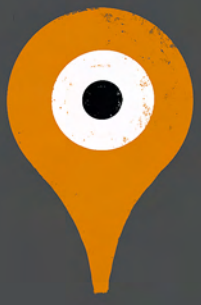
Portal Wissen

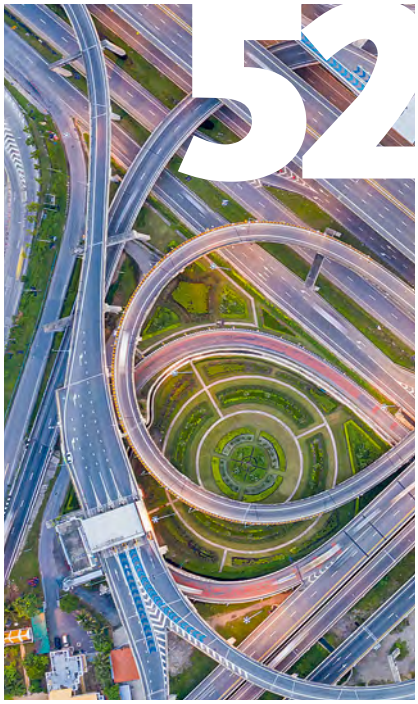
The Research Magazine of the University of Potsdam

One 2022

Universität Potsdam



TOGETHER



Contents

Imprint

Portal Wissen
The Research Magazine of the University of Potsdam
ISSN 2194-4237

Publisher: Press and Public Relations Department on behalf of the President of the University

Editors: Dr. Silke Engel (responsible according to the German Press Law), Matthias Zimmermann

Contributions: Luisa Agrofylax, Antje Horn-Conrad, Heike Kampe, Dr. Stefanie Mikulla, Dr. Jana Scholz

Translation: Susanne Voigt, Monika Wilke

Address of the Editorial Office:
Am Neuen Palais 10, 14469 Potsdam
Phone: (0331) 977-1474
Fax: (0331) 977-1130
Email: *presse@uni-potsdam.de*

Cover picture: Andreas Töpfer

Layout/Design: unicom-berlin.de

Editorial deadline for next issue: 30 April 2022

Advertisements: unicom MediaService,
Phone: (030) 509 69 89 -15, Fax: -20
Valid advertisement price list no.1
www.hochschulmedia.de

Print: ARNOLD group – arnoldgroup.de

Portal Wissen online at:
www.uni-potsdam.de/portal

TOGETHER

What makes humans human – and what distinguishes them from other creatures on Earth – has long been fervently discussed and is still being discussed today. "Homo sapiens", the scientific self-description of our species, is already the characterization as an "understanding, wise, knowledgeable human being". It could be argued that we owe this additional knowledge to our trait of (basically) feeling particularly attached to our equals. We are what we are, above all, and perhaps even exclusively: together. The development that eventually turned communities into societies in the course of which culture and knowledge emerged, could well be told as a story of more and less togetherness. People were always successful when they lived with instead of against each other. Things that were much admired later came into being when people worked together, knowledge that made history as progress was developed by minds that came into a conversation.

It is therefore all the more surprising that this "recipe for success" is being pushed into the background at a time when it is needed more than ever. As a result of the Corona pandemic, we are living in a time in which the world is faced with a – literally – all-encompassing task which it can only overcome together, as has already been said many times. And yet, many people are primarily concerned about their own well-being in various ways – not infrequently without reflecting that the well-being of many others, and possibly ultimately even their own, suffers as a consequence. When there is a need for more togetherness while there is a lot of talk about division, it becomes clear that the success of togetherness is not a foregone conclusion: If we want to achieve something together, we must always keep talking about the goals and the way to get there.

For this issue, we have collected what people can achieve together and how research is trying to fathom the "secret of togetherness" in many ways. We visited a team of environmental scientists who are developing forest gardens together with committed residents – as green oases in the middle of cities. We took a first look at the prototype of a national education platform that will bundle all kinds of digital learning in the future. We also present a model project that aims to help teachers and students prevent hate speech. Last but not least, the issue presents a small selection of various collaborations across disciplinary and national borders: We show how researchers from law and political science are working together to examine the ups and downs of international law, and why religious studies scholars from Potsdam and Iraq benefit from each other.

Of course, the issue also brings together the entire spectrum of research at the University of Potsdam, we promise! We found out how heavy rain turn into flash floods and how to prepare for such events. We interviewed a migration researcher and visited a geoscientist who is drawn to mountains and valleys alike. It's about – often unwritten – "body rules" in everyday life, the exploration of our gaze with the help of artificial intelligence, 33 answers full of complexity, and about mathematics at infinity. Enough words. Read for yourself – alone or together. Just as you like!

MATTHIAS ZIMMERMANN

Illustrations | Photos: Töpfer, Andreas (p. 2, top left, top right, p. 3); Meyer-Oldenburg, Valentina (p. 2, bottom left.); AdobeStock/elenabsl (p. 2, top right), Travel man (p. 2, bottom right)

Illustration: Töpfer, Andreas

A FERTILE PLACE

Three forest gardens are being created in Berlin-Britz and Kassel

The future of humankind lies in the city. Today, 57% of the world's population is already living in cities. By 2030, it is estimated that this number will increase to 60%. At the same time, there is a growing desire to live in and with nature – and the growing awareness that we need nature more than it needs us. While some people are turning their backs on the city and "escaping" to the countryside, Dr. Jennifer Schulz of the University of Potsdam has launched a project to make urban spaces green and rich in species with Forest Gardens. A model project will be implemented in Berlin-Britz in the coming years: A forest garden will be created on 28,000 m2 – as a joint project of science, politics, administration, and local residents. At the same time, two more gardens will be created in Kassel. The project is funded by the German Federal Office for Nature Conservation with funds from the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety within the Federal Biological Diversity Program, and in Berlin by the Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action.

The crowns of fruit trees – such as plum, apricot, and apple trees – form the canopy and protect bushes layer of berries such as currant, gooseberry, or raspberry underneath. Beneath them, there is an herbaceous layer of mostly perennial vegetables and herbs. "A forest garden is striving for the ecosystem structure of a mixed forest," Schulz explains. "It mimics the overlapping layers of vegetation but with edible plants." For the researcher, forest gardens represent the future of urban gardening creating synergies with biodiversity and climate protection. They make it possible, for example, to cultivate a large variety of crop plants on a relatively small space due to an arrangement in multiple layers. Ideally, the plants complement each other in terms of light, nutrient, and water requirements through different root architecture and depths and plant heights as well as individual light requirements. Based on a careful site-adapted selection and combination of species and varieties, the forest garden can provide yields almost all year round.

"At the same time, we urgently need the ecological function of the forest, especially in cities with lots of construction," Schulz emphasizes. "A few green roof terraces are not enough." The forest garden ecosystem functions as a CO_2 reservoir, forms a cooling counterpart to overheated concrete deserts and supports the preservation of biodiversity. In the multi-layered biotope, numerous animal species and especially insects find a home – the useful insects among them in turn keep pests away and are essential for pollination.

Forest gardens are not only ecologically multifunctional, but they also offer perspectives for social encounter. "In cities, the few green spaces have to fulfill many functions – not least as social spaces," Schulz explains one of the most important goals of the project. "Forest gardens should be places where people have the long-term perspective of gardening together, growing food, but also creating climate oases and establishing places where they can experience environmental education and intergenerational dialogue."

Model garden in Britz

In Berlin-Britz, all these things will turn into reality in the coming years: the edible forest, the oasis, the educational place, and the meeting point for multiple generations. Many things have to work together for a forest garden to be grown. This was shown by the feasibility study conducted from 2018 to 2020 by the team led by Jennifer Schulz and Torsten Lipp from the University of Potsdam. First, the researchers evaluated whether there were any suitable areas at all in a major city like Berlin. "We developed a transparent procedure for systematic site search and evaluation," says Schulz. Are the areas large enough? Uncultivated? Easily accessible? Where would forest gardens contribute to climate protection, green infrastructure, and environmental education? By using a specifically developed GIS model, existing information on urban areas can be analyzed, and potential sites can be evaluated. "For a forest garden, you should plan at least 5,000 m2 of space – and it must be available and available for contracting in the long term," says the researcher. "This is a real challenge in Berlin, which is constantly changing and where building density tends to increase." But it is equally important to determine whether there are people in the neighborhood who are interested in developing, building, and permanently managing the forest garden. Likewise, it is crucial to find out if there are institutions such as public admin-

On the site of the future forest garden in Britz

Photo: Schulz, Jennifer

istrations willing to support the project? For this, they had many discussions – with the Berlin Senate administration, district offices in charge of parks, allotment gardens associations, nature conservation organizations, and those active in urban gardening. "I've never experienced a project with so much momentum and euphoria," Schulz says happily.

First planning, then planting

In the nearly 300-page final report of the feasibility study, the research team has compiled everything that needs to be considered when planning forest gardens. From finding the right area and the necessary activists to the equally important legal aspects that need to be considered. The right operating model, liability and safety issues – it takes more than a large meadow and a handful of plants to turn the idea into reality. "So far, the concept of a forest garden is unknown in urban planning. A lot of research, networking and communication with stakeholders, but also ingenuity and perseverance are needed here," she says.

It took an intensive site search until the team found about a dozen potentially suitable sites, including public green spaces, green spaces adjacent to sports fields, educational institutions or housing estates, brownfield sites, and even a former cemetery. But one after the other had to be excluded. Most of them lacked the long-term perspective that is needed for a forest garden. In Berlin-Britz, things finally worked out. Instead of classic garden plots, an exemplary site will be created in the coming months and years south of Britzer Garten to bring people and plants together. "The site has been designated as a replacement area for allotment gardens that had been eliminated due to a highway construction. Apart of suitable soil and site characteristics the area comes along with an existing long term zoning plan as an allotment garden," Schulz says. "As a result, the area is permanently protected. A precious situation." For the new allotment area, the Potsdam researchers and their project partners, including the district association of allotment gardeners (Bezirksverband Berlin-Süden der Kleingärtner e.V.), the responsible administration, and volunteers who are enthusiastic about the project, have developed a novel, modern form of an allotment

Photos: Schulz, Jennifer

THE PROJECT

"Urban Forest Gardens: Perennial, Multi-Dimensional, Multi-Functional"

Funding: German Federal Office for Nature Conservation with funds from the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety within the Federal Biological Diversity Program, Berlin Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action.
Duration: April 2021 – March 2027
Project coordination: University of Potsdam: Dr. Jennifer Schulz and Dr. Torsten Lipp (both principal investigators), Luisa Gedon, Lea Matscheroth, Luca Durstewitz; project partners: Bezirksverband Berlin-Süden der Kleingärtner e.V., Freilandlabor Britz e.V., City of Kassel: Department for the Environment and Gardens

As part of the preliminary investigation of a BfN-funded testing and development project, the conditions for forest gardens in urban areas, including participation procedures, were investigated between 2018 and 2020. Based on the results, an in-depth participatory planning process and preparations were carried out for the project area in Berlin-Britz during 2021, so that the structure of the forest garden plots can be built in spring 2022 and the forest garden can begin to grow on this site. In Kassel, two forest gardens are to be created in parallel at the green belt of Wahlebach in Waldau and in the Marbachshöhe area.

https://urbane-waldgaerten.de

garden park with the forest garden as its guiding principle. Most recently, the 2.8-hectare area was used as grassland by Britzer Garten and was grazed with cattle. Beginning in 2022, 60 garden plots and a 5,000 m2 community forest garden will be created there. The community forest garden will be located in the center of the overall site, together with a 1,000 m2 zone for environmental education which will be supervised by the environmental education association Freilandlabor Britz e.V. Concerning the allotment gardens, eight to ten garden plots – some with and some without summerhouses – are grouped together in clusters, which will be jointly enclosed by a fence. No garden fences are planned within the clusters, which will have a common "core zone" that can be used and designed collectively, with fruit trees and shrubs following the forest garden structure.

Ideas of many people for a joint garden

This concept is the result of intensive preparatory work, which not only included the expertise of the researchers, landscape architects, and horticultural experts, but also the ideas and commitment of the involved citizens. Already in the summer of 2019, a series of workshops was held for this purpose – in a stimulating participation process accompanied by experts. "One important finding of our feasibility study is that this participatory process is essential for such a long-term and complex project as a forest garden," Schulz explains. People have to get to know each other, exchange wishes and ideas, work together, and organize themselves. "The co design is the crucial process and foundation for the participants to ultimately take responsibility for the project and support it in the long term. You shouldn't underestimate that. It might be a bumpy ride sometimes but things will get back on track."

One of those involved in Britz is Philipp Resch. The 27-year-old is studying biotechnology at Technische Universität Berlin and has been involved since 2020. "I've always wanted to get a garden plot, but it wasn't until the first lockdown that I finally had the time to take the initiative." When he came across the project online, he was immediately convinced about it – "because it's not a typical garden plot but a forest garden where each plant helps the others flourish, whether by providing shade or nutrients." He finds the community of those who are actively involved particularly appealing. "A lot of knowledge is gathered which contributes to the project to varying degrees."

Jennifer Schulz has also been involved in the garden design. Already during her studies, the researcher had come across the concept of forest gardens and studied the ecological benefits of this method of cultivation. Later, she created a forest garden with over 500 edible plants for a client. The forest garden in Britz is a personal highlight for her. "So far, forest gardens –- both in urban and rural areas – are still largely unknown and hardly researched in Germany. We can change both with our project."

Fertile soil

Cooperating with various municipal institutions is essential for success, especially in Berlin, where it was necessary to convince two levels of administration at the same time, the district and the Senate administration. "The support of politics and administration is indispensable," Schulz says. The district administration of Berlin-Neukölln leases the area to the Bezirksverband Berlin-Süden der Kleingärtner e.V., which bears great responsibility for the success of the project and will lease the plots to future users. The Berlin Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action in turn contributes to the financing of the project. "As a result of the Corona pandemic, it was not clear whether we would be able to continue," she explains. While Schulz wrote the necessary funding applications, her colleague Luisa Gedon continued working with the activists – due to the pandemic mainly online. The group communication is getting increasingly better thanks to the communication working group that Philipp Resch founded with two others. "Since we have started using the Miro website for online seminars and to prepare our ideas, our work has improved enormously,"

Photo: Hopfgarten, Tobias

THE TEAM

From left: Luisa Gedon, Dr. Torsten Lipp, Dr. Jennifer Schulz, Luca Durstewitz, and Lea Matscheroth (not in the photo).

✉ jennifer.schulz@uni-potsdam.de


Dr. Jennifer Schulz

he reports. “This has made it easier for us to submit our spatial planning results to the landscape architecture firm in the end.”

In spring 2021, the good news came out: A forest garden in the middle of Berlin is not only possible, but it will also become reality. Thanks to funding from the Federal Agency for Nature Conservation (BfN) and the Federal Ministry for the Environment (BMU) in the Federal Program on Biological Diversity and the Berlin Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action, the project can be implemented over the next six years. All preliminary work on the spatial planning was handed over to a team of specialist planners led by a landscape architecture firm. Together with the volunteer group, they then worked out the final plans in participatory workshops. Two more forest gardens are being created simultaneously in Kassel. The city has been involved since 2019, and the local Department for Environment and Gardens is committed to promoting the project development there. In the meantime, important project structures and necessary staff positions have been created in both cities.

The researchers at the University of Potsdam will continue to coordinate the joint project, but will also provide scientific support and evaluation. Their goal is not only to create documentation for research purposes. A knowledge platform is also being created to ensure that the three project forest gardens are only the first of many. “With the help of the platform, we want to pass on all that we’ve learned in the project to enable other cities to go through this process themselves.” To that end, Schulz and the forest garden team have been collecting as much data as possible since the beginning. Even before construction began, two climate measuring stations were set up, one in the area of the forest garden, and a comparative one outside. They measure temperature, precipitation, humidity in the air and in the soil, solar radiation, and wind. Later, a number of small mini-transmitters, so-called data loggers, will be added at different locations in the area. And in line with the project’s spirit, the forest gardeners will also help: with species monitoring, for example. “In terms of soil biology, initial surveys have already been conducted on earthworms,” says Schulz. “Part of our team has been involved with this and is currently planning how to also incorporate civic engagement into forest garden research.”

Not just setting it up but also accompanying it

Digitization in the right places should also help, for example by using apps for monitoring species. Environmental education will be digitally supported from the beginning on as well. “We want to prepare the knowledge about forest gardens in such a way that it can also be experienced with the help of new media,” Schulz explains. “Our gardener is already compiling plant fact sheets. When these can be accessed via QR codes next to the plants, the knowledge will be available digitally on site – for gardeners and interested people alike.” However, the researchers not only accompany the planning, horticultural, or biological developments. The social dimensions are recorded as well. How do people in the project work together? How do they communicate? What is the knowledge gain and how is it used? The findings could be helpful for future projects.

Schulz is convinced that the model will form a precedent. After all, interest in the project was high from the very beginning. Even during the feasibility study, numerous cities and initiatives indicated their wish to participate, among them Bremen, Heidelberg, Freiburg, and Tübingen. The team has already looked for suitable sites with some of them. But the Corona pandemic has slowed down many of these initiatives. If the Britz and Kassel gardens bear fruit, they could gain momentum again. “I can really imagine that there will be a movement toward ecological urban redevelopment, in which forest gardens can play an interesting role,” Schulz says.

In Britz, things will really get started in spring 2022: The last fences and paths of the previous use were dismantled at the end of 2021. Over the course of 2022, the garden structure will be built and water connections laid for horticultural use. Then the new “residents” will also arrive: 400 (fruit) trees, 2,000 (berry) bushes, and 10,000 perennials of various kinds of vegetables and herbs will be planted. Numerous activities are planned together with the active participants: hands-on construction of garden sheds and seating areas, and planting. Resch is ready and full of anticipation. “To be honest, I don’t have that much experience in gardening yet. But what better way to learn than directly from other people?” He is certain: “Something great will be created on this site.”

