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LEARNING

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LEARNING

Changing through learning is one of the most important characteristics we humans have. We are born and can – it seems – do nothing. We have to comprehend, copy, and acquire everything: grasping and walking, eating and speaking. Of course, we also have to read and do number work. In the meantime, we know: We will never be able to finish this. At best, we learn for a lifetime. If we stop, it harms us. The Greek philosopher Plato said more than 2,400 years ago, "There is no shame in not knowing something. The shame is in not being willing to learn."

As humans we are also capable of learning; thanks to more and more knowledge about the world around us, we have moved from the Stone Age into the digital age. That this development is not a finish line either, but that we still have a long way to go, is shown by man-made climate change – and above all by our inability as a global community to translate what research teaches us into appropriate actions. Let us dare to hope that we also comprehend this.

What we tend to ignore in the intensive discussion about the multi-layered levels of learning: We are by no means the only learners. Many, if not all, living beings on our planet learn, some more in a more purposeful and complex and more cognitive way than others. And for some time now, machines have also been able to learn more or less independently. Artificial intelligence sends its regards.

The significance of learning for human beings can hardly be overestimated. Science has also understood this and has discovered the learning processes and conditions in almost all contexts for itself, no matter whether it is about our own learning processes and conditions or those around us. We have investigated some of these for the current issue of "Portal Wissen".

Psycholinguist Natalie Boll-Avetisyan has developed a box that can be used to detect language learning disorders already in young children. The behavioral biologists Jana Eccard and Valeria Mazza investigated the behavior of small rodents and found out that they do not only develop different personality traits but they also described how they learn to adapt them different environmental conditions. Computer linguist David Schlangen examines the question what machines have to learn so that our communication with them works even better.

Since research is ultimately always a learning process that strives to understand something yet unknown, this time all texts are somehow along the motto of the title theme: It is about what the history of past centuries reveals about "military cultures of violence" and the question of what lessons we should learn from natural hazards for the future.

We talked with a legal scholar who looks beyond the university's backyard and wants to make law comprehensible to everyone. We also talked with a philosopher who analyzes why "having an opinion" means something different today than 100 years ago. We report about an AI-based genome analysis that can change healthcare sustainably. Furthermore, it is about the job profile "YouTuber", *minor cosmopolitanisms*, and wildlife management in Africa. When you have finished reading, you will have learnt something. Promised! Enjoy your read!

MATTHIAS ZIMMERMANN

Face to Face

David Schlangen
wants to enable artificial
intelligence to interact
with us in real time

Whether in an online help chat or when calling a service provider on the phone: communication with dialogue systems has become omnipresent. Most of the time, we encounter prefabricated statements that often don't fit our situation at all. Wouldn't communication work much better if the system also knew what we were looking at? If it told us which screw to drill into which board or which cable to plug into which socket of the router? And then also helped us if we had taken the wrong board or cable? The RECOLAGE project, funded by the German Research Foundation, aims to enable computer systems to react to their human counterparts within seconds. By recording both auditory and visual data, they should also be able to react to spontaneously emerging problems and not wait until the human has put the wrong screw into the wrong board. Prof. Dr. David Schlangen manages the project. For years, the computational linguist has been looking into the interaction of humans and artificial agents. Time plays an essential role in his research. Prof. Schlangen is working on computer systems that can simulate human behavior in real time and in a very concrete situation.

Human language as a model

David Schlangen has been Professor of the "Foundations of Computational Linguistics" at the University of Potsdam for three years. But he is not entering new territory here. At the beginning of the millennium, he already did research in Potsdam for many years as a postdoc and, starting in 2006, led the Emmy Noether Group "Incrementality and Projection in Dialogue Processing". From 2010, he was Professor of Applied Computational Linguistics in Bielefeld, where he was involved in the Cluster of Excellence "Cognitive Interaction Technology". "I came back because of the very good institute, the highly qualified colleagues, and the opportunities this position offers me," he says. "In addition, the Cognitive Systems Master's degree program is excellent and brings a steady stream of very good students to Potsdam."

Schlangen also studied computer science and philosophy in addition to his current domain. He came to computational linguistics via a small detour. "In Bonn, I first studied physics for two or three semesters, already with an interest in philosophy. But at least in my basic studies, this interest wasn't satisfied." A school friend then told him about the subject of computational linguistics, which he didn't know at the time. "It was still a bit exotic in the 1990s when I was studying." So he began this course of studies together with his friend in Bonn. Schlangen can still build a bridge to philosophy today because both the philosophy of language and computational linguistics deal with the creation of meaning in interaction. Twenty years ago, however, hardly anyone in computational linguistics was doing research on dialogue systems, according to Schlangen. Today, so-called natural language processing, and dialogue research as part of it, is well-established as a central field of artificial intelligence. But not all researchers have a background in linguistics. "Many in the field think that they, as a computer scientist, don't need to know much about the domain in which the machine is supposed to learn," Schlangen says. "I naturally see this differently. From my point of view, it's important to be as close as possible to language processing, the way it happens in humans."

In the Emmy Noether Group, Schlangen and his team worked on dialogue systems that process utterances even before they are complete. "Speech systems usually listen until you are quiet and only then start processing what was said." We humans often find this behavior "unnatural" or disturbing. "After all, we already understand a statement, at least partially, while our counterpart is still speaking and can react to it," he says. That's why we constantly give so-called feedback signals: we nod or say "mhm" to show that we are following. "A listener influences the speaker through his or her continuous feedback, and a good speaker constantly responds to the listener's signals." These sometimes subtle signs are what interest Schlangen in conversation research.

When computers tell us what to do

Prof. Schlangen and his team focus on language, but the researchers also take into consideration the human body and its physical environment. "Our goal is that artificial systems are situated in time in the same way that human conversation partners would be," Schlangen says. "We want to get to the point where an interaction with agents is more like a face-to-face conversation than a chat conversation." That is why the Potsdam computational linguists like to use robots that have a body or at least a head – such as Furhat, which is available for studies in the computational linguistics lab at the University of Potsdam. In the RECOLAGE project, Furhat gives instructions to humans – in Pentomino. Schlangen has been using the

Computational linguist
David Schlangen

game, which is reminiscent of the classic Tetris, since his postdoc days. "It lends itself to being a simplified domain that offers certain degrees of freedom but at the same time a relatively large amount of control." As the instruction is given, the robot can see from the human's reactions whether it has been understood correctly. It might someday be possible, for example, for a computer system to help us assemble a piece of furniture according to Ikea instructions, also partly thanks to another area of artificial intelligence – image processing.

