universität der Künste Berlin
Prof. Dr. Gesche Joost	Speaker of the innovation area "Digital Society"	ECDF Professor of Wearable Computing, Berlin University of the Arts
Dr. Christine Kurmeyer	Representative of the State Conference of Women's Representatives of the Berlin Universities and University Hospitals of the State of Berlin (LaKoF)	Central Women's and Equal Opportunities Officer, Charité – Universitätsmedizin Berlin
Prof. Dr. Christian Meske	Speaker for the innovation area "Digital Industries and Services"	ECDF Professor of Digital Transformation and Strategic Information Management
Prof. Dr. Axel Radlach Pries, MD	Speaker for the innovation area "Digital Health"	Professor of Physiology and Dean / Member of the Board of Charité – Universitätsmedizin Berlin
Prof. Dr. Jochen Schiller	Speaker for the innovation area "Digital Industries and Services"	Professor of Computer Systems and Telematics, Freie Universität Berlin
Prof. Dr. Juliane Siegeris	Representative of the participating universities	Professor of Software Engineering at the University of Applied Sciences (HTW) Berlin

HTW Berlin, Nikolas Fahlbusch

USING SYNERGIES IN DIGITALIZATION RESEARCH

Prof. Dr. Juliane Siegeris represents the universities on the ECDF Executive Board

Prof. Dr. Juliane Siegeris has been a member of the ECDF board as a representative of the partner universities since spring 2020. The professor of software engineering at HTW Berlin succeeded Prof. Dr. Alexander Löser from Beuth University of Applied Sciences Berlin (the two universities alternate the role). Siegeris is also speaker for the Scientific Advisory Board of the Berlin university program "DiGiTal – Digitalisierung: Gestaltung und Transformation" (Digitalization: Design and Transformation) for scientists and artists, with which the ECDF works together closely. Simone Harr (Managing Director, ECDF) conducted the interview.

What fascinates you about the ECDF and why do you want to get involved?
Siegeris: The ECDF is a research network that aims to develop Berlin as a center of science into a leader in the field of digitalization. This is an opportunity to support people who are conducting research on current and important social issues in the field of digitalization. As a member of the board, I want to play an active role in the discussion about the people and topics that should receive support and help to reflect the diversity of society in Berlin's higher education landscape. As a representative of the universities of applied sciences, I will try to make their competencies visible and support them. One of the strengths of universities of applied sciences is the applied nature of the research conducted there and close contacts with industry. Berlin has many digital startups and innovative small and medium-sized enterprises. I can contribute my personal network in leveraging the strengths of the universities of applied sciences for the further development and expansion of the ECDF.

The ECDF attaches great importance to interdisciplinary collaboration among professors. What opportunities and challenges do you see specifically for research in the field of digitalization?
Siegeris: Research on digitalization is always about working across disciplines. The quality of researchers is measured by the number of high-quality publications they produce. For researchers at the crossroads between two disciplines, this means that they have to gain acceptance in different communities. Through the ECDF, a Berlin-wide network of scientists and scholars is being created who can collaborate across university boundaries and disciplines. This diversity of perspectives offers great potential for joint research, but also means building mutual understanding and respect.

You are the speaker for the Scientific Advisory Board of the Berlin university program DiGiTal – which the ECDF already works closely with. What other synergies might come about?
Siegeris: Both the ECDF and the DiGiTal program promote excellent research on digitalization. While up to 50 new professorships will be created through the ECDF, the DiGiTal program will support scientists and artists on their way to professorships. I mainly see synergies in the potential to further intensify networking among participants, because joint research can improve individual career paths as well as the visibility of research results.

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. Since October 2018, the SAB has consisted of eight members, who convene at least once a year to review progress, advise the ECDF on its future development, and to offer input on the professional and scientific development of ECDF Professors.

In addition, the members of the SAB contribute to collaboration with other research institutes and organizations and help design medium- and long-term goals with regard to the global development of the digital transformation.

ECDF/PR/Felix Noak

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	Co-Chair of the Scientific Advisory Board, Saarland University, Institute of Computer Science and Director of the German Research Center for Artificial Intelligence (DFKI GmbH), Germany
Prof. Dr. Peter Apers	University of Twente, Dean of the Faculty of Electrical Engineering, Mathematics and Computer Science, Netherlands
Prof. Dr. Søren Brunak	Technical University of Denmark, Disease Systems Biology, Dänemark
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 Centre, Sweden
Prof. Dr. Iwona Miliszewska	University of Technology Sydney, Head of School, Information, Systems and Modelling, Australia

ECDF/PR/ Dirk Lässig

MANAGEMENT OFFICE

The Management Office coordinates the activities across the center and supports the board in implementing overall management, the advancement of junior scholars, equal opportunities, and open access. The office is responsible for internal and external communication processes as well as press and public relations, and it coordinates the various interdisciplinary formats and events with politics, business, and society. The Management Office is also responsible for administrative matters such as financial and contract management at the ECDF, in cooperation with the TU Berlin administration. As such, it also manages the structural cooperation of the participating universities and research institutions.