MATTHIAS ZIMMERMANN
TRANSLATION: SUSANNE VOIGT

Photo: Hopfgarten, Tobias

THE PROJECT

The project **"Bildungsraum Digital" (BIRD)** focuses on creating a federated infrastructure for digital education in Germany. To this end, previously isolated educational platforms and individual educational services are to be networked while preserving existing heterogeneity, and at the same time broad interoperability. The aim is to create an ecosystem of independent educational services that offer users support in the course of their education and promote the formation of individual learning paths.

Duration: April/2021–March/2023
Participants: University of Potsdam (project coordination); other partners: DAAD, TU Berlin, GWDG, Otto von Guericke University Magdeburg, g.a.s.t., edu-sharing, Bündnis für Bildung, MathPlan
Funding: Federal Ministry of Education and Research (BMBF)

Illustration: AdobeStock/elenabsl

BIRD'S EYE VIEW

BIRD LOOKS AT THE WEALTH OF DIGITAL LEARNING OPPORTUNITIES AND CONNECTS THEM ON A NATIONAL EDUCATION PLATFORM

"It is the biggest and most demanding project that I have ever done," says Ulrike Lucke, leans back into her office chair, and blows a strand of hair away from her forehead. It's evening in Golm, and there's hardly any light left in the new computer science building. Shortly after moving in, Professor Lucke launched the development of a prototype of a new, national education platform here in spring 2021. It's an IT structure that will do nothing less than link various digital services and educational offers so that they can be used across the board and throughout Germany – from primary school to university and far beyond. "We don't want to invent anything in addition but rather integrate what already exists," she says, describing the plan. Due to the digitization needs during the pandemic, educational institutions have developed different approaches, the professor says. "There's no way to standardize that. We don't want to impose anything, either," she asserts. "Rather, we are offering a kind of platter, on which the particular menu can be arranged according to the particular needs."

Of course, Ulrike Lucke can't accomplish such a task alone, but she is pulling the strings: In the project "Bildungraum Digital," or BIRD for short, the University of Potsdam is in charge of coordination. Other project partners are Technische Universität Berlin, Gesellschaft für wissenschaftliche Datenverarbeitung Göttingen, and Otto von Guericke University Magdeburg. The German Academic Exchange Service (DAAD) and a number of social and economic players are also participating in the mammoth project, which is being funded by the German Federal Ministry of Education and Research with about 7.3 million euros over the course of two years.

One platform – for lifelong digital learning

The expectations of the German government are high. The pandemic has mercilessly exposed the digital wasteland in German education. The makers of BIRD must therefore get an overview very quickly. They must integrate existing platforms and digital teaching offerings via middleware and establish common standards. The aim is to create a virtual space that facilitates access to education in all phases of lifelong learning, whether through institutions or on individual paths. "We've proven that we can do this," says Lucke. Her team had built a prototype even before applying for the project. "Over Christmas, because time was tight. And then everything happened very quickly. In spring, we were awarded the contract."

While the professor is talking – quickly and in a low voice – she has long moved to the edge of her chair again and explains with her hands what the Potsdam project group is currently doing. She imagines corner points, draws connecting lines, intersections, docking points. All of a sudden it becomes clear what "complex multimedia application architectures" mean, which are being designed at Lucke's chair of the same name. Like on a drawing board, the plan of that digital space is being developed, in which walls, building blocks, and design elements form a meaningful whole. The development team works together with the e-learning experts and media didactics in the university-wide Center for Teacher Training and Educational Research. The experts from ZIM, the Center for Information Technology and Media Management, look after the technical operations. The project group has now expanded to 20 people in Potsdam alone.

Lucke knows that the interplay of different subject cultures and competencies is essential, for example, when a content idea needs to be translated into program code or a digital concept needs to be implemented in the classroom. "The problem often starts with the terminology. Transparency, for example, generally means being able to see through something. In our case, however, it sometimes means making something invisible to the user," the computer scientist

THE RESEARCHER

Prof. Dr. Ulrike Lucke studied computer science at the University of Rostock. Since 2010, she has been Professor of Complex and Applied Multimedial Architectures at the University of Potsdam.

✉ ulrike.lucke@uni-potsdam.de

Working together in Potsdam to digitize education throughout Germany (from left to right): Dirk Bußler, Ilka Goetz, Hendrik Geßner and Prof. Ulrike Lucke

explains, pleased that BIRD is also being promoted by the "Bündnis für Bildung" (Alliance for Education). The Germany-wide association of publishers, IT companies, and public institutions supports the digital transformation in teaching and learning and plays an important intermediary role in the project. The players want to open up the "educational landscape of closed silos" and see BIRD as an opportunity to make the multitude of existing as well as future learning opportunities generally accessible.

Enabling exchange

Connectivity seems to be a key word in the project: to other systems, to software and services that will only exist in the future, and to platforms abroad. "With the DAAD on board, we ensure that the national education space will be internationally compatible," Lucke also emphasizes. For the European Digital UniverCity (EDUC), led by the University of Potsdam, this is of essential importance. After all, the aim is to conduct research and study together "freely accessible" across several European borders. It is not without reason that the project repeatedly refers to "educational journeys". Journeys through fields of knowledge, into the depths of individual subjects or to neighboring disciplines. Expeditions into virtual worlds, educational trips to foreign countries, with all that this implies: encounters, discussions, and intercultural exchange, the certificate of a language course or a degree from a university. BIRD wants to pave the way and bridge gaps so that the "educational journey" of each individual becomes successful without disruptions, self-determined, and ideally life-long.

The developer team recently showed what such a user journey can look like on the digital "terrain" of the education platform with a live demonstration at the Federal Chancellery. "We knew that Mrs. Merkel cared a lot about the project, so we were highly motivated," Professor Lucke reports. Even though the former chancellor could not be there in person, the presentation created a lot of tailwind and the certainty of being on the right track, she says. With a specially written script and actors from the university, they acted out exemplary learning scenarios at school, university, and continuing education live in the system.

A video that accompanies trainee teacher Stefanie Schubert on her educational path between seminars, teaching practice, and continuing education also offers an impression of this: Using her unique account, she gains access to the platform, connects to the school cloud, and conducts a biology sample lesson in an 11th grade via the Big Blue Button conferencing system. During the lesson, she accesses digital material that illustrates the subject matter, interacts with the students and, at the same time, uses the networked DAAD portal to inform them about a language aptitude test they need for a planned stay abroad. Needless to say, her subject supervisors have also been in touch and have not only given her feedback on the teaching sample, but also a grade via the examination board, which Stefanie collects in her personally managed "data wallet", a digital folder. The trainee teacher shares the recorded lesson with her fellow students in a virtual workspace and receives helpful comments. Her teaching sample appears to be a success, since Stefanie attaches it to an application that she sends to her "dream school". Because her supervisors have recommended that she furthers her knowledge on digital teaching formats, she takes an e-learning course. Her successfully completed online examination fills another verified certificate of her "data wallet" that will accompany her during her lifelong learning – always at hand.

Her example shows what will be possible when the technical backbone for the digital education space is ready. Professor Lucke also sees BIRD as an incubator and experimental space for testing technical possibilities for the education of future generations. Therefore, further prototypes based on open-source software are to follow. "Step by step, features are built around it, new rooms are added," says the "architect" of complex multimedia applications, "until the whole building is complete and serves its purpose."

ANTJE HORN-CONRAD
TRANSLATION: SUSANNE VOIGT

Photo: Roese, Thomas

Religious Diversity in Northern Iraq

A German-Iraqi Collaboration

Three researchers and nine students at the Department of Jewish Studies and Religious Studies of the University of Potsdam set off to Iraq at the end of September 2021, to the Autonomous Region of Kurdistan, to be exact. In its capital Erbil, a special kind of scientific mapping was on the agenda: In the "Religious Mapping Erbil" project, the Potsdam researchers, together with local partners, are recording and documenting religious diversity in one of the oldest continuously inhabited settlements worldwide. Matthias Zimmermann talked to the project director, religious studies scholar Prof. Dr. Johann Hafner, about the goals and pitfalls of the project as well as about how such a map can be read.

What is the project goal of "Religious Mapping Erbil"?

Erbil has always seen lively migration due to its location between the Ottoman, Persian, and Arab empires. But in recent years migration has increased. Many people came there from the south, from Baghdad because of the pressure on religious minorities, from Syria fleeing the "Islamic State" (ISIS), from the Nineveh Plain, about which there are disputes between central Iraq and Iraqi Kurdistan. We wanted to find out which different religions exist in Erbil and how active their believers are. This includes Islam, of course, starting with the 304 mosques which exist in the city according to the Ministry of Endowment and Religious Affairs. Our Iraqi colleagues said there wasn't much to see, that the same prayers were being said everywhere. We doubted that: There are mosques attended by the rich and those attended more by the poor, there are more progressive and very conservative, politically involved and apolitical ones …

In addition, there are about 15 different Christian denominations, including the very old, ancestral ones – the Armenian, the Chaldean, the Syrian Orthodox, and the Apostolic Church of the East. They were present long before Islam, since the 2nd century, and have

THE PROJECT

"Religious Diversity in Northern Iraq"

Participants: University of Potsdam, project director: Prof. Dr. Johann Ev. Hafner and Dr. Ulrike Kollodzeiski, coordinators: Dr. Stefan Gatzhammer, Dr. Michael Haußig, Imam Kadir Sanci M.A.; partner universities: Ishik University, Salahaddin University, Catholic University in Erbil

Funding: German Academic Exchange Service (DAAD)

Photo: Laibl, René (background)

the same theological standing as the Roman Catholic Church in the West. Until today, each of them has its own "pope" called Catholicos. Due to western immigrants, free churches such as the Methodists, Evangelical congregations, and a parish with the Latin rite have also emerged. These Christianities still had 1.2 million believers in Syria and Iraq ten years ago. Now they have shrunk to 200,000. Their imminent disappearance would be a dramatic loss of culture. They have their own liturgies, their own canon law, and magnificent prayers. In addition, there are Mandaeans, a pre-Islamic religious community of Gnostic origin, the neo-Zoroastrian movement, and also a small Jewish group who, like the Baha'i, meet only privately. The project is intended to document this religious diversity. By the way, the Yazidi, several thousand of whom had fled to Erbil from ISIS, were not to be found. Since they are religiously oriented towards a sanctuary in their tribal area, they did not establish religious communalities in exile....

How did the research trip to Erbil come about?

It is part of the project "Religious Diversity in Northern Iraq," which is funded by the German Academic Exchange Service (DAAD) and in which we are cooperating with three universities in Erbil: Tishk University, the Catholic University, and Salahaddin University. We want to show the students that another Christianity, besides the Catholic and the Reformed one, exists. In addition, we wanted them to get to know the local religious diversity beyond these. By the way, this also applied to our three cooperation partners as they did not know each other and their respective religious backgrounds. Many Muslim colleagues had never been to a church, and the traditional Christians had never been to an evangelical place of worship. Since Iraq hardly appears on the map of scientific cooperation, the DAAD welcomed our project very much.

What were you interested in?

We wanted to find out certain things about the religious communities: What is the structure of the congregation? How many employees and volunteers are involved? How active are their members, i.e., who comes when, how often, and what for? What annual celebrations do they hold? How are worship services and other religious practices conducted? To account for all this, we set out to visit as many as possible. Two years ago, at the beginning of the project, we already selected representative samples for this purpose because we can definitely not, for example, visit all mosques. Our local partners already described 50 communities over the past months. During our visit, we continued and completed this preliminary work in order to evaluate and process it afterwards.

THE RESEARCHER

Prof. Dr. Johann Ev. Hafner is Professor of Religious Studies at the Department of Jewish Studies and Religious Studies at the University of Potsdam

✉ hafner@uni-potsdam.de

How exactly did you go about it?

We formed mixed German-Iraqi groups of two and set off to mosques and churches that we had chosen before. We conducted participant observations in services and talked to representatives of the congregations and to believers on the basis of an interview guide. I myself was in one of the strict mosques. Fun fact: The imam there gestured and shouted for 20 minutes during his sermon so that I thought he was calling for jihad. According to my translator, the sermon was about forgiveness, gentleness, and humility, saying that these were practiced much better in European countries. When I asked how style and content match, they explained to me that a good sermon – following Muhammad's example – should be so impulsive that the imam's jugular veins swell.

How do you want to present Erbil's religious diversity?

We have written down all the collected information according to a previously determined pattern and entered it into a database, which forms the basis for a website. Its core consists of a map of Erbil with symbols indicating the location of the mosques and places of worship and brief descriptions of each congregation visited. The long versions and scientific analyses will be compiled into a book to be published in 2022. It is particularly interesting for me that we want to use the surveys to find out how high the level of religious activity really is in Erbil. Based on our sample with concrete data on how many believers attend prayers and services, we can make well-founded estimates of how active which religious groups actually are. This, in turn, will allow us to draw conclusions about the degree of secularization. But this evaluation will take some more time.

TRANSLATION: SUSANNE VOIGT

Photo: Fritze, Karla (top right)

PREEMPTING HATE SPEECH

How the “HateLess” program
help young people free their schools
from hate speech

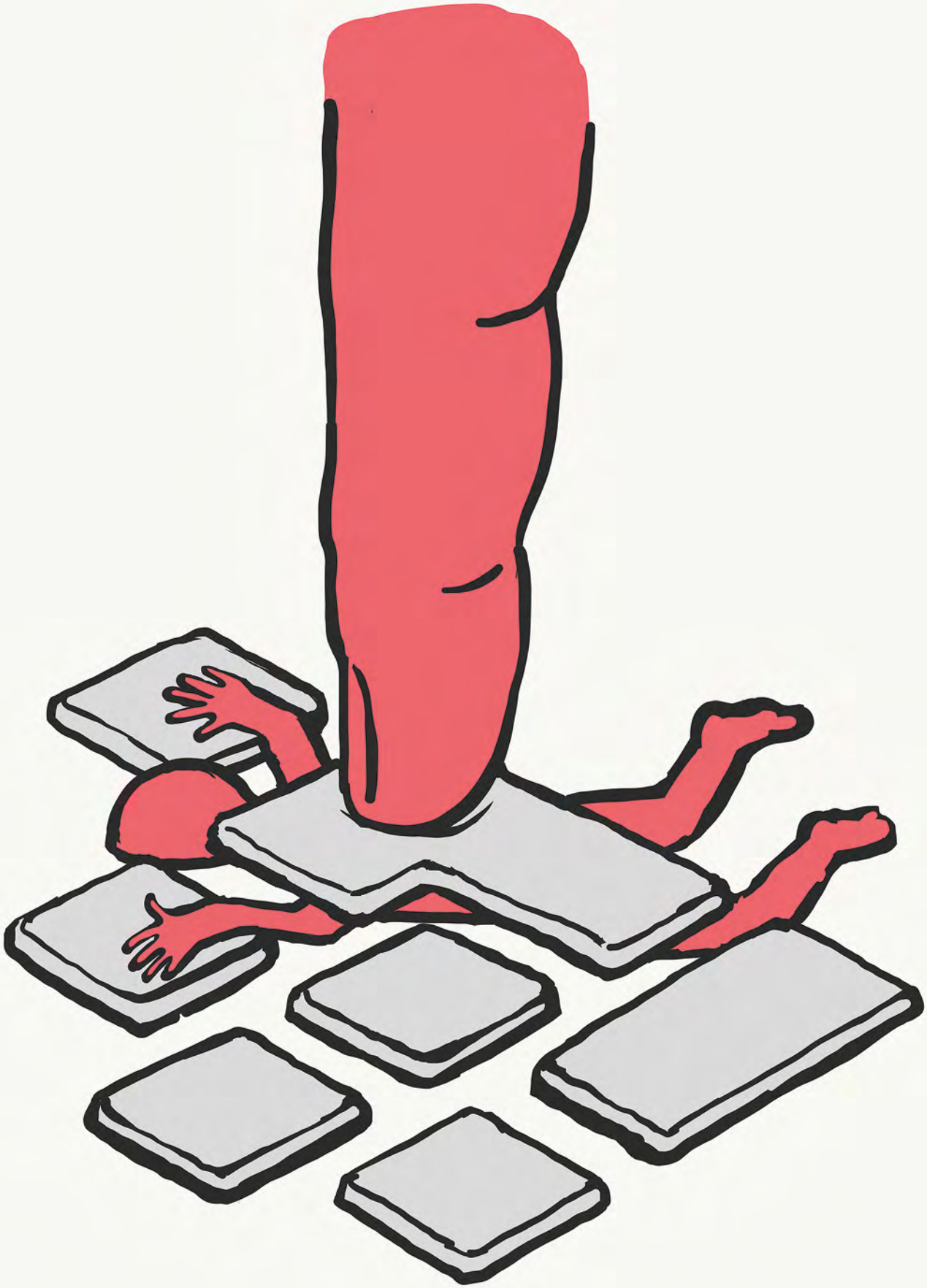


Illustration: Töpfer, Andreas

Scrolling through the comment sections of news platforms, one sometimes wishes there was a delete button to remove all the hate mail, insults, and threats so that people can have factual discussions again. This year's winner of the Better World Award presented by the University of Potsdam, Dr. Julian Risch, has indeed found a solution to this problem: A machine learning process that automatically filters out toxic comments so that a team of moderators can decide whether or not to delete them. A quantum leap for communication on the web! Yet the hatred is not gone, it is just switched off for a moment in a defined place.

In a recent study on hate speech at German schools, students as well as teachers describe what it is like to be unable to escape hate speech and be confronted with it on a daily basis, and in increasingly blatant forms. The study is carried out by Potsdam educational researchers Dr. Sebastian Wachs and Prof. Wilfried Schubarth and their colleague Prof. Ludwig Bilz from Cottbus and attempts to identify risk factors for hatred and hate speech, and show what teachers and students can do about it in very concrete terms. As yet, not all the data has been analyzed. The researchers, however, considered the issue so urgent and challenging that they decided to launch a prevention program in parallel.