"Take that board over there and the little silver screws", such a computer system might say to us. With the help of a tablet, the system would not only record what we say, but also watch us via a camera and help us to assemble the various components around us. If we reach for the wrong part, it should correct us immediately. "No, not the brown one, but the green one next to it." "The linguistic correction results from the respective context, which is what makes it so complicated," says Schlangen. "Because it's about milliseconds here." If, for example, the computer system observes that the human's hand is moving in the wrong direction, it should react while the human is still doing so – in real time and not only when the screw has landed in the wrong board. That's why the computer has to anticipate where the human is going

Robot Furhat playing Pentomino …

… at the computational linguistics lab in Golm

to reach. This can also go wrong if the robot predicts a movement that we didn't intend to do. "But something like that can also lead to disturbances between two people who know each other well," says Schlangen and laughs. In order to interpret and implement the system's instructions easily, the common basis of understanding between machine and human must be negotiated. Which technical terms should the computer explain, which can it assume to be known? After all, if the human counterpart does not understand the instructions or does not feel properly understood, he or she will find the communication exhausting. Then the system would no longer be a real support.

Even if the question of application is not part of the research project, the results of RECOLAGE are conceivable for personal assistants in every respect. It is also thinkable that an artificial agent will guide us through a recipe while cooking. "Amazon is currently working on the development of such a system," the researcher tells us. Computer scientists in business often deal with problems similar to those of Schlangen and his team. "There is an extreme amount of money going around in my field. Large companies operate research departments and also publish." In Potsdam, however, basic research is carried out; it's not about product development here. "In this respect, there is largely friendly competition between us and the private industry."

Simulating human behavior with computer models

Machine learning is an essential element of Schlangen's research. The point is to generate knowledge from experience: The computer system receives learning data, from which it derives rules and which it can, ideally, apply to new situations. However, the computational linguist is to some extent critical of deep learn-

Robot Nao

THE RESEARCHER

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ing models – a specific method of machine learning in which artificial neural networks are supposed to facilitate deeper learning. "I come from a slightly more traditional approach, where it is common to start theoretically. We want to develop theories that explain something, not just 'do' something, as is the case with deep learning models." Such models can look very convincing when it comes to a short chat conversation, for example. "But when we're dealing with an embodied computer system, a robot in human form, there's a lot that needs to be controlled simultaneously – not just speech but also facial expressions and gestures, all in a short time." After all, the robot can't maintain one facial expression for ten seconds until the next one comes because that would again already be interpreted by the human. Because deep learning models have not learned from situations in real time but from "dead" data, they are, in Schlangen's view, only suitable to a limited extent for processing information under time pressure and reacting accordingly. "In order for the behavior of the artificial agents to fit the situation, we need more computer models that have to be extremely dynamic."

That is why the researcher is working with cognitive scientists of the University of Potsdam who model cognitive processes. "We use different models from our colleagues who work very precisely on smaller phenomena, such as predicting eye movements. Our task is to put these theories together and, in this way, develop language systems that simulate human behavior." The researchers also plan to use robots for psychological or linguistic experiments, which is a rather unusual approach so far but one for which there are good arguments. "They are very well suited as a controlled counterpart. A robot can mercilessly produce stimuli that are exactly identical for every subject."

When computer systems seemingly become more and more like us, the question arises how they differ from us at all. In his research, Schlangen is often confronted with the phenomenon that precisely what is easy for us humans is difficult for computers (and vice versa – just think of demanding arithmetic tasks). Small talk, for example, is an uncomplicated everyday activity for humans, but it poses challenges for computer systems. They regularly make mistakes. "That's not so problematic. It happens to us, too. But unlike computers, we are very good at correcting ourselves." For the scientist, it is therefore clear that computer systems cannot perfectly simulate us humans. On the contrary, it should always be clear that they are artificial agents. "But they should be understandable and react appropriately to the situation, behave 'naturally'." But why is it apparently so difficult to achieve 'natural' behavior in artificial agents? "Perhaps they lack something fundamental," Schlangen suggests. "They are fed text, whereas the newborn is encouraged and challenged in interactions from the very first moment. Interaction is fundamental to us humans and is one of our innate learning mechanisms. We do not learn in passive observational situations but want to understand and communicate. In my view, it is essential for our human interaction that we understand each other and our counterparts as intentional agents." Schlangen therefore does not believe that computer systems will soon be able to communicate naturally, or perhaps even intentionally, with the help of the current methods. "On the other hand, ten years ago, I would not have thought possible what artificial intelligence can do today."

DR. JANA SCHOLZ
TRANSLATION: SUSANNE VOIGT

"WE RECOGNIZE ANIMALS AS INDIVIDUALS"

RESEARCHERS OF THE
UNIVERSITY OF POTSDAM
INVESTIGATE THE PERSONALITIES
OF WILD ANIMALS

Jana Anja Eccard knows her mice well. For 27 years, she has been researching the behavior of small rodents in numerous experiments, both in the laboratory and in their natural habitat. The professor and her team in the Department of Animal Ecology are particularly interested in the differences between individuals of a species, in animal personalities. This approach is still new in ecology. "For a long time, ecology worked with the average characteristics of species," she explains. "Individuality was more of a distracting background noise. We recognize that animals are individuals and consciously gear our research questions to this fact."

In recent years, the researchers have gone one step further. Prof. Eccard and Dr. Valeria Mazza are now focusing on individual differences in wild populations. This is also pioneering work, which is urgently needed as tests in the laboratory have so far hardly included the ecological significance of behavioral variation. "We are increasingly trying to work with wild animals," Eccard says. "It is important to understand how they cope with changes in the environment such as urbanization, interference in landscapes, climate change, the introduction of new species. Individual trait combination is important for all of this. Some parts of populations will be able to adapt better than others and we'd like to understand why."

But what are personalities in the world of mice anyway? The researchers work with behavioral traits that are inspired by the concept of the five personality traits in psychology, and are specific to each species. They distinguish between active and reserved mice, fearful and willing to take risks, aggressive and amicable, explorative and less curious, as well as individuals

that seek the proximity of their conspecifics and those that tend to avoid them. "Just because animals belong to a certain species doesn't mean that they all react to stimuli in the same way," Mazza says. "We think that the consistent variation in their behavioral responses describes individuals."