As of 2020, the members of the Management Office are as follows:

// Managing Director: Simone Harr
// Press/public relations and development: vacant
// Events and Cooperation: Tim Kawalun
// Interdisciplinarity and Open Labs: Friedrich Schmidgall
// Coordination of the graduate program: Nina Reinecke
// Finances: Anja Hertel (head), Jennifer Friese
// Secretary: Ursula Menzel
// Student assistant: Romina Artero

The office plays a key role in the operational and strategic development of the ECDF. It is not only the administrative backbone, but also provides the necessary organizational support for the ECDF's unique environment. The team combines different areas of expertise and responds flexibly to the needs of the different stakeholders. Last but not least, it acts as a central communication channel and brings together all knowledge sources.

The office's structure also reflects the concept of the ECDF as a dynamic and evolving scientific institution. For all tasks that are not covered by the Management Office, such as legal affairs, building management, appointment and contract management, the office works closely with the participating universities and receives comprehensive support from the respective departments of TU Berlin as the host university as well as the other participating universities and colleges.

PUBLIC PRIVATE PARTNERSHIP

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

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

The state of Berlin adds 50 cents for every Euro raised from privately financed companies – this is known as "matching funds".

In addition, the Federal Ministry of Labor and Social Affairs and the Federal Ministry of Education and Research each contribute funding for one professorship.

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

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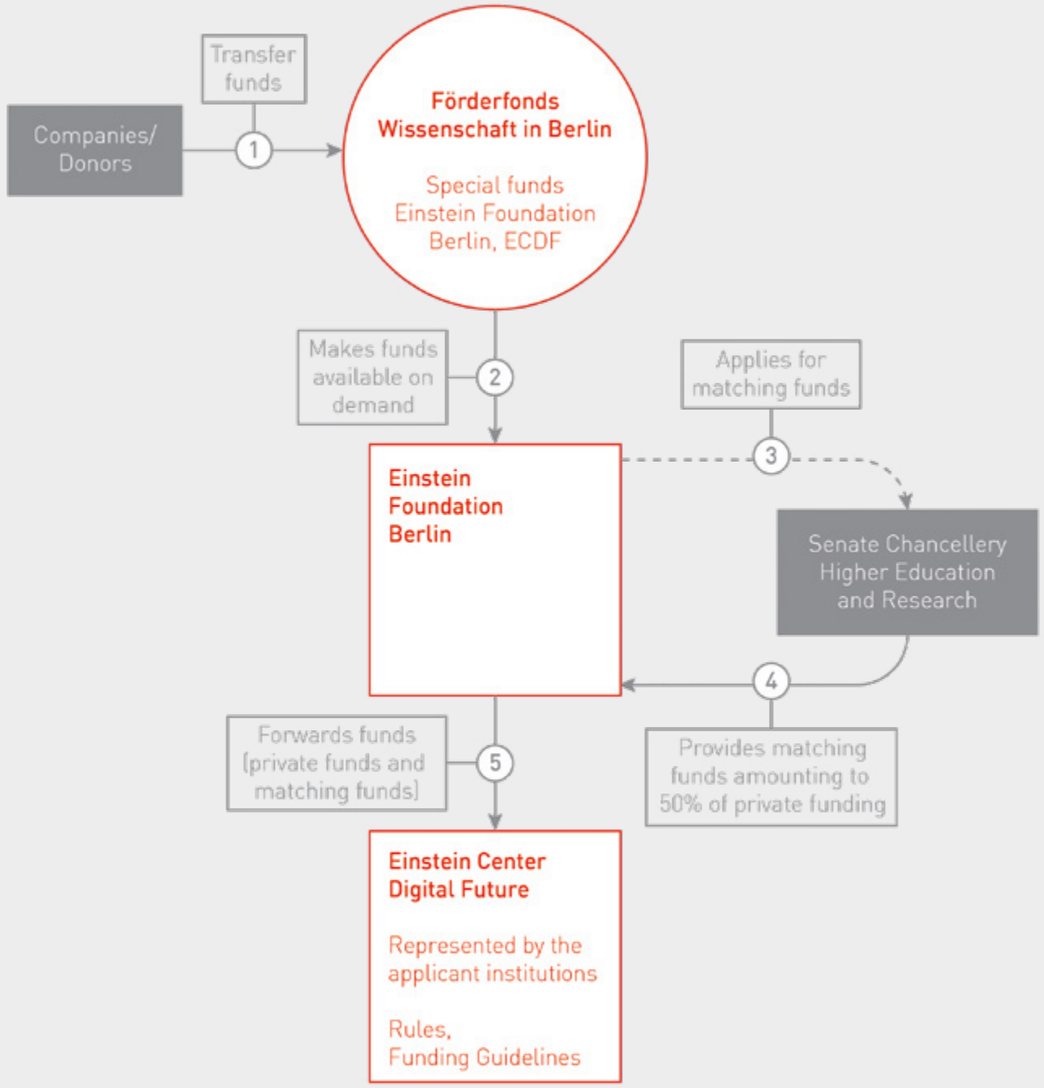

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