The program is called "HateLess", and its subheading "Together against Hatred" indicates that it focuses on the strength of cohesion in a class or school. As the Professor for Educational and Socialization Theory in Potsdam, Wachs has developed the program together with research assistant Norman Krause and master student Marie Richter, for seventh and eighth graders in particular. In five modules, the students jointly learn what makes hate speech so dangerous, where it comes from, and what harm it does, so they can fight it with the right strategy and free their school from hatred and hate speech. As each module builds on the previous one, the program is especially suited for project weeks. A detailed manual navigates teachers through the difficult subject and provides them with didactic tools, illustrative PowerPoint presentations, animated videos, and a short film. Each module has its own protagonist: Anura, Bennet, Carla, Hamza, and Laura, all given their own very individual character by artist Karoline Becker. The protagonists are of the same age as the students, so they can become confidants, and students may identify with them. It also helps that the five protagonists all learn in one class and are as diverse as is typical of heterogeneously composed classes today. Their social, cultural, and family backgrounds are not ignored, nor are their personal characteristics, interests, and experiences. They themselves or their relatives have experienced hatred and hostility, were disadvantaged or discriminated against. Their characters are presented as credible, enabling empathy and reflecting the diversity of life situations at the same time.

Creating awareness

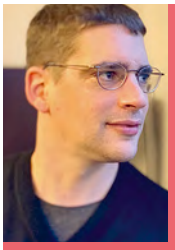
In the program, the protagonists lead the students step by step to the module's objective, helping them on their journey to a school without hatred. It all starts with Clara's question, "You mean this is hate speech?" Students learn to distinguish between hate speech, verbal abuse, and bullying. Examples help them understand how systematic attacks in words, pictures, and videos encourage people to violate someone's dignity – not because they don't like them, but because they belong to a marginalized group, such as refugees or people with disabilities. Hate speech always carries a message, an invitation to discriminate against someone.

THE PROJECT

ERASED – Development of a Prevention Program against Hate Speech among Adolescents

Funded by the Federal Ministry of Justice and Consumer Protection
Duration: 3/2021-12/2022
www.uni-potsdam.de/en/erziehungstheorien/forschungsprojekte/erased

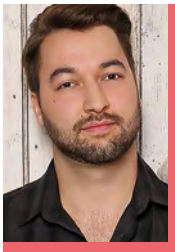
Foto: Becker, Karoline



THE RESEARCHERS

Dr. Sebastian Wachs studied educational science and earned his doctorate from the University of Bremen. Currently, he is Deputy Professor for Education and Socialization Theory at the University of Potsdam.

✉ sebastian.wachs@uni-potsdam.de



Norman Krause, M.A., studied educational science/politics and administration in Potsdam and educational science in Berlin. Currently, he works as a research assistant at the Chair of Education and Socialization Theory.

✉ normankrause@uni-potsdam.de

Marie Richter, B.A., studies educational science at Freie Universität Berlin and works as a research assistant at the Chair of Education and Socialization Theory at the University of Potsdam.

✉ marieric@uni-potsdam.de

Once the students have understood this, the second module invites them to search for the underlying reasons and motives. They reflect on what group they belong to, and what its social norms are. But "What is normal?" Hamza asks provocatively, challenging the class to question notions of normality and otherness. In a game with reversed roles, students experience what it's like to be excluded. Here, at the latest, it is time to speak about hatred on the web, the filter bubbles, echo chambers, clickbait, and online disinhibition that make it so easy to spread cruelty on the Internet and get away with it undetected.

In the third module, Anura speaks up and says, "Words can divide". She encourages students to think about the consequences for society. Using the world café method, students discuss the ways hate speech affects their lives – at school, in movies, in music, on social media, at play, in sports, wherever. When the learning objective of the module is reached, students will see the potential dangers to democracy and freedom of speech. By changing perspective and putting themselves in someone else's shoes they understand how much words can hurt. When someone insults you, it helps to grow a thick skin. In the terminology of the HateLess program that means: becoming aware of your inner and outer resources, seeking help and counseling, or at least knowing where to find them in case of need.

"Each and every one of us matters," is Bennet's point, too. In the fourth module, he directs the students' attention to how best to deal with hatred. The concept of moral courage is introduced. Students discuss how to intervene courageously in hate speech situations, and role-play to see which reactions work best. They learn how to resolve conflicts in a socially acceptable way, argue fairly, and strive for constructive solutions. The objective of the module is to become a class without hatred. The students know that rules and solidarity are needed to get there. Reflecting on what they have learned will strengthen their cohesion, too.

Once several classes have completed the program to this point, they may join forces and decide to turn their school into a place without hatred. In the fifth module, Laura therefore suggests setting up an interest group at school, preparing a HateLess exhibition, information flyers, or a podcast episode. There are many ways to share the newly acquired knowledge with the student body and position oneself clearly against hate speech. And most importantly, speak as one.

ANTJE HORN-CONRAD
TRANSLATION: MONIKA WILKE

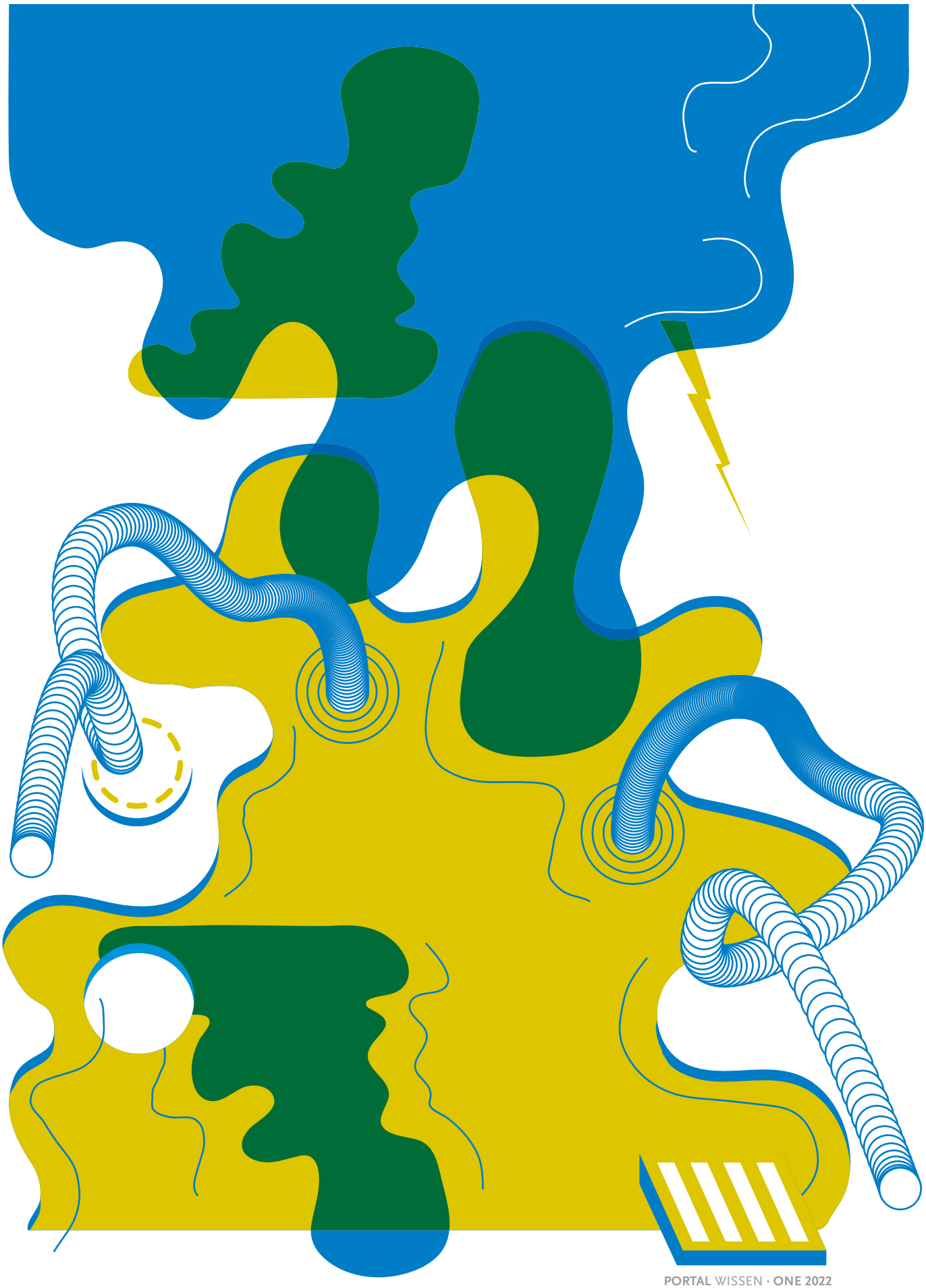


Illustration: Töpfer, Andreas

WHEN HEAVY RAINFALL TURNS INTO FLASH FLOODS

Hydro & Climate research group examines the hazards of flash floods for cities

In July 2021, there were devastating floods caused by heavy rainfall with 180 deaths and immense economic damages in Rhineland-Palatine and North-Rhine Westphalia, and to some extent also in Saxony and Bavaria. Such an extreme flood event is very rare but within the realm of possibility, as researchers of the working group Hydrology and Climatology led by Prof. Axel Bronstert say. In principle, cities such as Berlin are also at risk.

The term "flash flood" refers to rapid, flash-like, thunderstorm-induced flooding. The stronger the thunderstorm and the higher the rainfall intensity, i.e. the amount of rain per unit of time, the less water the soil can absorb proportionally. The cause of such pluvial flooding – flooding caused by heavy rainfall – are local, convective precipitation cells, usually with a diameter of ten kilometers or less. "A lot of water comes down very quickly from these cells, and when the surface can no longer absorb it, there's a flood," explains hydrologist Prof. Bronstert. Such extreme events can happen anywhere, but their effects are naturally dramatic in populated areas, especially in cities. Heavy rainfall in the Italian region of Liguria caused flooding and landslides on October 4, 2021, for example. Cities on the coast and inland cities were affected, with rivers bursting their banks. Such events with more than 100 liters per m2 in a few hours are relatively common in the Mediterranean. Another example: In July 2014, violent storms with unimaginable rainfall of 292 liters per m2 in just seven hours flooded Münster. Such a large amount of torrential rainfall in such a short time had never before been measured in Germany before. These precipitation-induced floods, however, were not always documented in the past.

THE PROJECT

"Towards parsimonious hazard assessment for urban flash floods"

Participants: Prof. Dr. Axel Bronstert, Dr. habil. Maik Heistermann, Dr. Tobias Sieg, Dr. Georgy Ayzel, Omar Seleem
Funding: German Academic Exchange Service (DAAD)
Duration: 2019–2023

A flood hazard map for Berlin

In Prof. Bronstert's team, hydrologist Dr. Georgy Ayzel, PhD student Omar Seleem, and PD Dr. Maik Heistermann research what triggers pluvial floods and how to predict the hazards for inhabited areas. In his doctoral thesis, Ayzel has developed models for rainfall prediction with lead times up to 1-3 hours. "In this context, the Rainymotion model delivers forecasts that are comparable to those of the German Weather Service. The RainNet model is a neural network for radar-based precipitation nowcasting," he explains. All models were consistently implemented using free software in a transparent and reproducible approach. This way, Ayzel also shows the advantages of open-source applications in this field. In his current research project, he is investigating how convective rainfall events must take place in order to cause severe flooding in urban areas. He is looking at how the frequency and magnitude of rainfall extremes have changed in the past or could change in the future due to global warming.

As a DAAD scholar in the Graduate School Scholarship Program, Seleem has been working on a project to predict urban pluvial flooding based on the analysis of radar image data and hydrological modeling since 2019. His doctoral thesis includes several subtopics, for example a case study to identify high-risk areas in Berlin, since the city is not completely flat. Such a hazard map for floods caused by rainfall does not yet exist for Berlin. "We are working with the Senate and the Berliner Wasserbetriebe on this," Seleem says. The


Dr. Georgy Ayzel

THE RESEARCHERS

Prof. Dr. Axel Bronstert studied civil engineering and water management at the University of Karlsruhe. Since 2000, he has been Professor of Hydrology and Climatology at the University of Potsdam.

✉ axel.bronstert@uni-potsdam.de

Dr. Georgy Ayzel studied hydrology at Moscow State University (Russia) und earned his doctoral degree at the University of Potsdam. Since 2019, he has been research assistant in the BMBF-project CARLOFF.

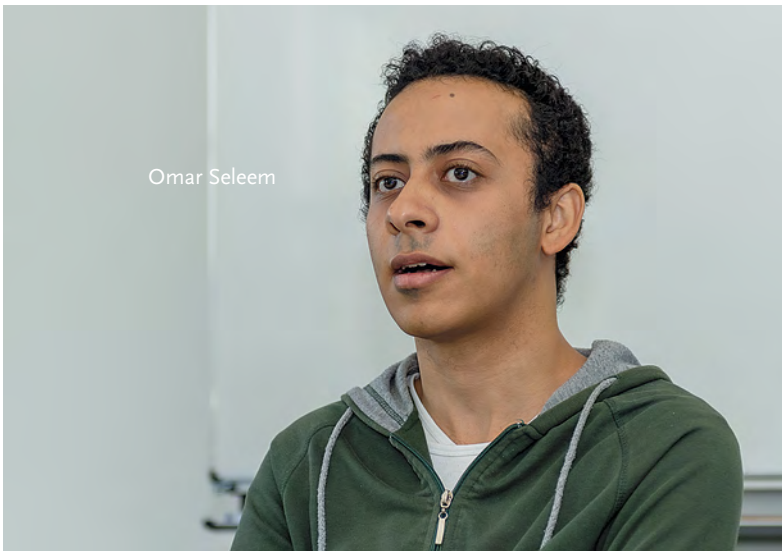
✉ ayzel@uni-potsdam.de

Omar Seleem studied engineering and water resources management at Cairo University (BA) and at Ehime University, Japan (MA). Since 2019, he has been writing his doctoral thesis in the working group Hydrology and Climatology of the University of Potsdam under the supervision of Prof. Bronstert.

✉ seleem@uni-potsdam.de

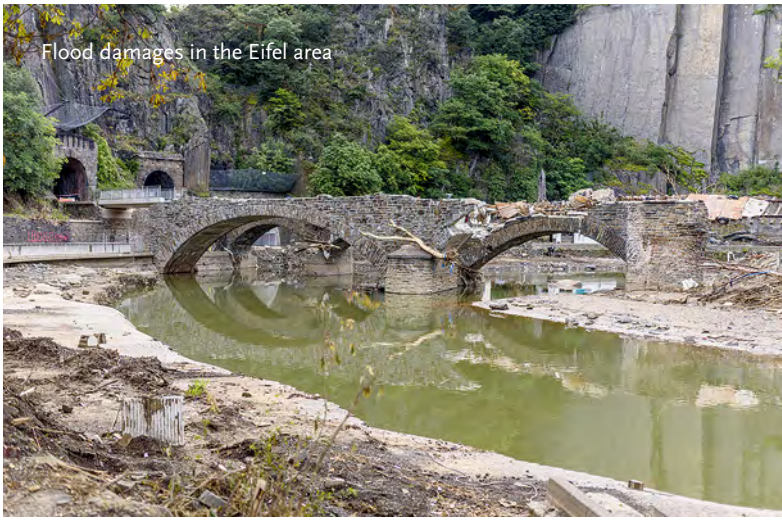
Photos: Hopfgarten, Tobias (3)


Prof. Axel Bronstert


Omar Seleem

Neckargmünd under water

Rescue mission during a flood



Flood damages in the Eifel area

Tempelhof-Schöneberg district is a key area. “The people there don’t know that they partly live in a ground depression and are therefore at risk," he adds. So far, hardly anything has happened. “But that was luck,” Bronstert says, “lives are also potentially at risk here.”

Rainfall forecasting with big data, statistics, and neural networks

Prof. Bronstert and his team now want to find out what and where the threats are. What happens in case of 100 – 150 liters of rainfall per square meter and hour? Where does the water concentrate? How high is the flooding in which area? To answer these questions, they analyze large data sets and use statistical surveys. “These methods allow us to establish reliable and robust correlations between different features, such as intensity or duration of precipitation events as well as the impacts they cause,” Ayzel explains. “By developing models, we aim to understand the origin and evolution of heavy rainfall. For this purpose, we are using physics-based modeling approaches based on machine learning and deep neural networks.”

Ayzel and Seleem will also be involved in the next project, which will focus on predicting pluvial floods in cities. This time Würzburg is the research partner, in addition to Berlin. “In contrast to Berlin, there is a strong relief in the city itself and in the surrounding catchment areas with many vineyards. So, the water runs off much faster and more torrentially than in the lowlands,” Bronstert explains. Without slopes, the water cannot run off quickly in the lowlands, whereas in relief-rich areas particularly the valleys are at risk because they channel the water. “The water then rushes through the streets,” he describes. Together with the Technical University of Munich and two engineering companies – a start-up from Berlin and a hydroinformatics company from Aachen – the team wants to hit the ground running in 2022.