Invasion of Ireland

In their research projects, Eccard and Mazza look at the behavior of wild voles, both resident and expanding populations. In summer 2019, the researchers had the unique opportunity to study an ongoing biological invasion by a rodent species: "We studied one of our favorite species in Central Europe, the bank vole, during its expansion on an island – Ireland. Animal ecologists rarely have such an opportunity," says Eccard, because most invasions of mammals, such as rats or house mice, have already been completed. The researchers' findings on the behavior of bank voles spreading in Ireland are therefore of great importance for invasion biology. The species was introduced 100 years ago and remained unnoticed until the 1950s. It spreads at a rate of 1-2 km per year and is now estimated to have colonized over half of Ireland. For their research, Eccard and Mazza compared the population at the edge of the distribution zone with the population at the origin of the distribution in western Ireland, i.e. the area where it arrived 100 years ago.

The experiments on the island were complex, but the researchers were able to draw on their many years of experience with behavioral experiments. Until then, voles had only been studied by parasitologists; no one had been interested in their behavior. "We dragged a lot of material into the forest, which was only possible because we worked together with Trinity College in Dublin," Eccard says. The researchers set up traps. All the animals that were caught underwent a series of behavioral tests inside a tent. For three days and then again three weeks later, the total of 200 bank voles completed the experiments, most of them several times. This is because the ecologists can only analyze an animal's personality index through series of tests. "Personality is defined by consistency in different contexts as well as consistency over time, so behavioral traits don't change in different contexts and over a short period of time," she explains. "Every time we catch the mice, we ask them again: Are you still among the bravest? Are you still one of the least active animals?"

First, the voles participated in a dark-light test to assess their penchant for risk-taking: How much time does the animal take to move from the safe, dark shelter into a bright, open arena? In the second test, the researchers observed how the rodent behaved in the arena, which has a diameter of 1.20 meters. Does

THE RESEARCHERS

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Dr. Valeria Mazza studied biology in Turin and Florence (Italy). Since 2020, she has been a researcher and Senior Lecturer in the Animal Ecology Group at the University of Potsdam.

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Behavioral experiment with wild rodents

it walk carefully along the wall or does it boldly walk through the middle, potentially exposing itself to predators? Does it move and explore through the arena during the five minutes of the test or does it remain in one corner? In the third test, the animals were released through a simple maze: There were several possible exits. One led to freedom, the others were locked. Here, the researchers investigated a combination of orientation, need for safety, and exploration.

The results show that the animals at the edge of the distribution zone are much more cautious and also much more flexible than in the center, where the

animals were rather bold and inflexible in their behavioral response. "When it came to exploring unknown territory, the voles at the edge of the distribution zone were slower and more cautious," Mazza says. "They were even cautious when jumping out of the maze into their own habitat," Eccard adds. This was similar during the experiments that the mice had participated in before their release. "Our cautious candidates on the edge of the distribution zone kept visiting the same place. At first, we thought they were making 'mistakes' because they had already been in the arms of the maze and should know there was no way out. But then we came to think that they were checking everything more thoroughly before making a decision." After all, they are dealing with many more unknown dangers compared to the resident populations.

Caution as a life assurance

Eccard explains the behavior with the different "selection pressures" during expansion: While it is about competition with conspecifics in an established area, at the distribution edges it is about being successful
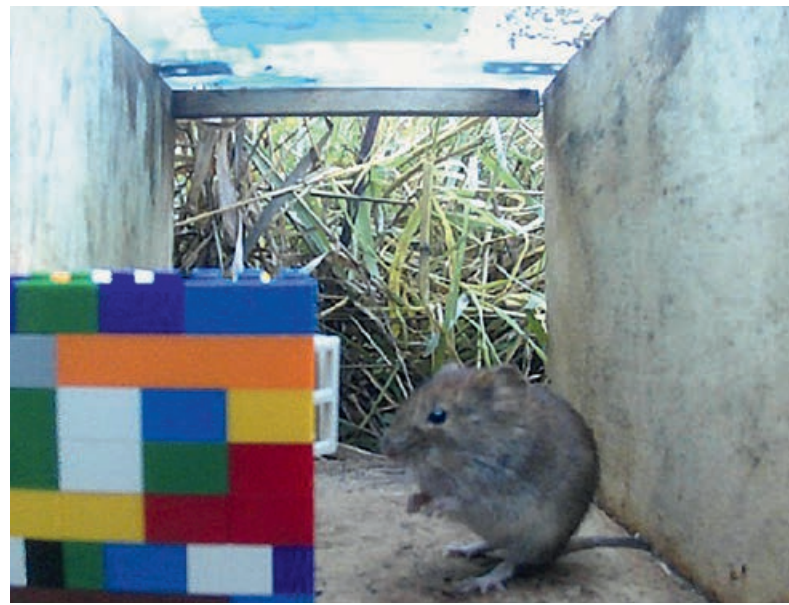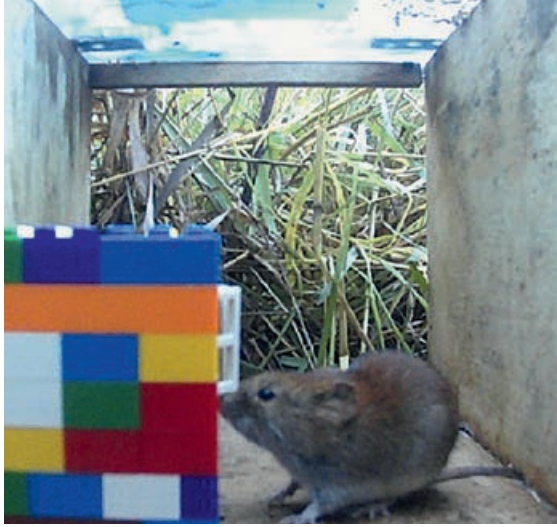
in the environment and vis-à-vis other species and perhaps about occupying a new territory. "The ability to adapt to natural conditions is quite essential for exploring new spaces. We had assumed that expansion had something to do with pioneering and courage. That was probably a rather anthropocentric perspective. It is probably more about not being eaten." The researchers suspect that it is precisely the rodents' caution that benefits them in unfamiliar habitats: "Rodents are incredibly successful colonizers," she says. "At the same time, they have many predators, making caution a life assurance." According to Mazza, this strategy is rare among species that conquer new territories. "We know from other expanding species that they are faster and bolder at the distribution edge," Mazza says. "Our voles, which have so many predators, follow the opposite strategy. They are cautious and check information carefully."