DR. STEFANIE MIKULLA
TRANSLATION: SUSANNE VOIGT

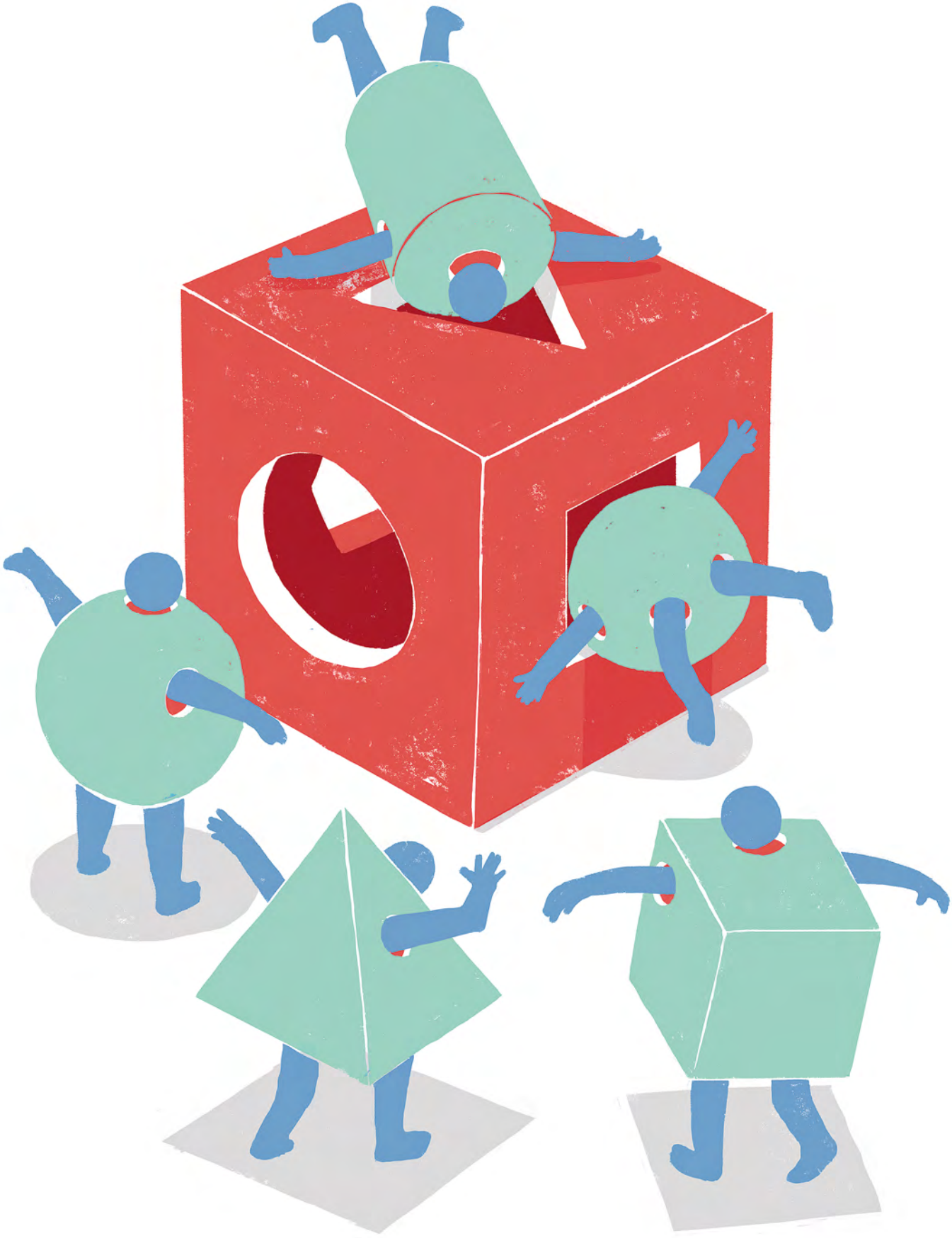


Illustration: Töpfer, Andreas

DIVERSITY WITH THE POTENTIAL FOR CONFLICT

The project "Bodyrules" researches official and unofficial rules related to the body

THE PROJECT

Bodyrules – organizational rules in dealing with the body in the area of conflict of organization and immigration examines how organizations in a society that is becoming more diverse by means of immigration react to changing social norms

Participants: Chair of Organizational and Administrative Sociology at the University of Potsdam (subproject: Schools); Charité Berlin, Institute of Medical Sociology and Rehabilitation Science (subproject: Hospitals); Center of Science Berlin for Social Research, Department of Migration, Integration, Transnationalization (subproject: Swimming Pools)
Duration: 2018 – 2020
Funding: Federal Ministry of Education and Research, research program: "Migration and Social Change", topic II "Diversity and Institutional Change by Means of Immigration"

www.uni-potsdam.de/de/ls-apelt/forschungsprojekte/bodyrules

How do cultural and religious diversity influence the way we deal with each other in public institutions such as schools, swimming pools, and hospitals? Researchers look at this question in the project "Bodyrules" with regard to the body. The Potsdam research team visited schools with a high percentage of migrants and interviewed the young people and teachers. The first results show: Apart from open conflicts there are many unspoken rules and conventions concerning the body.

Armando Rodrigues de Sá came to Germany in 1964. The Portuguese was the German Federal Republic's millionth guest worker and received a bouquet of flowers, an honorary certificate, and a moped on his arrival at Cologne-Deutz station. The 38-year-old carpenter was representative of all those guest workers from Italy, Greece, Spain, Turkey, Morocco, South Korea, and former Yugoslavia who had been recruited since the 1950s. In the GDR, there was also a great demand for workers from abroad – here especially from Vietnam, Angola, Cuba, and Mozambique.

Germany has been a country of immigration for a long time. But the Federal Republic of Germany, to which Armando Rodrigues de Sá immigrated in 1964, was very different from the world today. In the 1960s, married women in the FRG were largely dependent on their husbands, divorce and children born to unmarried parents were a stigma, and homosexuality was punishable. Over the years, the call for individual self-determination grew consistently louder. More and more, different social groups demand equal rights regardless of life and family models, origin, religion, and gender. For decades, sociologists have been noting a social shift toward greater diversity in lifestyles, customs, and manners in Germany.

On the one hand, this is enriching for society, but on the other hand, it holds a great deal of potential for conflict. The research project "Bodyrules" looks at areas of tension that can arise in connection with the body: Clothing, fasting rules, touches, or gender relationships vary between social milieus, and religions. In this project, researchers from the University of Potsdam, Berlin's Charité Hospital and the Social Science Research Center Berlin (WZB) are taking a look at schools, hospitals, and swimming pools to find out how different social norms are reflected in these places, how the institutions are adapting to increasing diversity, what conflicts arise, and how they are dealt with.

Fasting as an area of tension

Sociologist Prof. Maja Apelt and her Potsdam research team conducted a nationwide online survey at more than 200 schools and visited four schools in urban milieus with a share of 80% or more Muslim


"Bodyrules" examines hospitals ...

Photo: AdobeStock/VAKSMANV

students. The researchers spoke with school administrators, teachers, and ninth-grade students. "The first thing we talked about was which topics related to the body are seen at all at the schools," explains Annika Koch, who is doing her PhD in the project. The interviewees were free to choose which conflicts or problems they wanted to talk about and which aspects were particularly important to them. Which official rules apply at the school? What unspoken unofficial norms come into play? How are rules interpreted from different perspectives? And what happens when rules are broken?

At the schools, two topics became apparent that particularly often lead to misunderstandings and resentment: fasting during Ramadan and the clothing of female students. During the fasting month, students are not supposed to eat or drink anything between sunrise and sunset. At school, this has an impact on students' ability to cope with stress: some are tired and listless, they find it harder to concentrate and perform well.

THE RESEARCHERS

Prof. Dr. Maja Apelt studied sociology and economics at Humboldt-Universität zu Berlin and earned her doctorate at Leuphana University Lüneburg. Since 2010, she has been Professor for Organization and Administration Sociology at the University of Potsdam.

✉ maja.apelt@uni-potsdam.de

Annika Koch studied social sciences at Humboldt-Universität zu Berlin. Since 2018, she has been a PhD student at the University of Potsdam.

✉ annika.koch.iv@uni-potsdam.de

... swimming pools ...

... and schools.

Photos: AdobeStock/Rido (top), Kzenon (center left); Hopfgarten, Tobias (center right, bottom right)

Prof. Maja Apelt

Annika Koch

Fasting students on the one hand and teachers to whom this is alien on the other – during Ramadan different perceptions from respective perspectives become apparent. Some teachers perceived the fast as a provocation. They suspected that their students were using the fast as an excuse. "Along the lines of: 'They don't want to learn and that's why they're fasting,'" Apelt explains. "That attitude really surprised me." The Muslim youth, on the other hand, wished for more understanding. For them, Ramadan is a special time of the year, comparable to the Advent period and Christmas for Christian classmates. Annika Koch sees this example as a general challenge for the German education system in a pluralistic society. On the one hand, there is a demand for equality of lifestyles, but on the other hand, time structures such as holidays often unconsciously favor Christian traditions.

Discrimination often happens unconsciously

The clothing of female students also harbors potential for conflict. Officially, there are no dress codes in schools. Everyone can wear what he or she likes as long as it does not contain any illegal symbols. In everyday school life, however, the researchers observed something different: pressure is often exerted by peers when female students wear tight clothing or crop tops. Apelt and Koch fear that this may unconsciously lead to discrimination, for example when teachers approve of peer group pressure, especially among Muslim girls. "In our interviews, some Muslim girls brought up the problem of sexist comments about clothing and felt that teachers do too little about it," Apelt says. "It is often difficult for teachers to intervene, especially if the comments are made outside of class and are justified with religious reasons. In addition, some teachers also disapprove of cropped clothing." If teachers stay out of the clothing issue, however, they may encourage unofficial dress codes and accompanying group dynamics.

"The whole topic is gendered," Apelt stresses. "First and foremost, it affects the girls and women who are being restricted." In the discussions, however, it became apparent that female teachers are not free of this either: They also dress, mostly unconsciously, according to an unofficial school convention and restrict themselves. In the classes and in the staff rooms, however, this is hardly ever discussed. This makes it difficult to approach problems together.

Can official rules help manage the conflicts better? Whether it's the school, hospital, or swimming pool – in all three spaces, she says, it's not easy to stipulate rules. "Then you make the conflict public," explains Apelt. "And rules that have been introduced also have to be enforced." It is often easier to look for solutions outside of official rules in discussions. Sometimes people simply look the other way. After all, teachers have enough other problems to deal with in their daily job routines.

What this means in practice can be seen in swimming pools, for example. Here, full-body bathing suits – so-called burkinis – are generally permitted. Nevertheless, as the researchers led by Prof. Ines Michalowski and Dr. Oliver Schmidt from the WZB discovered, there are some facilities in Germany where swimming with a burkini is not possible. Some lifeguards referred burkini-wearing women to the non-swimmer pool. Some women felt so insecure due to the reactions of other visitors that they refrained from going to the pool altogether. "The examples show: Even though it is officially allowed to go to a pool wearing a burkini, there are norms among people on another level that limit this right," she explains.

"In all three spaces, there are rules that initially take diversity into account," the researcher notes. "But we have a shortage of resources and an additional burden on staff everywhere." Cultural diversity, after all, also means that teachers or medical staff have to adapt to different needs and have a higher workload. How to deal with this is negotiated, often unconsciously, among all those involved. Conflicts are often not openly dealt with. Does this lead to disadvantages and discrimination, for example, because they result in different educational opportunities for students? The researchers now want to make further investigations.

Looking for the right strategy

Currently, the researchers are looking through the interviews and survey responses, analyzing the situations in the schools, and listing the conflicts that respondents have brought to their attention. However, Annika Koch dampens expectations that their research findings will provide easy solutions. "A strategy that works well in one school may already be problematic in another." She says it depends on the particular circumstances – the staff, the students, the individual conflicts and problems.

The results of the research project can help people at the schools get along with each other despite different needs. Koch visits the schools again and takes the analyses with her. When she presents what conflicts occur at the schools and what effects they have on students, but also on teachers, the situation can be better reflected and perceived by the school community. "We provide reflective knowledge," she says, hoping that this helps schools find a way to communicate more openly about their conflicts and also become more sensitive to them. As she says, the goal must be to find common rules of social interaction.

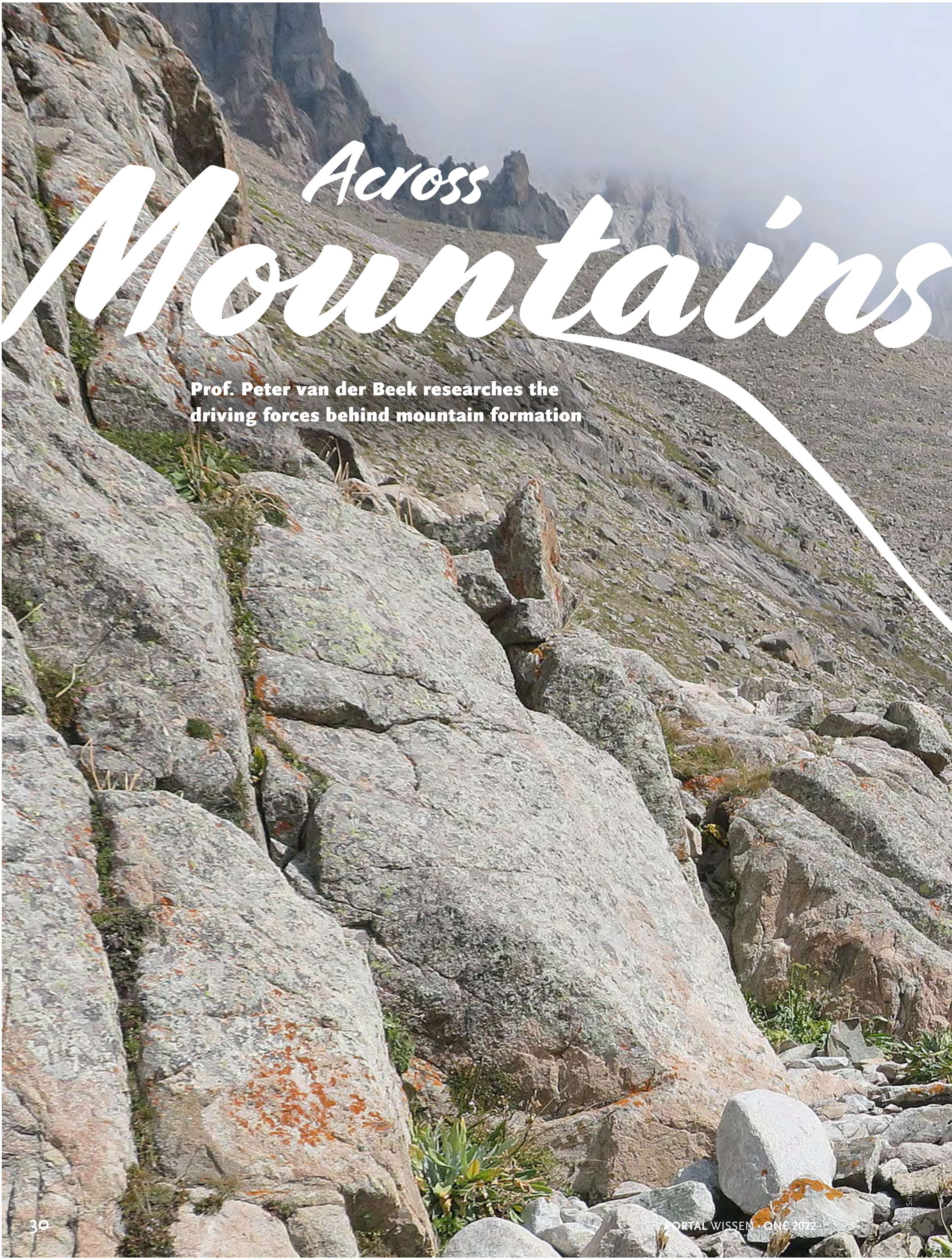
One example of such collective negotiations is the so-called "Neukölln Recommendation", which was published in 2017 at the initiative of the Berlin district office of Neukölln, the local education authority, and the Senate Department for Education, Youth, and Family. Together with parents as well as mosques and family counseling associations, the authorities had asked how Muslim students can be supported during Ramadan to better reconcile their school and religious duties. The result of the discussions are twelve tips for teachers and parents, which were prepared in a mutual exchange. They state, for example, that fasting is a pillar of Islam, but at the same time does not relieve someone of school duties. Fasting can also be postponed in case of important exams or tests. Not all Muslims, however, agree with this interpretation of Islamic rules. For the researchers, the "Neukölln Recommendation" therefore reveals an interesting field of tension between state and religion: state actors recognize religion and at the same time interpret it in a specific way. This raises new questions and problems.

To be able to negotiate solutions for conflicts, you have to talk to each other. "There are no easy solutions," Apelt emphasizes. However, diversity is increasingly being recognized -– politically, in society, in institutions, and by authorities. "But the uncertainties about how best to do justice to this diversity are still great."

HEIKE KAMPE

TRANSLATION: SUSANNE VOIGT

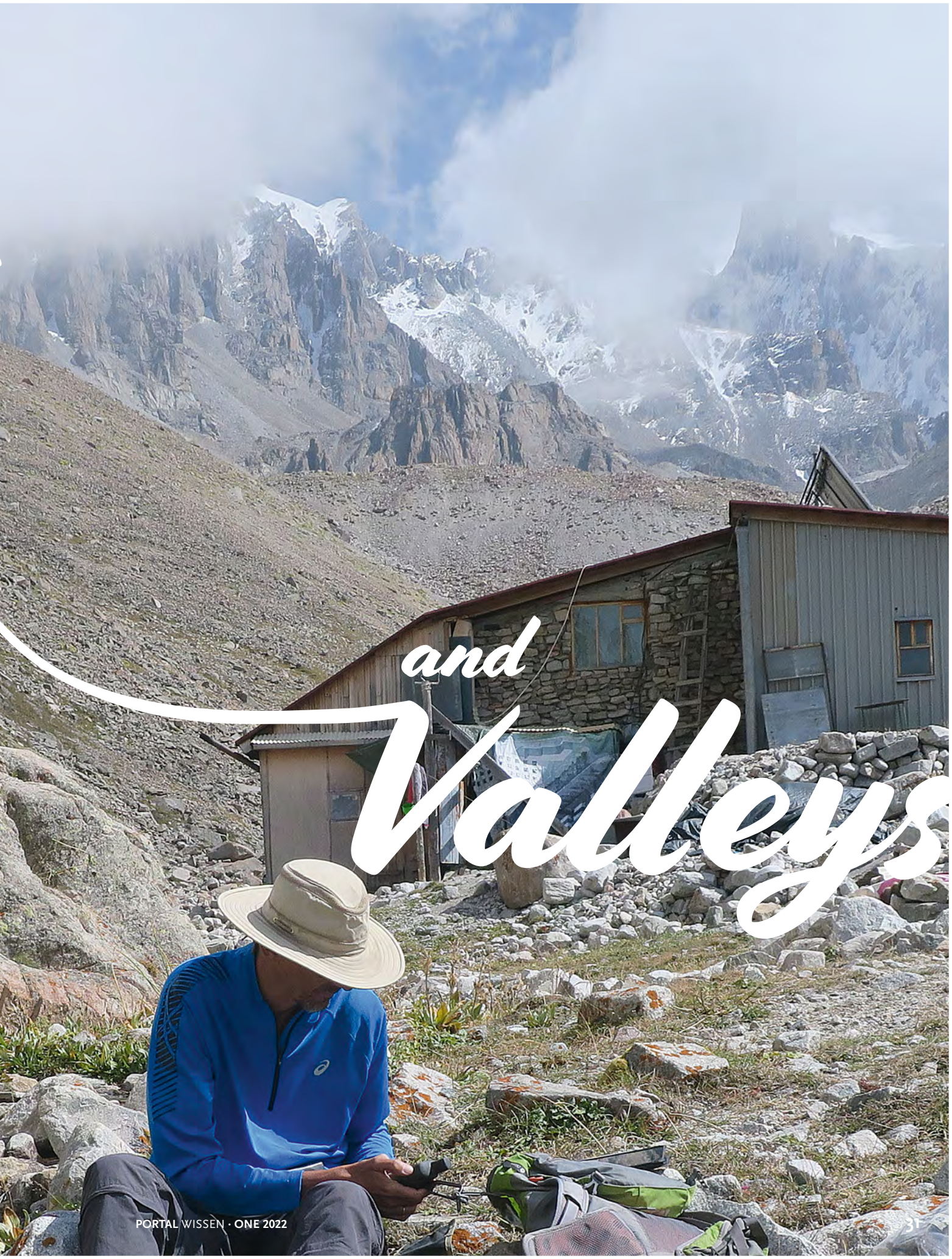
Photo: Hopfgarten, Tobias



Across Mountains

Prof. Peter van der Beek researches the driving forces behind mountain formation

Photo: Schildgen, Taylor


and
Valleys

Geoscientist Peter van der Beek is a specialist in thermochronology. With this method, he looks far back into the history of mountain ranges and landscapes using isotopes of the noble gas helium that have survived millions of years in the crystal lattices of minerals. They tell him how quickly mountains have risen and how they are being eroded at the same time.

When he came to Potsdam from Grenoble in 2020, everything was a bit different from what was planned: It wasn't until June – two months later than originally planned – that Peter van der Beek was able to move into his office at the Institute of Geosciences and take up his position as Professor of General Geology. "We had a lockdown in France and I couldn't relocate," he recalls. The schedule, however, was tight: A major research project was about to start, researchers had to be hired, and a special measuring device was due to arrive in Potsdam. The pandemic upset the schedule a bit. "But in the end, we managed to get everything done and were able to get started," van der Beek says.

In the EU-funded research project "COOLER", he and his team are now on the trail of those forces that form the appearance of mountains. Why are there deep valleys and high peaks, rugged mountainsides or plateaus? Why do mountains look so different? How do tectonic uplift and erosion interact? And what's the role of the climate in all this?

Well-known and unexplored places

Whether it's the Alps, the Rocky Mountains, the Himalayas, or the Andes – the Earth's mountain ranges have an eventful, still ongoing history. Fast-growing mountain ranges like the Himalayas are pushed up a few millimeters per year by plate tectonics. Others grow less than a millimeter. Wind, precipitation, glaciers, or chemical weathering erode the material at the surface again – sometimes this erosion offsets the growth of the mountains completely. "The shape of the mountains gives us information about tectonic uplift and erosion. It is this erosion history that we are trying to understand," van der Beek explains.

As a geologist, he looks at a period of several million years and uses an approach that analyzes how the rock has cooled during it. This method is called thermochronology. It looks at the structure and composition of minerals and thus at their history. The temperature below the Earth's surface increases by about 30 degrees Celsius per kilometer. When plate tectonics pushes material from the depths to the surface, it cools down. Van der Beek is one of only a few experts in thermochronology, and can draw conclusions about erosion history from this information.

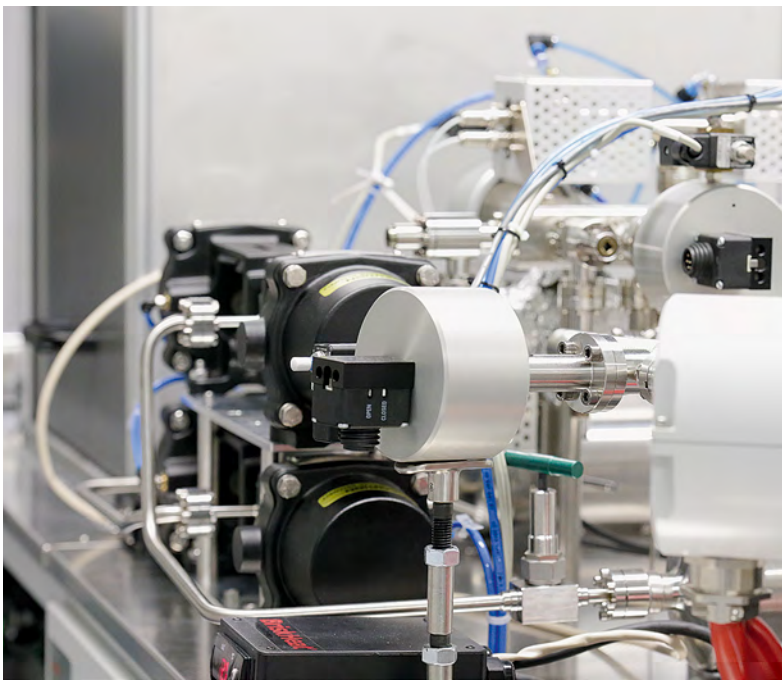
The instrument needed for this analysis takes up a lot of space: At the Potsdam institute, a separate small

THE PROJECT

The research project **"COOLER"** (Climatic Controls on Erosion Rates and Relief of Mountain Belts) investigates the feedbacks between tectonic processes in the lithosphere and climatic processes in the atmosphere. It uses new methods of thermochronology to collect and analyze high-resolution data on erosion rates and relief changes in mountains.

Funding: European Research Council, ERC Advanced Grant
Duration: 2020–2025
http://erc-cooler.eu/

Prof. Peter van der Beek



Photos: Scholz, Sandra (2)

laboratory is needed for it. “There is only one other lab in the whole world that already uses this technology effectively – in Berkeley, California,” says Peter van der Beek, who is proud of the Potsdam noble gas mass spectrometer. Other research laboratories are working on establishing the method as well. Although first publications on it appeared in 2005, a noble gas mass spectrometer is very expensive and not easy to handle. The samples have to be irradiated with protons, for example. “You can’t do that in many places,” van der Beek explains.

In the Potsdam lab, it is possible, and the first measurements with the precious instrument are slowly getting underway. The rock samples for it come from the Swiss Alps. Last summer, van der Beek spent a week there with a research team and brought rock with him for analyses. The Alps are among the mountain ranges of the Earth that particularly fascinate the researcher. “A lot of very good research has already been done here. We can use all this data to go into more detail and answer new questions,” he explains.

But unexplored mountains are also very appealing to the geologist. The Tianshan Mountains in Kyrgyzstan, for example, where he spent several weeks last summer. “It was a very special research trip,” he recalls. “We were in an area on which there is no scientific data yet.” Untouched and unexplored – exactly such landscapes are a source of inspiration and motivation for van der Beek. In return, he gladly accepts the hardships of such an expedition – hours of driving in a jeep over bumpy gravel roads and across the region, a lack of infrastructure and camping under very basic conditions, far from any civilization. “We were ten hours away from the next village,” he recounts. “To be the first to collect data in such a place is something very rare and special, a little adventure.”

The history of millions of years conserved in a grain of sand

The gray chunks of rock that Peter van der Beek brings back from such a trip weigh several kilograms. About 350 kg of samples from Kyrgyzstan are waiting for the flight to Germany to be analyzed in the Potsdam laboratory. The researchers are particularly interested in the mineral apatite contained in the rock. Helium isotopes have formed in the crystal lattice of this mineral over millions of years as a result of the radioactive decay of uranium. Helium is a very light element that moves through the mineral and can escape from it. As the rock rises and cools at the surface, the helium slows down and becomes trapped in the apatite. In the case of the helium-4 isotope, this happens at 85 – 75° C at a depth of 2 – 3 kilometers below the Earth’s surface. Thermochronologists also use other elements that solidify at different depths and temperatures and thus have a whole collection of so-called “isotope clocks”.

All that is needed for the analysis of helium in the noble gas mass spectrometer is a granule of apatite the size of a sand grain, which is slowly heated inside the instrument. The trapped helium is thereby “thawed” and begins to escape. The device measures exactly how much helium is released at what temperature and when the process stops. First, the helium escapes from the outer layer of the apatite grain. The warmer it gets, the more helium escapes from the inner layers. With

Photo: Scholz, Sandra

In the field

the measurements, the researchers can look back into the past and trace the location of the minerals in the Earth's crust. When was the rock at which depth? They can also tell whether the rock migrated quickly or slowly to the surface during its history and how high the erosion rates are at the site where it was found.

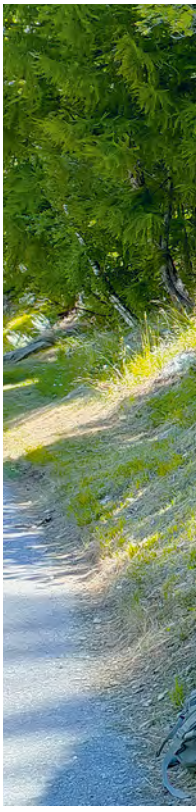
Glaciers, precipitation, and the climate

"We are only able to measure erosion indirectly because the material disappears," explains van der Beek. He is particularly interested in glacial erosion. Glaciers change the landscape and shape mountains but in very different ways, depending on geographic loca-

THE RESEARCHER

Prof. Dr. Peter van der Beek studied geology at Vrije Universiteit Amsterdam. For over 20 years, he researched at the Université Joseph Fourier in Grenoble, France. Since 2020, he has been Professor of General Geology at the University of Potsdam.

✉ vanderbeek@uni-potsdam.de



Photos: Bernard, Maxime (left, bottom right); Scholz, Sandra (top right)

tion and topography. When the ice and snow masses rub over rock, they can take a lot of material with them and leave deep valleys. But if they are frozen to the rock, they protect it in all weather and thus from erosion. “Glaciers have a strong local effect,” he emphasizes. That’s why he plans measuring inside and outside of various glacier valleys to determine these effects more precisely.

Wind, precipitation, rivers, and glaciers are the driving forces of erosion – and gravity, too, shapes landscapes. Over millions of years, however, there is another actor that also determines the interplay of erosion and tectonics: the climate. Chemical weathering of silicate rock removes carbon dioxide from the atmosphere – a process that has naturally cooled the climate for about 50 million years. If it weren’t for the massive greenhouse gas emissions by humans, the Earth would likely continue to gradually cool down. “Human-induced climate change outpaces all of these natural processes by orders of magnitude,” the researcher points out. “If we understand the whole system better, it will also help us distinguish natural from anthropogenic influences.”

The less carbon dioxide is present in the atmosphere, however, the more inefficient chemical weathering becomes, so that, according to one research hypothesis, this process would have slowed down. The erosion of organic material also removes carbon dioxide from the atmosphere. “In the Indian Ocean, a research team found tree trunks on the seabed that got here from the Himalayas through erosion hundreds of thousands of years ago,” van der Beek says, describing the process. The wood is preserved in the deep sediment layers of the waters – and with it many tons of carbon dioxide.

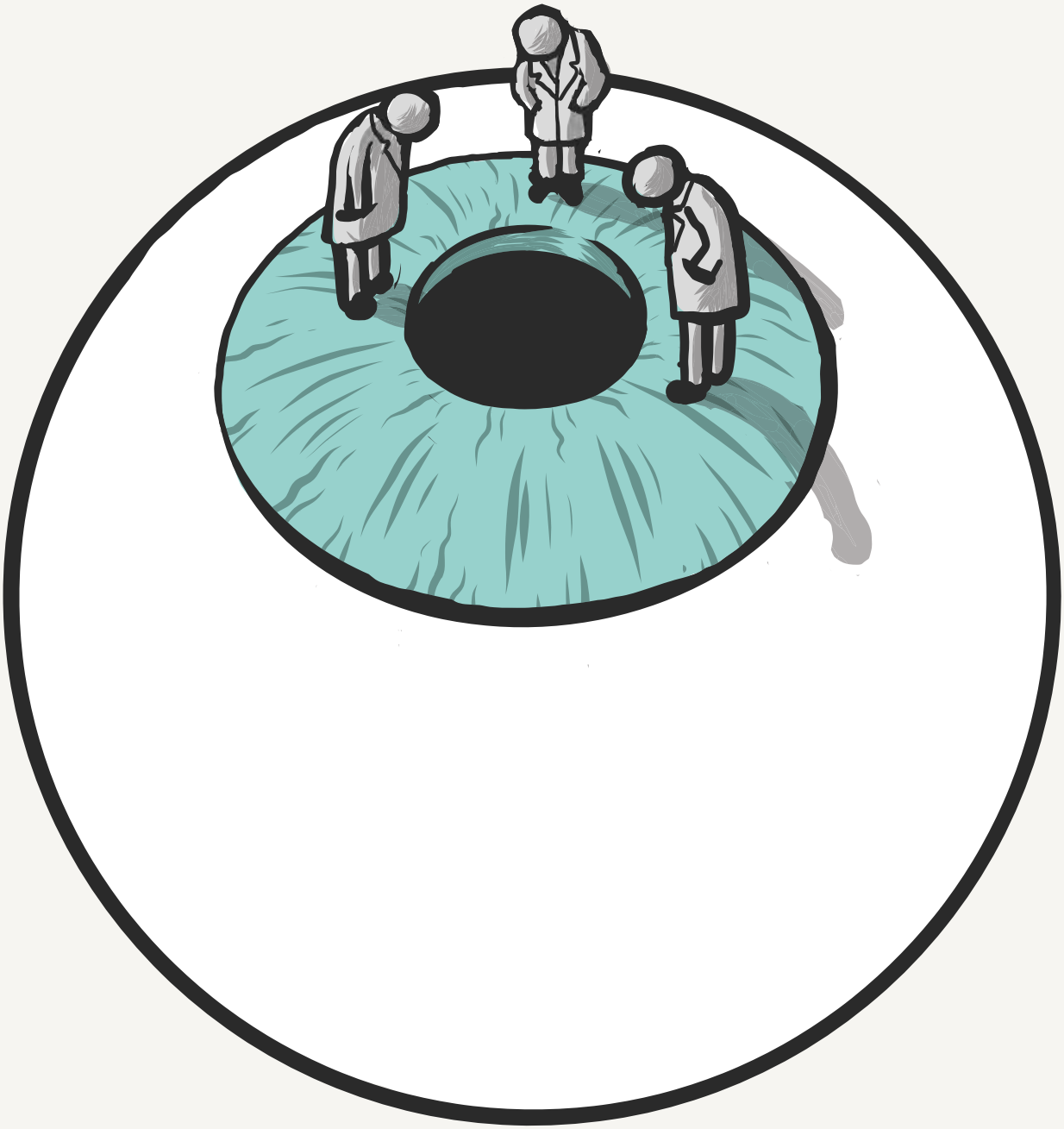
How cooling has affected global erosion rates, how climate, tectonics, and erosion together shape mountain landscapes, and what feedback mechanisms are at work is still not sufficiently understood. With the thermochronological data, van der Beek and his team hope to provide some explanation. They want to refine thermochronological methods and develop numerical models to better analyze and interpret data sets from around the world. What are the differences between individual mountains? Which differences can be explained by tectonics, and which by climate? In the end, the models are meant to provide a look not only into the past but also into the future. How will a landscape further evolve and what are the driving forces?

The next research trip will take Peter van der Beek to Patagonia. Here, the southern foothills of the Andes form mountain ranges with numerous and large glaciers. “It’s all a bit complicated at the moment, but we very much hope that this expedition will be possible,” he says. After all, the rock samples from the region will provide additional important data for a better understanding of what shapes mountains in the long term.

HEIKE KAMPE

TRANSLATION: SUSANNE VOIGT

Photo: Bernard, Maxime



IN THE **BLINK OF AN EYE**

**Eye movements can reveal a lot –
A junior research group investigates what exactly**

Illustration: Töpfer, Andreas

Eye movements have long been a subject of research. For decades, cognitive psychology and psycholinguistics have been analyzing eye movements to understand cognitive processes in the mind – how language or other information is processed, for example. The AEye Junior Research Group links eye movements with artificial intelligence. The group's goal is to develop machine learning algorithms to draw conclusions about a person's cognitive characteristics and conditions from eye tracking data and mathematical models. In the future, such data could be used to determine how well someone understands a text or whether they are too tired to drive.

Our eyes rarely remain still. When we talk to each other, go for a walk, drive, read, or look at a painting, the gaze always wanders from one point to the next, pausing in one spot for just a fraction of a second, only to focus on a new section the next moment. Six external ocular muscles ensure that our eyeballs can move in different directions. These eye movements are controlled by the central nervous system and can therefore reveal a lot about how the brain works. The AEye Junior Research Group keeps its eyes firmly on very practical applications and has high hopes for new tools of analysis.

Learning aids for artificial intelligence

Researchers at AEye must be prepared to think outside the box. The junior research group with its nine members is interdisciplinary: The researchers come from the fields of computer science, cognitive science, linguistics, and mathematics. Principal investigator Prof. Lena Jäger studied experimental and clinical linguistics after an undergraduate degree in sinology, earned a doctorate in cognitive science, and studied computer science in parallel. "Cognitive science and computer science are very closely connected," she explains. "Many ideas influence each other. For example, the von Neumann architecture inspired cognitive models that try to explain human information processing. Conversely, the first artificial neural network was developed by a cognitive psychologist and mimics the function of a biological neuron." The group leader

THE RESEARCH GROUP

AEye (Artificial Intelligence for Eye Tracking Data: Deep Learning Methods for the Automated Analysis of Cognitive Processes) is a junior research group at the University of Potsdam. The researchers develop machine learning methods for the analysis of eye tracking data to make inferences or predictions about the cognitive processes and psychological states of an individual.