Once the whole island will be colonized by the voles, the differences between the center and the distribution edge will slowly disappear. Their special caution and flexibility will no longer make the animals successful at the edge. "In another 50 years, we will no longer see this behavior," Eccard says. Incidentally, the change in the species community means a gain for diurnal predators. This is because the immigrant bank voles are active at daylight, while the resident wood mice become active only at night. "With video camera traps, we are currently investigating whether the species, which was already there before and now has to share space with the bank vole, shifts its activity peak a little. We are currently conducting a study on this as part of an exciting Master's thesis." The animal ecology team likes to work with non-invasive methods such as camera traps and relies on the voluntary participation of the animal test subjects. "We want the animals to enter the visiting arenas on their own and to engage with puzzle tests." Strong personality differences, after all, are found in problem-solving strategies, Valeria Mazza's area of expertise.

"Problem-solving tests can tell us something about the ability of animals to display new behaviors," Mazza explains. The researcher calls this "animal innovation propensity." Cognition, personality, and flexibility are in turn key to determining whether an animal has the ability to respond to changing conditions with behaviors that researchers did not previously know from a species. "This ability is very helpful when an animal

leaves its traditional territory," she says. "Cognitive flexibility allows animals to decide on the spot what the best strategy is to meet environmental challenges." This is especially important, she says, in the face of sudden changes caused by humans. Since behavioral innovations of animals in nature are not easy to study empirically though, the researchers use "problem-solving box set". It was developed by Dr. Anja Guenther from the Max Planck Institute for Evolutionary Biology, originally for house mice in the laboratory. Mazza and Eccard now also use the test battery for wild animals. "If we want to look at cognitive flexibility, it's not enough to just look at what happens under laboratory conditions," Mazza explains.

The researchers worked with animals in Berlin, Potsdam, Gülpe, and in the Uckermark region and thus considered very different degrees of urbanization in the region. In addition, they included different species such as the striped field mouse and the common vole. First, they trained the mice that were willing to participate in the experiment to collect a reward in the form of a mealworm at one location. Then this reward was hidden in the puzzle box, for example in a petri dish. Getting to the worm became increasingly difficult. Some containers could be opened in three ways, some in two, others only in one. For example, the lid of a petri dish could only be lifted with the teeth or paws. "When you stop the time and look at how many ways are tried, you can see clear differences between the populations," Eccard says. "We were able to show that small mammals in the city can solve a problem much more often than their counterparts in the countryside. But when they can't solve it, they give up more quickly." The results, incidentally, are similar for the different species.

The cautious flexible ones and the brave 'old hands'

The animal ecologists are also interested in the different learning styles of the rodents. In an earlier experiment, for example, Mazza placed bank voles in a maze with two exits – one led to a reward, one didn't. The animals learned to associate each of the two exits with a specific scent. The researchers then swapped the two scents. The result was that the more courageous bank voles used the same solution again and again if it had worked in the past. The more cautious ones, on the other hand, always checked a solution they had found anew. "At first we thought they were not as good at learning, but that was not true," the professor says. "They were flexible, kept their return path open, and were quick to relearn if we changed the solution." Mazza's experiments show that cautious animals acquire knowledge more slowly and braver animals form routines more quickly. The researchers

believe that while the "brave routineers" are more in line with the traditional standards of learning research, "in a normal learning test, these would be the ones who, once they have found a rule, display what we call the 'right behavior'," Eccard says. "We are not getting anywhere here with our learning paradigm. Because when environmental conditions change, for example, it's a great advantage not to stubbornly insist on something but to question it." Research results like these always draw a great response. Learning types are also of interest to dog schools in the training of rescue dogs, for example. "If you know that there are different learning types, you might have to come up with different teaching styles."

However, research also benefits from the findings that the researchers gain in experiments. They are included in computer models that biologists at the University of Potsdam and beyond use to learn more about how species deal with ecological changes. "Colleagues use our empirical data in computer simulations to predict the compositions of populations, for example."

Although the researchers have a passion for rodents, Valeria Mazza could imagine studying the personalities of other mammals. She has developed an interest in raccoons, for example – a species that has been spreading in Europe since the middle of the last century and about whose personality traits there is certainly a lot to discover.

DR. JANA SCHOLZ
TRANSLATION: SUSANNE VOIGT

Early Detection at the Push of a Button

Button

Prof. Natalie Boll-Avetisyan has developed
a toy to indicate the risk of a language disorder

The teacher gives specific instructions: "When you have finished the exercise, pack the book, go to the shelf, and get a worksheet from the rack." The pupils follow without any difficulty. Only one boy packs his book and remains seated. Was he not listening properly? On the contrary, the instruction was simply too complex for him. He has a developmental language disorder that makes it difficult for him to understand what is being said. Such disorders are often only discovered when they become obvious in everyday life. That is too late for Natalie Boll-Avetisyan. With the help of a toy, the psycholinguist wants to make sure that such risks are already recognized in infants.

Photo: Sandra Scholz

It sounds quite unusual: playing for science. But for the small test subjects whose behavior Boll-Avetisyan analyzes, it is exactly the right research method. "My method is suitable for babies from the age of nine months. From this age on, they can play with the toy," she explains. "You can test children very early to see if they have difficulties with language. Long-term studies from the field of language development research show that in the case of disorders precursor skills are already not developed during infancy."

Prof. Boll-Avetisyan developed the play object for studies in the BabyLAB at the University of Potsdam and has since patented it: Externally, it is nothing more than a wooden box with two green push buttons. As simple as it appears, the interior structure of the box is exciting. The electronics inside ensure that tones sound at the touch of a button. It also measures how often and how long the child presses which button when it perceives certain sounds, words, and intonations. Small, compact, portable, and with an easy-to-understand application – this makes the box well suited for mobile use.

Supporting preventive medical examinations

Boll-Avetisyan would like her toy to be used in the future during the pediatricians' U6 checkup (early

Prof. Natalie Boll-Avetisyan

diagnosis and prevention examinations), that is for infants 10-12 months old. "We wanted to have a tool that can determine a status during the regular visit to the pediatrician." Until now, the little ones are only being tested for their language development at the U7 checkup, when they are about two years old. Among other things, they have to demonstrate a certain vocabulary during this examination. It is tested which words the children understand, which ones they use and whether they can form short sentences with them. "But not all language disorders come down to a small vocabulary," Boll-Avetisyan explains.