Funding: Federal Ministry of Education and Research (BMBF)
Duration: 2020–2024
www.uni-potsdam.de/de/cs-ml/aeye

In the lab of the AEye research group

Photo: Hopfgarten, Tobias

is convinced that the two areas of research complement each other very well and that one helps understand the other better. Her group is primarily looking for methods to incorporate linguistic and cognitive expertise into the learning mechanisms of artificial neural networks.

The interaction between the different disciplines must work well for this to happen. Computer scientists and mathematicians think and work their way into the tasks of the linguists and vice versa. The PhD project of linguist Chiara Tschirner, for example, aims to use eye movement measurements – so-called eye tracking data – to develop a diagnostic screening system for language development disorders such as dyslexia.

Already diagnosing dyslexia at preschool age

Until now, dyslexia, which affects about one in ten children, has been diagnosed with extensive psychometric and linguistic tests. The children must already have a certain meta-knowledge about language to be able to answer the questions and must know, for example, what a rhyme is. "An early diagnosis or assessment of the risk of developing dyslexia is very important because the therapeutic success is much better then," Jäger explains. If the risk of dyslexia is identified before children start school, it also spares them a lot of frustration. Teachers and parents can adjust to the situation from the outset and support the children accordingly. The AEye team is therefore working on the foundations for a test that will predict the risk of dyslexia in preschool children using eye movements and artificial intelligence.

The research project shows how well computer scientists on the one hand and linguists on the other are connected. "The linguists developed the experimental design in an ongoing dialogue with the computer scientists," explains co-principal investigator Paul Prasse. "Then we use the data for our mathematical models. The models' output is in turn analyzed and interpreted by the linguists."

Tschirner and her colleague Maja Stegenwallner-Schütz are currently preparing the tests they want to carry out in kindergartens and schools with children from the age of five. In total, they will test 500 children. The children will see different objects on a monitor and are asked, for example, to look at the "bag" while their eye movements are recorded. "There is a connection between sensitivity to rhymes and dyslexia," says Jäger, explaining the background of the test. Children with dyslexia find it more difficult

Photo: Hopfgarten, Tobias

to recognize rhymes or the same word beginnings. Children without dyslexia tend to be distracted more easily by similar-sounding words. If, for example, a "cat" is shown next to the "bag," children without dyslexia switch back and forth between the two words, while the eyes of children with dyslexia tend to stay on the "cat".

In addition to the eye tracker, Tschirner is also going to conduct classic diagnostic tests to assess the children's awareness of linguistic sounds or their cognitive development. In parallel, mathematician David Reich will use the collected data to train a model. By means of machine learning, this model is designed to be able to analyze the children's eye movements autonomously and predict the risk of dyslexia as precisely as possible.

Eye movements tell even much more

Other projects of the research group also focus on the interaction of eye movement measurements and artificial intelligence. Shuwen Deng uses eye movements to determine whether a child has attention deficit hyperactivity disorder (ADHD). The analysis of eye movements also reveals whether a person is attentive while driving and able to react quickly to dangerous situations or is already too tired to react. Assistance systems in vehicles already use eyelid closure speed, driving time, and sensors on the steering wheel to measure whether drivers should take a break because they are getting tired. The researchers are convinced that eye tracking data could predict this even more accurately.

Therefore, there is a driving simulator in the research group's laboratory, which will be used to test numerous subjects in the future. The scenarios for these tests will be rather boring: for example, driving

Photos: Hopfgarten, Tobias (bottom); privat (3, right)

THE RESEARCHERS

Prof. Dr. Lena Jäger studied sinology at the University of Freiburg, Tongji University Shanghai, and Université Paris 7 Denis-Diderot, and subsequently experimental and clinical linguistics at the University of Potsdam, where she received her PhD in cognitive science in 2015 while studying computer science at the same time. Since 2018, she has been conducting research in machine learning at the University of Potsdam. Since 2020, she has been principal investigator in the AEye Junior Research Group, for which she raised the funds. She has also been Professor at the Institute of Computational Linguistics of the University of Zurich since 2020.

✉ lena.jaeger@uni-potsdam.de

Shuwen Deng studied information and communication technology at Beijing University of Technology and Friedrich-Alexander-Universität Erlangen-Nürnberg. She is doing her PhD in the AEye Junior Research Group.

✉ shuwen.deng@uni-potsdam.de

Dr. Maja Stegenwallner-Schütz studied patholinguistics and experimental and clinical linguistics at the University of Potsdam, where she received her PhD on language development in children in 2019. She is a postdoc in the AEye Junior Research Group as well as a researcher at the Department of Inclusion Education of the University of Potsdam.

✉ stegenwa@uni-potsdam.de

Driving until being tired

on a country road, with little traffic and in half-light. “We hope that our test subjects will tire quickly and that we will then be able to measure this,” explains Prasse. In other scenarios, the drivers will be distracted by the noise of children or a fellow passenger. The eye movements will also reveal whether this has an effect on, for example, reaction time.

David Reich uses this data to develop and implement machine learning models. This requires intuition and a lot of patience. “In about 95% of the cases, the model will not do what we hope for,” says Paul Prasse. In order to achieve the goal, it is necessary to develop a completely new type of model architecture. The researchers sit at the computer and tinker with their models for a long time, looking for problems and the right solutions. Especially where language or behavior meet eye movements, this requires not only computer know-how but also knowledge about cognitive processes. If sometimes, even after hours, something doesn't want to progress and the model gets stuck, talking to colleagues helps one find solutions, perhaps from a different perspective. “Sometimes it’s already enough that I as a mathematician explain to a

Photos: Hopfgarten, Tobias (2)

linguist what I'm doing," says Reich. "It often becomes clear very quickly what has been forgotten or ignored."

Black box machine learning

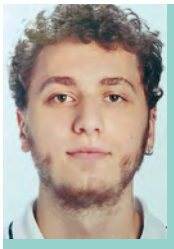
When models are trained using machine learning methods, the idea is to enable them to recognize whether someone is tired, has dyslexia, or what their competence level of a foreign language is. In the process, the prediction errors are calculated retroactively, and the model parameters are improved in small steps. If it still doesn't fit, the computer scientists are called upon again. "Then the model architectures have to be adjusted again," explains Prasse. "We build deeper networks, consider transformations that make sense for our problem or optimize the type of data input." There are numerous relevant parameters to consider in order to make the model work as intended by the researchers. Daniel Krakowczyk is researching the interpretability of neural networks. He is interested, for example, in how exactly the models arrive at their results. After all, the decision processes of a neural network cannot be explained and interpreted straightaway. A look into this "black box" could reveal more about how an artificial intelligence gets to the solution of a problem, and from which properties in the data it derives a particular conclusion or prediction. The latter is a prerequisite for achieving transparency in AI.

HEIKE KAMPE

TRANSLATION: SUSANNE VOIGT

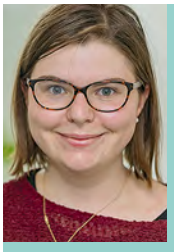
David R. Reich studied mathematics at Freie Universität Berlin and Technische Universität Berlin. He is doing his PhD in the AEye Junior Research Group.

✉ david.reich@uni-potsdam.de



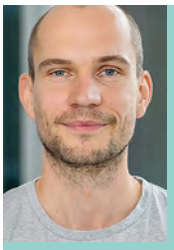
Daniel Krakowczyk studied computer science at Freie Universität Berlin and at the University of Potsdam. He is doing his PhD in the AEye Junior Research Group.

✉ daniel.krakowczyk@uni-potsdam.de



Chiara Tschirner studied linguistics at Leipzig University and subsequently experimental and clinical linguistics at the University of Potsdam. She is doing her PhD in the AEye Junior Research Group.

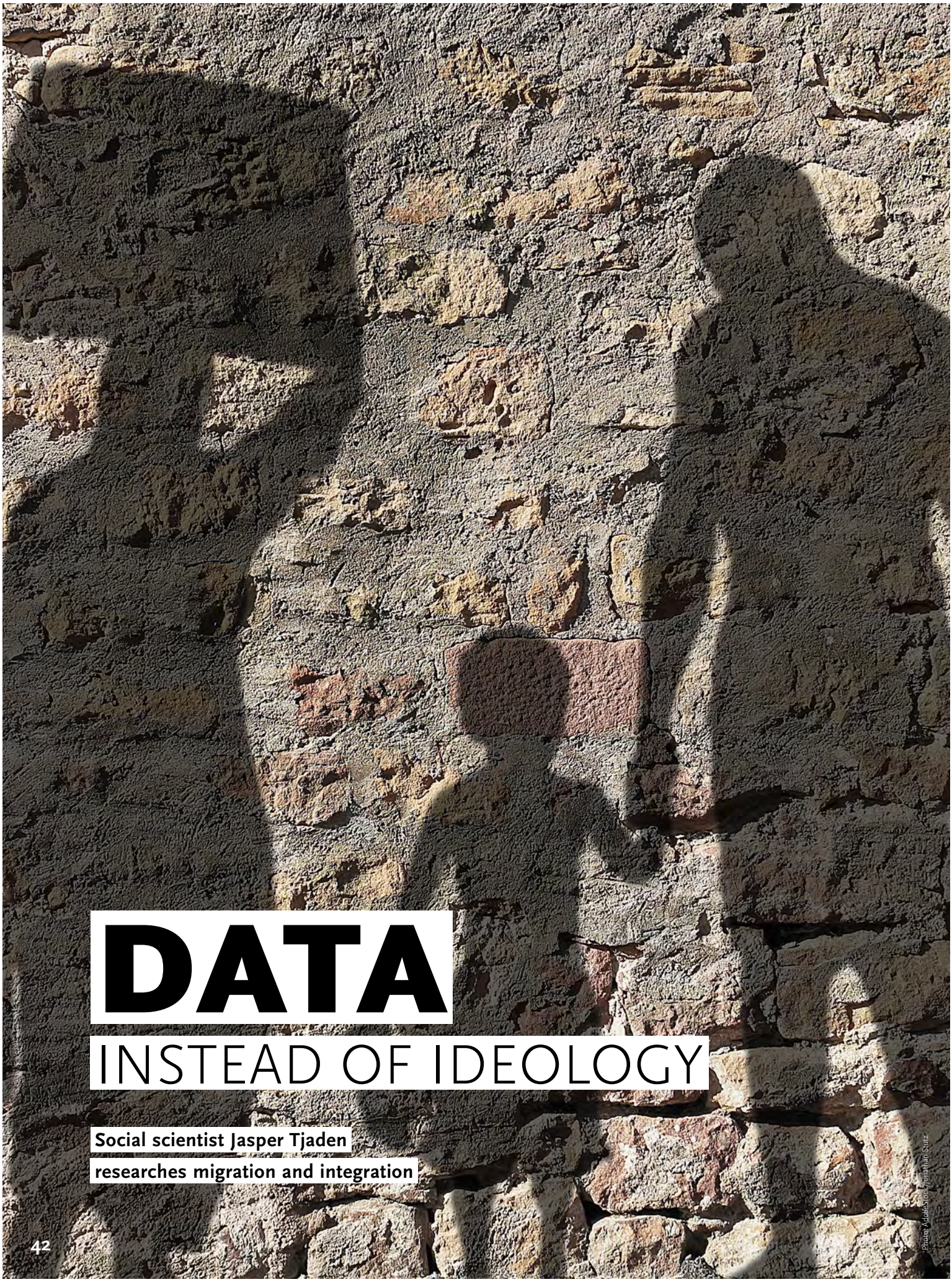
✉ chiara.tschirner@uni-potsdam.de



Dr. Paul Prasse studied computer science at the University of Potsdam, earned a PhD there in 2016, and is now the co-principal investigator of the AEye Junior Research Group.

✉ prasse@uni-potsdam.de

Photos: Hopfgarten, Tobias (top right, right 2nd from bottom, bottom right); privat (right 2nd from top)



DATA
INSTEAD OF IDEOLOGY

Social scientist Jasper Tjaden researches migration and integration

"I didn't know the University of Potsdam very well before, but it's just beautiful here. It's green, you have rivers and lakes on your doorstep, and there are many colleagues with very interesting topics." The social scientist would like to expand migration and integration research at the University of Potsdam and create an appealing range of courses for students.

Since 2021, Jasper Tjaden has been Professor for Applied Social Research and Public Policy at the Faculty of Economics and Social Sciences. His research on integration and migration processes has already caused quite a stir. In a study together with economist Tobias Heidland from Kiel University, for example, he examined the effect of border openings on long-term immigration patterns. Did Angela Merkel's decision in 2015 to keep the borders open lead to more people coming to Germany in the long term? This notion had been repeatedly heard in public. "Since the federal elections and the end of the Merkel era were coming up, we wanted to test this hypothesis," Tjaden explains. For this purpose, the researchers evaluated data from the years 2010 to 2020. The study was based on asylum applications before and after 2015; in addition, people around the world were asked whether they planned to migrate to Germany. Ultimately, the researchers looked at Google search queries: Was "Germany" frequently searched in connection with "visa"?

To cut a long story short, the social scientist summarizes, "We have not found any evidence of such a pull effect anywhere." Actually, there had already been a rapid increase in immigration in 2011/12, a few years before the so-called refugee crisis. After 2015, interest in migration to Germany quickly declined. The primary reason for the larger number of refugees in 2011/12 was the civil war in Syria. "It had been raging for much longer, but many people had initially fled to neighboring countries." Conditions in the reception camps in these countries had deteriorated tremendously, with too little food and inadequate health care. "Médecins Sans Frontières" sounded the alarm and warned that people would start to leave if the situation did not improve. At the same time, the conflict in Syria had intensified, bombardment had increased. The second-largest group of migrants at that time came from Iraq and Afghanistan, where armed conflict has raged for decades. "For the majority of people who applied for asylum, these conditions were the driving force – not Merkel's decision to keep the borders open," Tjaden says. So, the chancellor had not triggered a mass migration with her statement "We will manage this!" Rather, the development had already reached its peak at the time of the statement.

An explosive field of research

The media response to the study was enormous. The results were presented in Spiegel, Frankfurter Allgemeine Zeitung, Tagesspiegel, Fokus, and ZDF. "We were happy about it, but it was also a challenge," Tjaden says. He received not only media inquiries but also many e-mails from citizens, "from the left to the right". There was very interested but also extremely critical feedback," Tjaden says. He is aware of the explosive nature and political relevance of the topic. He is interested in migration and integration research, he says, because the topic has high social relevance. At the same time, many questions remain unanswered and there is only little knowledge about migration in many debates. "Therefore, it very quickly becomes ideological, in media, politics, and everyday life. But as a result, the demand on communicating research results is much higher – we have to report carefully." And Professor Tjaden is not entirely inexperienced with this. Until his appointment in Potsdam, the social scientist worked for the Global Migration Data Analysis Centre (GMDAC) of the International Organization for Migration (IOM), a United Nations agency. "I provided scientific policy advice there. We were constantly in contact with ministries and the press." Before that, he had worked for the World Bank and for the Migration Policy Group.

Why did he leave his job at an NGO to come to the University of Potsdam? "To have more time for research," he says. Of course, he had an "interesting job" at the UN. "I learned a lot there, traveled a lot, and worked in a great team. But some fundamental questions came up for me that I couldn't pursue." In the day-to-day work of an NGO, there is little time for research because the projects are of very short durations. Reports for ministries have to be written all the time, and there is a lot of pressure. "Although that is electrifying, it meant that I had to write the scientific papers in the evening or on the weekend." But there's something else that drew Tjaden to the university. "I really enjoy teaching." And he is not the only one:

THE RESEARCHER

Prof. Dr. Jasper Tjaden studied at the London School of Economics and Political Science (LSE) and earned his doctorate in sociology at the University of Bamberg and the City University of New York. Since 2021, he has been Professor for Applied Social Research and Public Policy at the University of Potsdam.

✉ jasper.tjaden@uni-potsdam.de

Photo: Scholz, Sandra

His seminars on migration or the evaluation of political measures are already in high demand among students.

Using new media to predict migration

Tjaden wants to contribute to filling the empirical gaps in migration research. “One of our problems is that we have too little data,” he says. Although the data situation on the integration of refugees in Germany has improved greatly over the past ten years, when it comes to migration, he says, science can only work with official dates of entry. “We know little about why, when, and under what circumstances people migrate. We have too little information from countries of origin.” Better sources of data are mostly limited to OECD countries. Little is known from large parts of Africa, Asia, and Latin America, he says.

Digital data is therefore the focus of Tjaden’s research. The scientist believes that social media can help make predictions about migration movements. So far, after all, these can only be measured retrospectively. “Predictions have become particularly important since 2015. Because the migration movement came as a great surprise to many at the time, despite the omens.” Facebook, for example, provides data for analyzing friendship networks, such as: How many people in Ghana have friends in Argentina? For each pair of countries, one can determine the density of friendships – and, interestingly, this correlates with international migration movements. Thus, he says, changes in friendship networks can be used to predict migration. In addition to Facebook, Tjaden has looked at seven other data sources, including LinkedIn, mobile phone services, and satellite data. It’s also possible, he says, to use flight data between two countries to see if more passengers are leaving than entering a country.

To learn more about emigration plans in the countries of origin, Tjaden interviewed people in West Africa. “We and a team were on-site and collected data from over 8,000 people in Senegal and 3,500 in Guinea with the support of a survey institute.” In a method project, the social scientist wanted to find out whether the instant messaging service WhatsApp can be used to survey (potential) migrants. After all, the fundamental problem for researching migration is staying in touch in order to record whether respondents have actually migrated. The advantage of WhatsApp: It is very inexpensive and very popular in some countries – especially voice messages. A year after the last survey, the team called half of the interviewees and contacted the other half via WhatsApp voice message. The probability of participation was not much higher. There is, however, the methodological advantage that the app is much cheaper than mobile communication.

Language course for refugees

Photo: AdobeStock/Frank Gärtner

Prof. Jasper Tjaden

Investments in immigrants pay off

What must the future government do better in terms of integration? "Germany is a latecomer when it comes to integration, has long denied being a country of immigration," Tjaden says. "There were huge failures in integration policy with guest workers, some of whom may never have fully arrived."

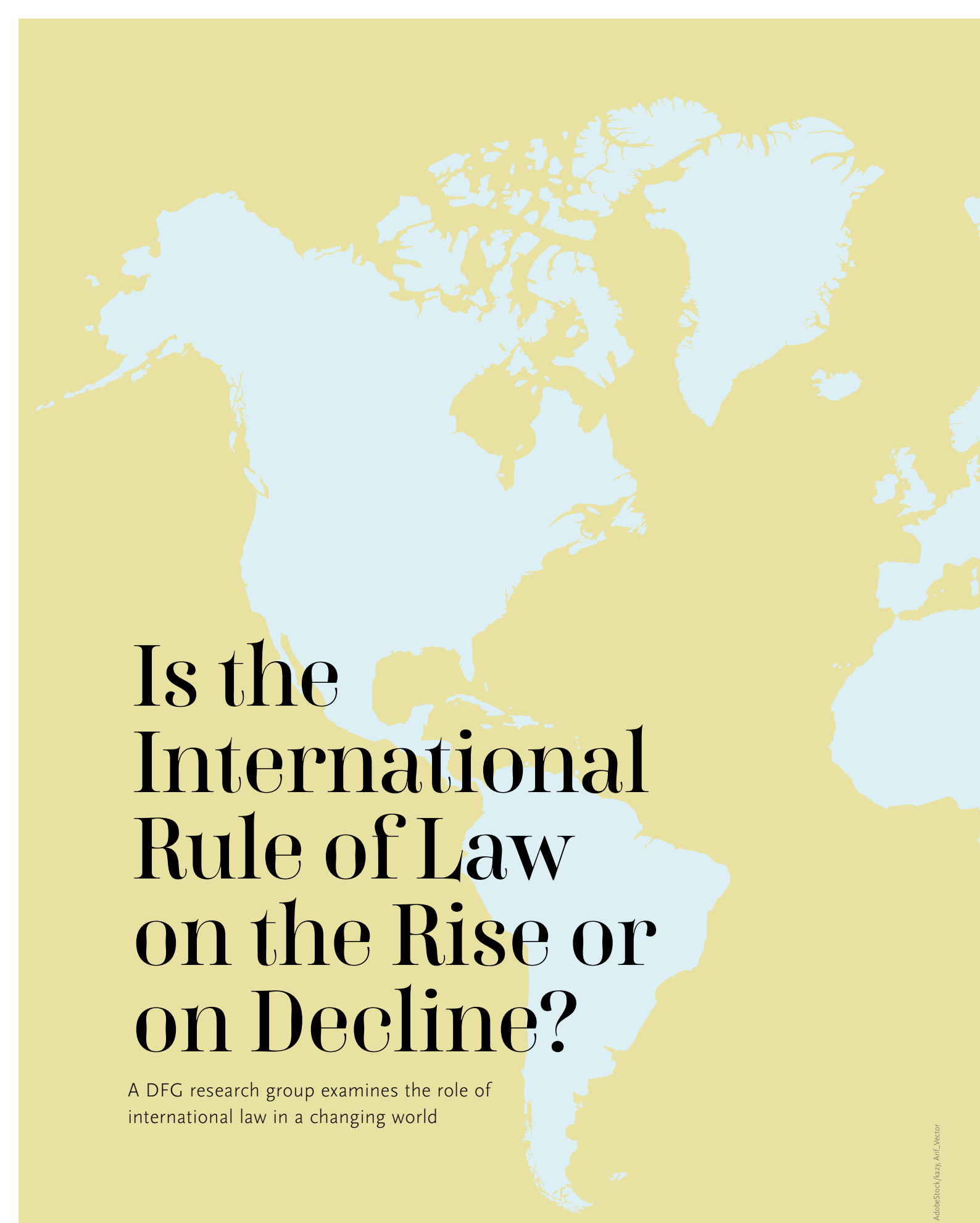
Now it's also a matter of providing the children of the new generation of immigrants with a good education and career opportunities. "Fortunately, a lot has happened in the past 20 years," Tjaden says. Particularly in 2015, when the number of immigrants in Germany was at its peak, many changes were quickly introduced. Access to integration courses was facilitated and more people were granted a secure residence status more quickly, even before their asylum application was approved – in order to integrate them more easily into the labor market. "A good measure," Tjaden thinks. "And a major administrative effort."

Nevertheless, the social scientist is generally dismayed by how little is spent on integration. "Although it would be worth it to invest much more!" Language courses are an important point, he says. It is unreasonable to expect that people with little education reach a colloquial language level after 600 hours of German lessons, he says. While the courses would have positive effects, they have to be adapted to different target groups: parents, women, or certain occupational groups. "The sooner refugees get a job, the more the state saves. Two or three times as much could certainly be invested. Successful integration reduces social spending and increases cohesion in society," Tjaden believes. The better, for example, the German language skills of the immigrants, the greater the trust of the host society in the new citizens.

Together with his PhD student Samir Khalil, Professor Tjaden is currently researching the influence of language courses on the integration process of refugees. So far, refugees have been randomly distributed among federal states in Germany, "you can be lucky or unlucky, end up in areas with high unemployment, great xenophobia or very few offerings of integration courses." Tjaden is now working with colleagues at the Hasso Plattner Institute to improve the distribution of refugees in Germany. The researchers have developed an algorithm that does not proceed at random but according to the characteristics of a person and the district, taking into account family situation, training places, housing vacancy, etc. "We want to create a better match this way. This may give immigrants a better start."

DR. JANA SCHOLZ
TRANSLATION: SUSANNE VOIGT

Photo: Scholz, Sandra



Is the International Rule of Law on the Rise or on Decline?

A DFG research group examines the role of international law in a changing world

Illustration: AdobeStock/kazy, Arif_Vector

Third party dispute settlement within the framework of the World Trade Organization, the establishment of the International Criminal Court, sanctions adopted by the UN Security Council against States threatening international peace and security, and the peacekeeping missions of the United Nations: they all seemed to be harbingers of an emerging international crisis management in a globalized world community. But is there really a juridification of international relations based on common values? Is the world growing closer together and creating a system of public international law equally supported by the international community at large – or are we rather witnessing an opposite development? Public international law scholar Prof. Dr. Andreas Zimmermann, and political scientist Prof. Dr. Andrea Liese, both of the University of Potsdam, have joined forces to examine these very questions. Together with partners from Freie Universität Berlin and Humboldt-Universität zu Berlin, as well as national and international visiting researchers, they have formed the Research Group (KFG) "The International Rule of Law – Rise or Decline? On the Role of International Law in a Changing Global Order" funded by the German Research Foundation (DFG).

"After the end of the Cold War in 1989/90, many advanced the claim that 'Now the world is being reordered'," Zimmermann explains. "Existing structures of the system of public international law were further deepened, new ones emerged." It seemed international law had increasingly developed from a merely formal, rather value-neutral order towards a more value-based and human-centered one. Yet for some time now, developments have emerged which challenge the very paradigm of such a value-based juridification at the global level. Great Britain turned its back on the European Union, Poland declared certain parts of EU law to be incompatible with its constitution and hence not applicable; Russia has annexed Crimea, the United States – under President Trump – moved to withdraw from the World Health Organization, while China has ignored an arbitral award on maritime boundaries in the South China Sea. Moreover, attempts by States to address pressing global issues using international law – for instance those relating to climate protection or regulating world trade – have repeatedly been frustrated. An increasing number of people have predicted a "stagnation or even regression of international law" and a "return of geopolitics," Zimmermann explains. Are these clear signs of a possible disintegration of the much-invoked global system of public international law? Or do they prove that the system is rather developing gradually, in line with the global political climate? These are the questions the research group seeks to answer – although it is already quite clear that the answers will be more complex than its trenchant title suggests. "The order is not dissolving before our eyes," Andrea Liese comments. Rather, certain institutions, values, or structures have been repeatedly called into question by various players. "We want to examine what

Prof. Andreas Zimmermann

Photo: Hopfgarten, Tobias

consequences this shift in the values, structures, and institutions of international law has. Which dangers or perhaps new opportunities arise from it? And what do they mean for the world order?"

Values, structures, and institutions

The researchers examine international law from the perspective of various disciplines and with a view to three layers, Liese explains. For instance, they investigate whether established fundamental values and principles underlying the system of public international law and that so far seemed to have been shared by all States, at least in principle, are possibly being undermined by a reinterpretation. These values include the maintenance of international peace and security, the protection of fundamental human rights, the protection of the environment, and the prohibition of the use of force. For example, China and Russia, Zimmermann points out, have been striving for some time to give traditional values – such as the protection of the family or of religion – preference over classic civil rights and liberties. So why are human rights then put up for discussion more often than environmental issues? And why are women's rights and religious freedom more contested than economic rights?

The group further examines the changing global structures of international law. Zimmermann explains that, compared to a few years ago, there are now fewer "strict normative orders and more informal agreements between States. We want to find out whether this approach challenges international law and its treaty-based instruments." Zimmermann himself is inter alia examining the development of the Geneva Refugee Convention, the international legal instrument for dealing with refugees, and its ability to meet the challenges of globalization and climate change. "The Convention was written in 1951, with a focus on those fleeing persecution in their countries of origin," Zimmermann states. "70 years later, people from all over the world are fleeing hunger, economic ills, prosecution as members of the LGBTQIA+ community, and the impacts of climate change. "The new situation reveals gaps in the Convention. So how are these gaps then utilized, filled, or possibly closed?"

In addition, the researchers examine the development and current state of international law based on institutions, such as the European Court of Human Rights in Strasbourg. Often, the rising number of international organizations and courts and their far-reaching activities have been interpreted as proof of a certain maturation of international law, Zimmermann remarks. However, there are also signs that States are turning away from this type of dispute resolution by international courts and tribunals. Today, more and more players do not recognize the jurisdiction their country is formally subject to, which stands in stark contrast to what we saw in the past. The Russian Federation, for example, simply did not appear before the Hamburg-based International Tribunal for the Law of the Sea in the case concerning its seizure

Prof. Andrea Liese

THE PROJECT

Research Group **"The International Rule of Law – Rise or Decline? On the Role of International Law in a Changing Global Order"**

Participants: Prof. Dr. Andrea Liese and Prof. Dr. Andreas Zimmermann (both University of Potsdam); Prof. Dr. Andrew Hurrell (Humboldt-Universität zu Berlin/Oxford University), Prof. Dr. Heike Krieger (Freie Universität Berlin)
Funding: German Research Foundation (DFG)
Duration: 2015-2023
www.kfg-intlaw.de/

Photo: Scholz, Sandra

of the Greenpeace ship 'Arctic Sunrise' in 2013. The same holds true of China in a dispute with the Philippines over sovereign rights in the South China Sea. "International courts and tribunals have always been considered one of the keystones of international law. Now it seems that this very keystone might be crumbling here and there." Liese, on her part, looks into issues such as the thematic mandates of the UN Human Rights Council where independent experts are appointed to investigate complaints on specific issues, including the right to food, the prohibition of torture, or the human rights of internally displaced persons. These special rapporteurs follow up on complaints in the respective countries, conduct on-site visits, report on them publicly, and submit recommendations to governments. "We want to find out whether the work of these special rapporteurs has changed over time: Are they truly independent and unbiased? Do they monitor some States more closely than others? And how accepted are they on the ground?"

Headquarters of the World Health Organization (WHO) in Geneva

Erosion of structures of international law

Six years into the work of the research group, the conclusions as to the changing structure of international law are mixed ones. On the one hand, Zimmermann says, autocratic and populist regimes are on the rise, and various powers are questioning existing value systems or institutions and their legitimacy. "I definitely see an ongoing erosion of the existing structures of international law," Zimmermann says. "At the same time, new alliances emerge that promote the protection of these values, defend and strengthen institutions, or fill structures in new ways," Liese replies. For example, it is by no means clear that the WHO will collapse as a result of its politicization by the US; perhaps it might even emerge stronger from the crisis. "In the research group, we investigate how such changes are affecting public international law."

When the research group was established in 2015, it set itself the goal of addressing developments from different angles. In addition to working with fellows, it is immensely important that the research group brings together researchers from many countries, including from India, the Philippines, China, and the former Soviet Union. Besides, "practitioners in residence", that is experts with practical experience, contribute their expertise. "It is a meeting place for us to network and increase awareness of challenges to and changes in international law," Liese says. And while some (post)doctoral students are researching topics for a number of years, visiting scholars delve into specific issues for a few months. Others join as guests

UN General Assembly in New York in 2012

US troops in Afghanistan

On the way to Europe

THE RESEARCHERS

Prof. Dr. Andreas Zimmermann, LL.M. (Harvard) studied law at the University of Tübingen, L'Université de Droit D'Economie Et Des Sciences D'Aix-Marseille III, and at Harvard Law School. He has been Professor of Public Law with a focus on Constitutional Law, European and International Law, as well as European and International Economic Law at the Law Faculty of the University of Potsdam since 2009.

✉ schiller@uni-potsdam.de

Prof. Dr. Andrea Liese studied political science, law, sociology, and German studies at the Goethe University in Frankfurt on the Main. She joined the Faculty of Economics and Social Sciences at the University of Potsdam in 2010, first as Professor of International Organizations and Public Policy, since 2020 as Professor of International Relations.

✉ andrea.liese@uni-potsdam.de

and present their work in public lectures or research seminars – such as most recently a Polish colleague who had been involved in the ruling by Poland's Constitutional Court on EU law.

Above all, the KFG brings together experts from various disciplines – such as legal scholar Andreas Zimmermann and political scientist Andrea Liese. Jointly, they examine current developments in international relations from different perspectives of international law, political science, as well as from a historical perspective, wherever possible. "To establish whether international law is effective, we of course need a kind of 'reality check'," Zimmermann explains. "Political science can do this far better than we can, as we are using a more normative approach." In fact, political science traces political changes in relation to international law differently, Liese confirms. "Often we are alarmed one step earlier, long before the law changes. At that time, it is still intact, but operating in a different environment." The exchange on potential change in different spheres benefits everyone. So far, some 50 works have been published as part of the group's working papers alone. In addition, books are being published, many of them with an interdisciplinary perspective. In 2022, Andrea Liese and Heike Krieger, Professor for International and Public Law at Freie Universität Berlin, will publish their joint book on resilience and change of value-based legal norms.

The concept is bearing fruit, Zimmermann underlines. "Internationally, the sphere of international law is now perceived differently. We have established a research agenda that will continue to make a difference." When the research group started, the critical issue of developments in international law had not been taken too seriously by some. This has definitely changed – not the least due to the DFG's decision to support the project during its by now second funding phase.

MATTHIAS ZIMMERMANN
TRANSLATION: MONIKA WILKE

33 Questions

to Prof. Dr. Karoline Wiesner

Photo: AdobeStock/Travel man

What connects ant colonies and the Internet, financial markets and the human brain? They are complex systems – a comparatively new field of research, but one that is gaining in importance. Karoline Wiesner has been Professor of Complexity Science at the Department of Physics and Astronomy since 2021. She investigates the mathematical and philosophical foundations of complexity science and its application to physical, climate, and social systems. The physicist worked abroad for many years and now holds the first professorship for complexity science in Germany. For "Portal Wissen", she answered 33 very simple questions.

What do bee colonies, the Earth's climate, the global economy, and the universe have in common?

They are all complex systems, that means the dynamics of the whole (people, the climate) do not exist at the level of the individual (bees, molecules).

Can complex systems also be simple?

They are often simple – in the sense that seemingly complicated phenomena follow simple mathematical laws.

What characterizes these systems?

Through feedback, the interactions of the many parts lead to a whole that is not centrally organized and yet robust.

How to analyze complex systems?

By combining statistical methods, computer models, real data, and system-specific (physical, biological, political, etc.) knowledge.

How susceptible to failure are they?

They are very robust in the face of random disturbances affecting parts of the system since other parts can quickly adapt and take over. But all robustness has its limits, as can be observed with the climate.

Does the Corona pandemic follow the rules of a complex system?

The pandemic is a dynamic of a complex system, which in turn consists of the complex systems viruses, people, ecosystems, and infrastructures.

How much philosophy is there in complexity science?

The phenomenon of emergence, that is, the emergence of something new from parts that do not themselves exhibit this phenomenon, raises questions. Is the causality here broken between the microscopic and the macroscopic? Many think, "yes". I, on the other hand, agree with those philosophers of science who say that causality continues to go from the microscopic to the macroscopic and not vice versa, as physicists see it. Also consciousness, in my opinion, will ultimately be explained by the interactions of neurons.

Why is this field of research needed?

Less and less often, the boundaries between traditional disciplines correspond to the questions we need to answer for our coexistence: The pandemic is a striking example. To deal with it, we need to link the biochemistry of viruses with the physics of aerosols, the engineering of transport networks, the sociology of groups, and the psychology of individuals. This requires quantitative methods, and complexity science provides such methods.

Does complexity science provide answers to the big questions of climate change, globalization, and digitization?

The research field provides tools for the scientific objectives and quantitative analysis of these systems.

Why did you study physics?

Because physics has such incredibly convincing answers to the question "why", usually expressed unambiguously in the language of mathematics.

When did you decide to become a researcher?

When I was 17, without really knowing what that meant. At that time, I read the science articles in the newspaper every week.

What do you want to achieve as a professor in Potsdam?

Complexity science combines my interest in physics with my passion for interdisciplinarity. I want to establish this field in Potsdam, in research, teaching, and in public outreach.

How important is success for you?

Success is the confirmation by others that your work is relevant. I need that time and again.

What was your biggest failure?

Failure is ... I've worked hard on something, and when it's finished, I or others don't like it. That happens all the time. I try to learn from it in the moment but to forget it in the long run.

In retrospect, what would you do differently?

Ask more questions during my studies.

What advice would you give to a young researcher?

Courage and self-confidence can be practiced. And they are half the battle in the science business.

How do you like the German academic culture?
I like the great importance that is still attached to the freedom of research and teaching today. In other countries, the university is becoming more and more similar to a company, which I find alarming. However, it is still a very hierarchical culture, which is not always conducive to the development of good ideas.