Those who stand out at U7 checkups are categorized as "late talkers" for the time being. Of these children, about 50% are able to catch up on their language deficits. According to Prof. Boll-Avetisyan, this ambiguous finding, the threat of therapy costs, and the fear that early treatment could create an awareness of the problem in both child and parents leads to health insurance companies not supporting measures that start at this early age. Parents only have the possibility to support their children privately with the help of the "Heidelberg Parent-Based Language Intervention". According to this program, they should, for example, repeat sentences in everyday conversations or support them with other actions. The prerequisite for a prescribed therapy is a diagnosed speech disorder. Currently, however, the diagnosis is made at the age of four at the earliest. "Risk screenings at both U6 and U7, whose results are combined, could lead to an earlier diagnosis," Boll-Avetisyan says. "A speech disorder cannot be cured but can be treated well. However, treatment methods are more effective the earlier you begin."

At the beginning of the project, which was awarded the FöWiTec Prize of UP Transfer GmbH in 2021, Prof. Boll-Avetisyan and her team tested which preference the babies have for stress patterns of artificial words. The result was clear: "The children would rather hear the German stress pattern than one that does not occur frequently in their mother tongue." This means that, even as babies, they prefer a stressed first syllable, which is typical in German.

THE RESEARCHER

Prof. Dr. Natalie Boll-Avetisyan studied linguistics at Johannes Gutenberg University Mainz and Utrecht University. In 2012, she received her doctorate from the Utrecht Institute of Linguistics. Since 2010, she has been working at the University of Potsdam. In 2019, she was appointed Junior Professor for Developmental Psycholinguistics and is now researching early language acquisition.
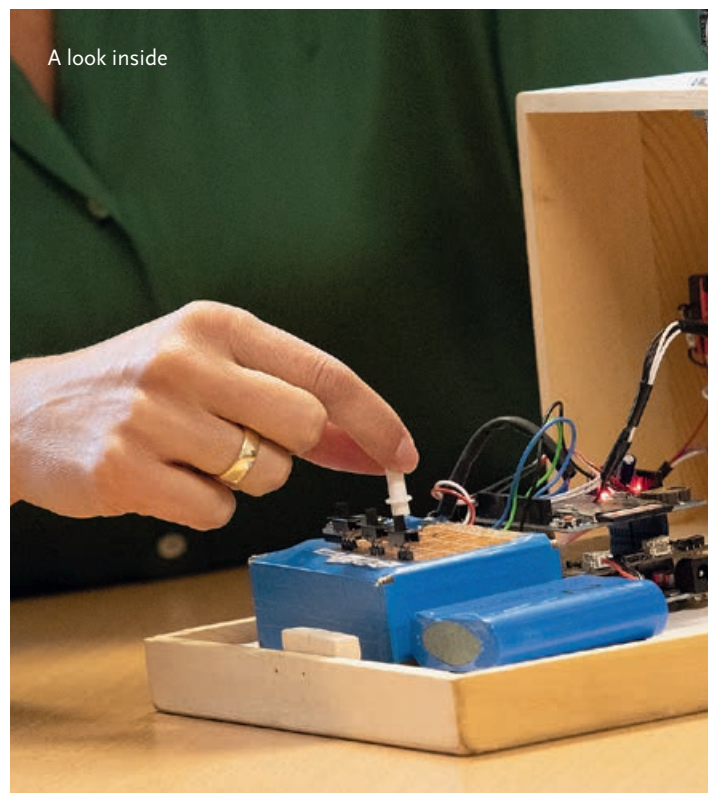
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Photo: Sandra Scholz

The box is intensively tested at the BabyLAB of the University of Potsdam.

A look inside

Language preferences put to the test

With the help of the two push buttons on the toy, Boll-Avetisyan is able to record how the children react to different phonetic stimuli as pairs of opposites – and prompt these reactions, so to speak. In the future, the researcher wants to use it to investigate further reactions to other stimuli: Do the babies prefer spoken words to noise? Do they prefer real words to artificial words? Are they more likely to respond to speech directed at the child than to how adults talk to each other? Whether one can clearly assign a disorder based on these preferences can so far only be roughly determined. Too little research has been done on language development disorders.

However, it is known how the clinical picture manifests itself. "Children with developmental language disorders do not understand long sentences well or have to search for words for a long time," she explains. "If their everyday life is characterized by misunderstandings and frustration, the affected children can develop mental illnesses that accompany them throughout their lives." How many symptoms the children have varies a lot. Prof. Boll-Avetisyan therefore wants to raise awareness of the disorder among parents, in kindergartens and schools, and provide the respective education.
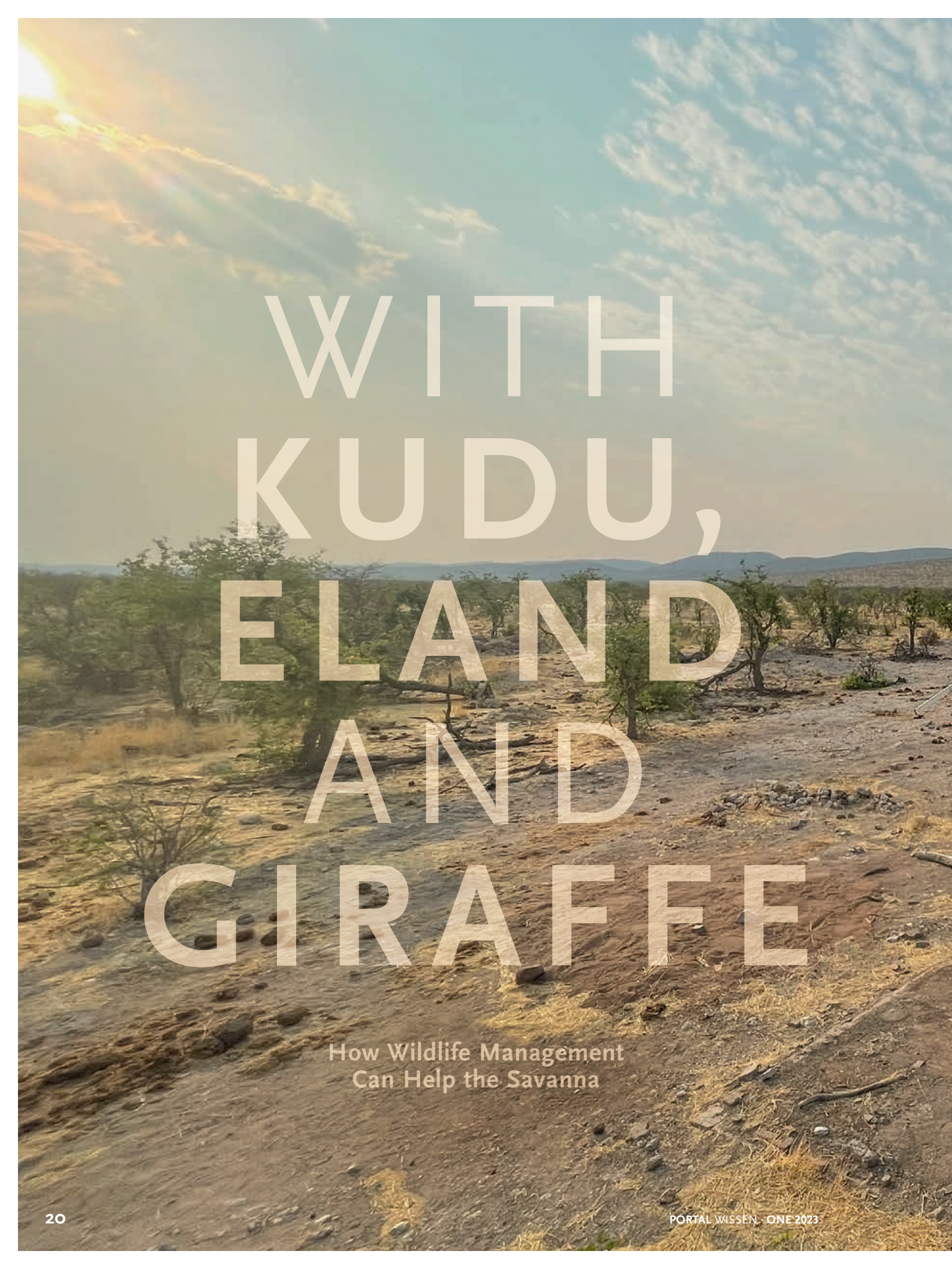
So, it is even more important to make the test toy fit for the pediatrician's practice: Boll-Avetisyan wants to prepare a guideline for the practitioners that lists criteria and standard values that facilitate risk identification. In addition, the toy will be equipped with a display so that doctors can easily evaluate the results. Before it can be launched on the market, the researcher still has to validate it for medical purposes. For this, she would like to seek support from the colleagues in Potsdam.

So far, almost 100 babies have taken part in her study. In the first step, the researcher is concentrating on monolingual, German-speaking children who are nine months old. In the future, however, she would also like to collect data from bilingual test subjects and follow the development of all the children interviewed over a period of years. Especially bilingual children with speech disorders are still rarely recognized because speaking difficulties are attributed to a natural delay due to the influence of several languages.

It was proven that the babies enjoyed playing with the box. Some engaged with it for up to a quarter of an hour. Even in the first study, it was shown that the children pressed that button for longer, which the researchers expected them to prefer. In concrete terms, this means that the toy works as they hoped. Now it is only missing a name.

AUTHOR: LUISA AGROFYLAX
TRANSLATION: SUSANNE VOIGT

WITH KUDU, ELAND AND GIRAFFE

How Wildlife Management
Can Help the Savanna

Installation of a solar-powered telemetry base station. GPS localizations and activity data with three-dimensional acceleration measurements are automatically downloaded from the collar transmitter when the animals drink at the watering hole.

Photo: Dr. Katja Geißler

The savanna: individual groups of trees stand picturesquely on wide plains, large herds of wild animals pass by, watched vigilantly by prides of lions and accompanied by the chirping of cicadas. But the African grasslands are in danger because they are on the verge of depletion. Besides climate change, their use as pasture for cattle, sheep, and goats is responsible for this change. This could be prevented by a political initiative, which advocates settling and keeping wild animals instead of farm animals on more and more land. Researchers of the University of Potsdam and colleagues from Berlin and Frankfurt/Main as well as partners in Namibia have been studying how this land use affects savanna ecosystems and how it can be managed.

In many places in Africa, the same problem prevails: the intensive use of large areas for grazing commercial livestock damages the land. It is degrading, as biologists say. Grass and trees that used to share the savanna are being displaced by thorny bushes and shrubs. As a result, the land is not only lost to livestock farming, it is also ecologically impoverished.

Since 2014, researchers from Potsdam have been searching for the causes of this development and for ways to stop and, at best, reverse it. "The widespread land degradation in Namibia has brought farmers and scientists together," explains ecologist Dr. Niels Blaum. When grasslands become overgrown, farmers and many other people lose their means of existence: Their animals can no longer find enough food. But the decline in grassland also has other consequences. Where the sward no longer protects the soil, it erodes more easily. The rain flows off the surface, and less of it seeps into the ground. Groundwater balance, nutrient cycles, and species composition change. The entire ecosystem is affected.

Ecological balance is the goal

Ironically, those that have been more or less expelled from their homes in many places over the past decades could now help: wild animals. "They are much better adapted to the climate and even to its changes than 'imported' farm animals and can contribute to the preservation of biodiversity," says Blaum. This requires a change in thinking, which has been taking place in Namibia for some time. "The country has realized the value of indigenous wildlife." The issue is a priority at the political level, and the second National Biodiversity Strategy and Action Plan was recently published. Moreover, about 35% of Namibia's land area – known as conservancies – are already being used for or by wildlife. "But wildlife management is a challenge," Blaum says. "During a drought, you can't just load the animals onto a truck and take them to a safe place. You have to solve the problem locally and prepare accordingly."