What would have to change in the academic system?
Teamwork needs to be rewarded more; most academic awards are for individuals. That is no longer in keeping with developments.

Who would you like to do research with?
When he or she is still alive I prefer contacting this person directly instead of mentioning his or her name here. From the deceased: political scientist Elinor Ostrom.

When was the last time that science changed your life?
Science has sent me around the world, from Sweden to the US and England and back to Germany. This has influenced who the important people in my life are, and, not least of all, led to the good fortune of meeting my husband (in England).

What does a normal work day look like for you?
Ideally: thinking time, writing time, study time, discussion time.... Normally, it consists of 50% hectic rush, deadlines, and administration.

What do you like the most about your profession?
The freedom to select topics that I find important und interesting, the permission and the aspiration to constantly learn new things, and the students who want to learn from me.

What not at all?
The permanent (internal and external) pressure to perform.

Which book that you have recently read has remained in your memory?
"Ein Heldinnen Epos" (A Heroines' Epic) by Annette Weber. I have a hard time with poetry, but this epic is great.

What is your favorite quote?
Groucho Marx is reported to have said, "I don't want to belong to any club that would accept me as a member." That has everything in it: humor, mathematics, and an appeal against arrogance.

Which invention would improve your life?
An internet that implements a new business model which places truth and fairness above consumerism.

How do you create a balance to your daily work?
Making music with the university orchestra Sinfonietta and swimming in and kayaking on Brandenburg's lakes.

What comes to mind when you think of your childhood?
Cologne carnival.

Is the glass half-full or half-empty for you?
Half-full.

What was the last thing you protested against?
I am rather lazy when it comes to demonstrations, but in England, where I lived until 2020, I took to the streets for remaining in the EU.

What do you fight for?
For overcoming prejudices, mainly my own.

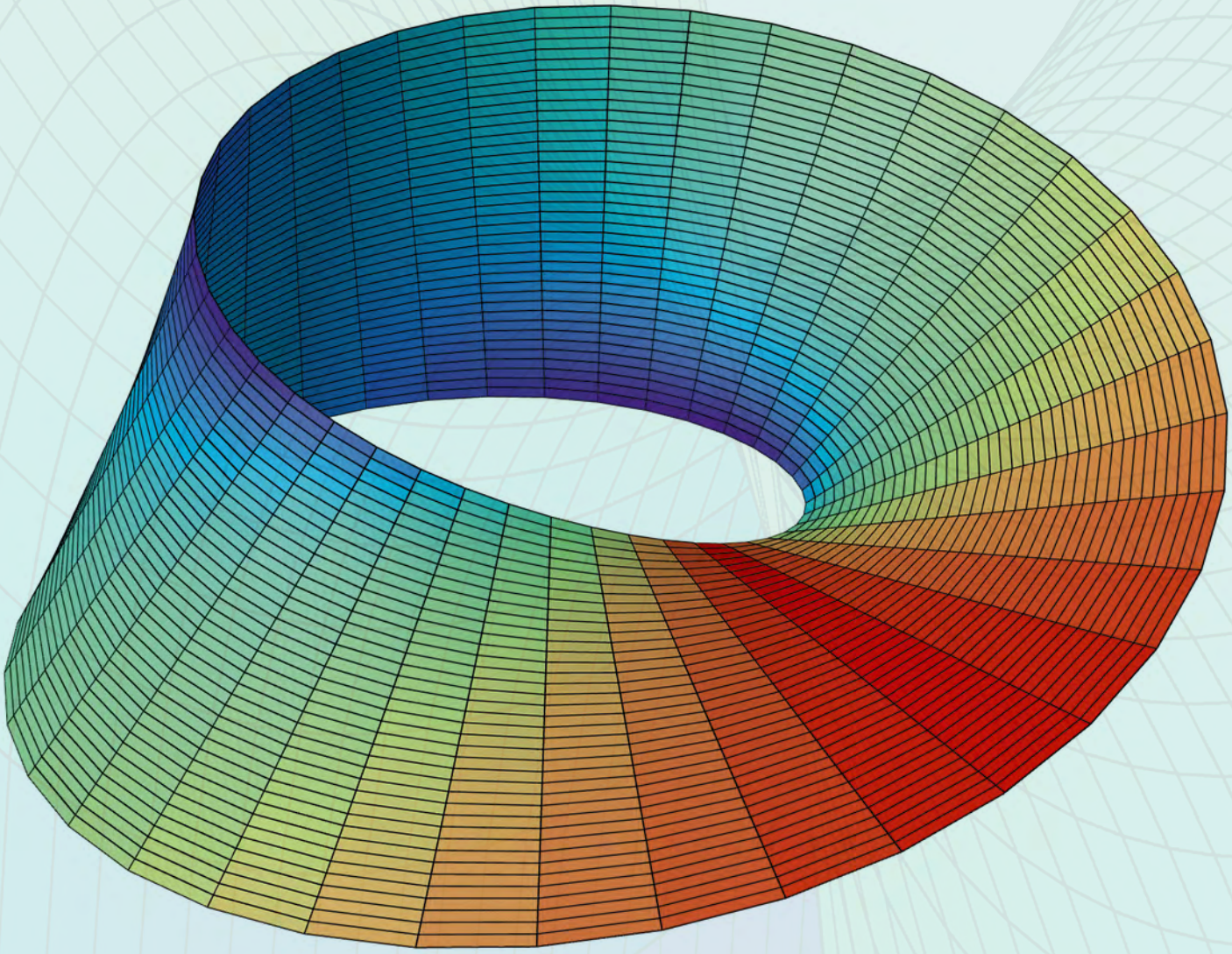
When did you last go to the cinema, theater, or museum?
I recently watched the production "Crucible" by Arthur Miller at Berliner Ensemble. Highly relevant issues, unfortunately.

What do you prefer – tricky problems or simple solutions?
I like it when both come together.

THE QUESTIONS WERE ASKED BY DR. JANA SCHOLZ.
TRANSLATION: SUSANNE VOIGT

Prof. Karoline Wiesner

Photo: Roese, Thomas



GEOMETRY AT INFINITY

MATHEMATICIANS OF THE UNIVERSITY OF POTSDAM ARE RESEARCHING ACTUALLY UNIMAGINABLE THINGS

Graphic: Bär, Christian

Prof. Dr. Christian Bär holds the professorship for geometry at the University of Potsdam and investigates differential geometry and its neighboring and application areas. As co-initiator and deputy speaker of the Priority Program (SPP) 2026 of the German Research Foundation (DFG), he describes the fascination of exploring infinitely extended geometric objects.

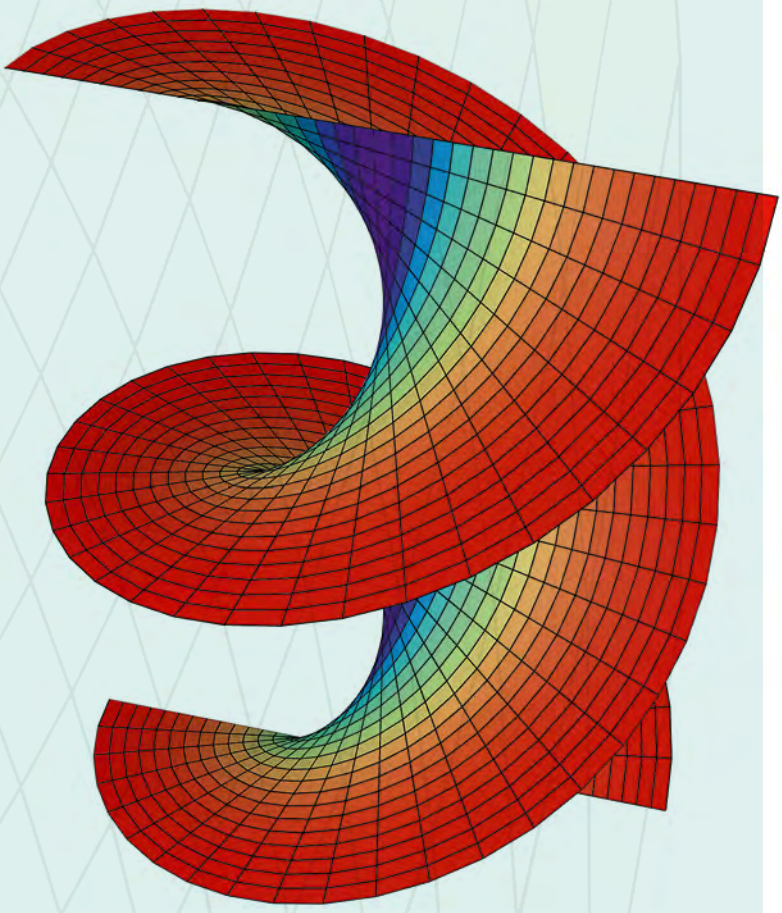
Research at infinity. Is that possible? How can people approach something that has no end? Investigate it, describe it, analyze it? Mathematics can do that, say mathematicians. "The strength of mathematics is that it can describe things completely beyond our imagination," says Bär. However, he says, it is permissible to work with auxiliary ideas. "For example, if you take a particle in the plane that moves randomly, this particle always returns to its starting point." This would not happen in an infinite, three-dimensional space, where the particle would get lost in infinity, so to speak. Not only space but also time can go into infinity. "We are investigating what this would mean for the solutions of important equations," Bär describes. To do this, mathematicians work with proofs. "This is, of course, the tool of the trade of every mathematician, our daily bread," he says. A proof is a mathematical derivation to decide whether a statement is true or false. "Let's assume that we want to find out if a certain surface can be deformed so that it is positively curved everywhere. If I can't get it right, that doesn't mean it can't be done." Bär radiates enthusiasm. "And now it gets really exciting: the solutions to the Dirac equation from physics can help us answer this purely geometric question."

Whether there are solutions to such geometric questions and, if so, what they look like, is being analyzed in the SPP 2026. The six-year priority program comprises 80 individual research projects at more than 20 German and Swiss universities and brings together experts from differential geometry, geometric topology, and global analysis to address current issues across disciplines.

Waves on curved spacetime

In his own project during the first funding period 2017–2020 with the title "Index Theory on Lorentzian Manifolds," Bär studied solutions of hyperbolic equations on curved spacetimes. "In general relativity theory, for example, you have a four-dimensional curved spacetime. We then look at how waves behave on it. These solutions describe what a physical system will look like in the future."

Currently, Professor Bär and his team are working on the project "Boundary value problems and index theory on Riemannian and Lorentzian manifolds".



Here, a new aspect is added. "We mathematically study the question: what happens at the edge of space? Do the solutions of the equations behave nicely there, or do they get wild as we approach the edge?" the mathematician asks.

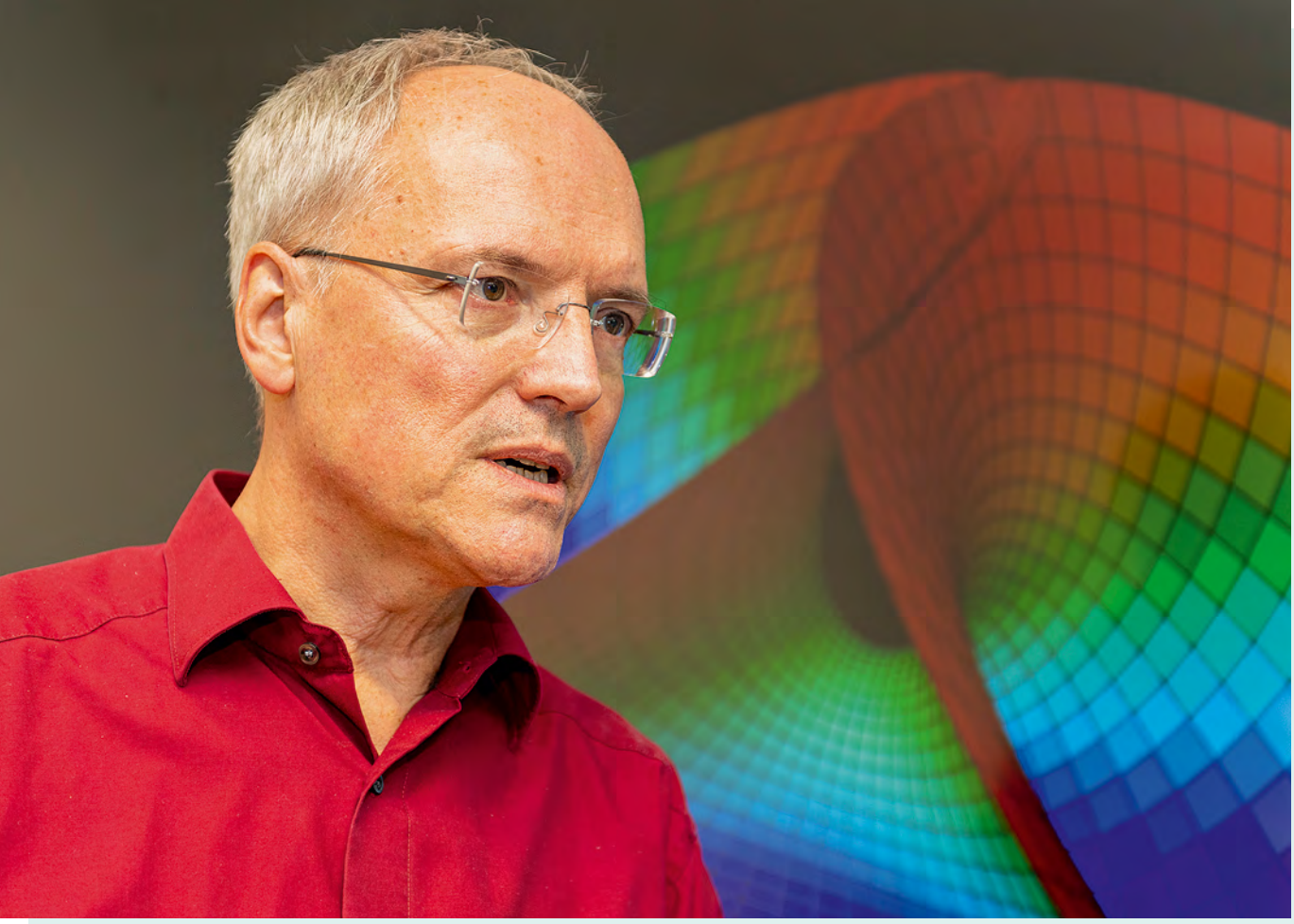
Two other projects are funded at the University of Potsdam within the current funding period 2020-2023. Prof. Dr. Jan Metzger and Prof. Dr. Carla Cederbaum from the University of Tübingen work on the topic "Geometrically defined asymptotic coordinates in general relativity", Prof. Dr. Matthias Keller, Prof.

THE RESEARCHER

Prof. Dr. Christian Bär studied mathematics at the universities of Kaiserslautern und Bonn. Since 2003, he has been Professor of Geometry at the University of Potsdam, and since 2017, he has been Deputy Speaker of SPP 2026 "Geometry at Infinity". In 2011/12, he was President of the German Mathematical Society.

✉ cbaer@uni-potsdam.de

Photo: Hopfgarten, Tobias; Graphic: Bär, Christian



Dr. Daniel Lenz, and Dr. Marcel Schmidt from Friedrich Schiller University Jena are investigating "Laplacians, metrics and boundaries of simplicial complexes and Dirichlet spaces"

Key aspect: promoting junior researchers

As deputy speaker of the SPP 2026, Bär and speaker Prof. Dr. Bernhard Hanke (University of Augsburg) and Prof. Dr. Anna Wienhard (Heidelberg University) form the current program committee. In the first funding period, Prof. Dr. Burkhard Wilking (University of Münster) was also a member. "The four of us submitted the proposal to the DFG at that time," he recalls. "The individual projects have their budgets, and there is an extra pot for funding workshops and conferences, which is at the disposal of the program committee." These funds can be used very flexibly.

Our conversation takes place at the end of October 2021, shortly before the SPP 2026 kick-off meeting in Nuremberg where all project leaders will present their approved projects for the second funding period. Professor Bär is looking forward to it. "Contacts often happen by chance, during breaks, over coffee – you can't simulate that online. Such networking events are very valuable, especially for young people. Quite a few of the project leaders are still at the postdoc level." The priority program supports both individual research projects and overarching research activities such as seminars, conferences as well as invitations of cooperation partners from abroad. Professor Bär, together with his whole team, also organizes a block seminar once a year together with Bernhard Hanke's research group at the University of Augsburg. "Bachelor and master students can also take part in this seminar and establish their first contacts." Endless possibilities, in other words, for junior researchers in mathematics, who are particularly promoted within the SPP 2026.

THE PROJECT

"Boundary value problems and index theory on Riemannian and Lorentzian manifolds" within the DFG Priority Program "Geometry at Infinity"

Participants: Prof. Dr. Christian Bär (project leader), Dr. Lashi Bandara (until July 2021), Dr. Mehran Seyedhosseini, Penelope Gehring, Rubens Longhi, Sebastian Hannes
Funding: German Research Foundation (DFG)
Duration: Sep 2020 – Sep 2023

DR. STEFANIE MIKULLA
TRANSLATION: SUSANNE VOIGT

Photo: Hopfgarten, Tobias

Rund um die Uhr bestens informiert mit der PNN

Die App der Potsdamer Neueste Nachrichten
Alle Live-Nachrichten und Eilmeldungen auf Ihrem Smartphone oder Tablet und die digitale Zeitung (E-Paper).

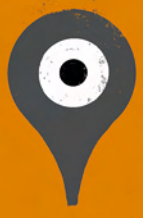
TAGESSPIEGEL PNN

Exklusiv für Studierende:
Die digitale Zeitung für nur 12,95 € mtl. 50% Ersparnis gegenüber dem regulären Bezug. Gleich bestellen: **pnn.de/studenten**

PNN App gratis laden:

App Store | Google Play

TAGESSPIEGEL POTSDAMER NEUESTE NACHRICHTEN



Where Knowledge grows

www.uni-potsdam.de