So far, the effects of keeping more wild animals instead of livestock on the savanna ecosystem were unclear, says Niels Blaum. In order to investigate whether wildlife management is suitable for the sustainable use of savannas, the Potsdam researchers and their German and Namibian partners have launched the ORYCS project, which is led by Niels Blaum. "So far

Map with movement profiles of tagged kudus (green), giraffes (brown), springboks (orange) and elands (pink).
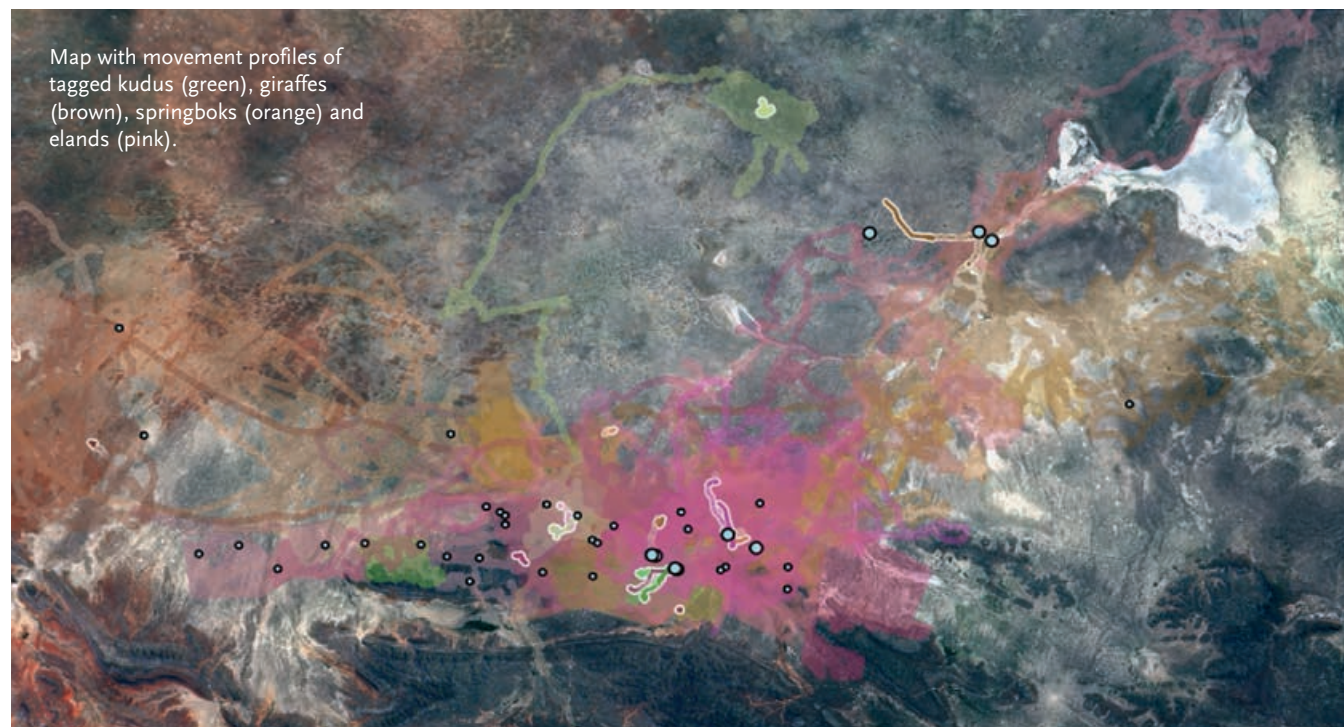
Photo: Dr. Niels Blaum

there haven't been any studies on whether it is better than the previously dominant livestock husbandry," he says. "For this reason, we analyzed the different types of use and how they can be optimized." How does settling wild, often diverse, animals affect vegetation? How do vegetation and water balance develop in areas with large springbok, kudu, or eland populations? How is climate change affecting the interaction of all these factors? Can humans ensure a stable ecological balance locally? The researchers had to answer these varied questions to understand this complex system. That is why the team included researchers from a wide range of disciplines such as wildlife ecology, vegetation ecology, hydrogeology, geological remote sensing, and social ecology.

New possibilities due to GPS transmitters

The Potsdam researchers coordinated the whole project and worked on four of six work packages. During the fieldwork phases, they collected data together with the Namibian partners. They tagged animals and plants with transmitters, measured water fluxes and biomass in predefined areas, conducted experiments on different vegetation systems and registered the investigated areas with state-of-the-art remote sensing technology.

Blaum not only led ORYCS but, for one subproject, also analyzed where the wild animals stay and how they move. The investigated area was Etosha Heights, one of the largest private reserves in Namibia. Springbok, kudu, eland, and giraffe: The ecologist and his team equipped a total of 60 animals with GPS transmitters. These measure their exact position and acceleration every five minutes. This makes it possible to track the animals' movements and also draw conclusions about their use of energy and behavior. When do they eat? When do they rest or flee, and when do they cover longer distances? "We wanted to know what influences their movements and when," Blaum explains. "What is the effect of searching for food and water, climatic conditions but also man-made changes such as fences?" Since 2019, over two million GPS localizations and four million activity records have been collected. The animals travelled a total of 130,000 kilometers on 13,500 recorded days. Each of the ani-

Springbok with GPS collar transmitter

Kudu with GPS collar transmitter

Giraffe with GPS transmitter

mals with transmitters, captured at a different location in the investigated area, represents an entire group. Thus, the data ultimately provide information about far more than just 60 animals.

Due to the long period of measurements, which also included several dry and rainy seasons, the researchers were able to demonstrate how much the animals adapt to the climatic conditions: During the dry season, they move less, staying relatively close to the easily accessible water points. With the start of the rainy season, however, when the vegetation sprouts and there is plenty of food, they start moving and cover long distances. To determine where they move, the researchers also analyzed satellite images. They analyzed the spectra of the images, that is, the characteristic composition of the light from spectral colors. They were thereby able to show that the animals don't wander around aimlessly but look for and find the greenest, and thus best, feeding places during their so-called migratory movements.

Climate change also afflicts wildlife

Nevertheless, the adaptability of wildlife also has its limits. "When temperatures rise to extremes, all species become less active," Blaum says. They move less and seek the shade of trees when it is very hot. "As a result, they may no longer be able to cover their basic needs." To investigate this question, the researchers compared the movement profiles of the animals on the ten hottest and ten coolest days in the warmest months of the year. "Springboks, for example, do not manage to compensate for the lack of activity," he says.

In other words, they suffer from the heat and have too little time to eat enough food. "Eland antelopes, on the other hand, make up for it at night." As temperatures continue to rise, this could, in turn, give them a decisive advantage in the competition among species and be taken into account in wildlife management.

Another important aspect only emerged in the course of the project: the influence that humans still have on animals even in protected zones. A veterinary fence runs through Etosha Heights, which is intended to prevent the introduction of foot-and-mouth disease into the south. Although the fence is two and a half meters high and safe for wildlife, it cannot withstand elephants breaking through, so there are always holes.

THE PROJECT

ORYCS – Option for sustainable land use adaptations in savanna systems: Chances and risks of emerging wildlife-based management strategies under regional and global change

Participants: University of Potsdam (coordinator), Namibia University of Science and Technology, Freie Universität Berlin, University of Namibia, Institute for Social-Ecological Research, Ministry of Environment and Tourism Namibia
Duration: 2019–2023
Funding: Federal Ministry of Education and Research (BMBF)

✍ https://www.orycs.org/

The ORYCS team

Photo: Dr. Niels Blaum
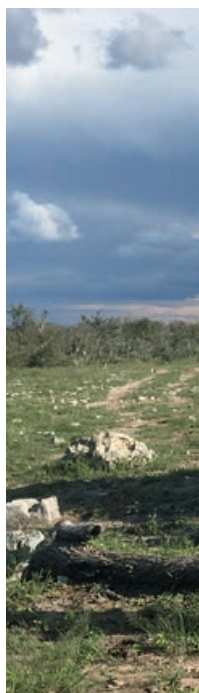
Other species also look for and find these holes, as the movement profiles of the tagged animals showed. A look at the data, however, revealed a very disturbing finding: the fence puts the animals under stress. During the so-called "crossing events" – when they are looking for gaps in the fence, using them and slipping through, but also afterwards – depending on the species, the animals spend 12-15% more energy than normally. "This finding definitely creates a stir politically," says Blaum. Especially since the fence, if damaged, only serves its purpose incompletely anyway. There is currently a discussion about the possibility of installing gates with mobile monitoring so that elephants, for example, could be automatically recognized and could then pass.

From small to big models

In additional subprojects, the researchers looked at the plants to determine how wildlife and vegetation mutually affect each other in the savanna. "The wild animals feed on bushes and trees, even on new seedlings. Cattle don't do that at all," Blaum says. "Because many bushes are 'armed' with thorns or store poorly digestible substances in their leaves." So wildlife is more likely to help keep bush encroachment in check or even reduce it.

Some effects of wildlife management can, to a large extent, be determined directly. For example, a comparison of the water quality of 68 water points in different areas showed that the quality is significantly better in national parks with long-standing wildlife management than where farm animals are kept. "Wild animals come to the watering hole, drink and leave again," Blaum explains. "Cattle stay by the water and thereby contaminate it themselves."

And the soil also "benefits" from the presence of wildlife. The researchers analyzed the soil in areas where springbok, kudu, and eland were active in large herds and found that it contained more nitrogen and carbon than in other places. Essentially, litter and excrement fertilize the soil, and the animals loosen it with their hooves. "They themselves create good conditions for plant growth," Blaum says.

Since wildlife in the conservancies is settled and kept by humans, ORYCS was intended to clarify as precisely as possible who "gets along" with whom. "The grazing pressure of the wild animals influences the architecture of the trees and thus also the entire water balance of the areas," explains Dr. Katja Geißler. The ecologist investigates the water flows in the savanna. To reconstruct this complex system, the researchers combined different methods. They recorded the vegetation in selected typical areas, for example. To do so, they also received help from other disciplines, such as from the Potsdam geoscientist Prof. Bodo Bookhagen, who contributed his expertise in "eco-hydrogeomorphic remote sensing". By analyzing satellite and drone images of the region, the researchers scaled the

MA student Anna Kraus locates a tagged springbok for behavioural observations during three-dimensional acceleration measurement

Project car that was bought onsite with the support of the Potsdam university administration.

Dr Katja Geissler and MA student Jonas Roth install sensors for measuring the transpiration of mopane trees.
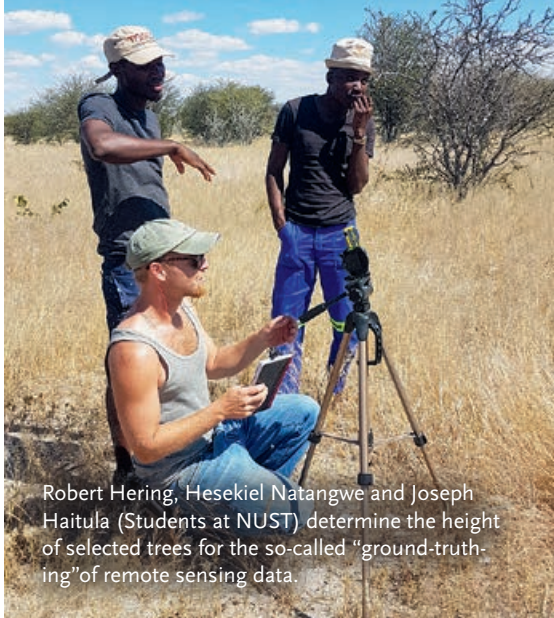
Robert Hering, Hesekiel Natangwe and Joseph Haitula (Students at NUST) determine the height of selected trees for the so-called "ground-truthing" of remote sensing data.

Robert Hering programming the telemetry base station

MA student Anna Kraus observing the behavior of kudus

Niels Blaum looking for tagged springboks

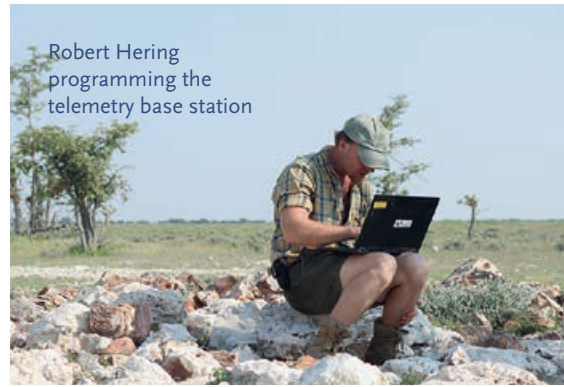determined biomass for the entire study area. They recorded the soil moisture and fitted selected trees with sensors that indicate where more or less water is flowing. To be able to determine grazing by wild animals, some of the trees studied were partly artificially defoliated. "By comparing trees that have been grazed to different extents, we can see what influence grazing pressure has on the water balance of the trees and the water flows," she says. All measurements were ultimately brought together to map the "cross-scale water flows" and to combine them with the studies on plant biodiversity. For this so-called "ecohydrological modelling of plant diversity", the Potsdam researchers cooperated with a team of colleagues from Freie Universität Berlin led by Prof. Britta Tietjen.

In the end, the researchers developed three different models into which the collected data were fed and with the help of which different processes were to be simulated. The two larger-scale models were developed in Potsdam under the direction of Prof. Florian Jeltsch and Dr. Dirk Lohmann. The smallest model was developed at the FU Berlin, and while it simulates

an area of only 25 hectares, it has a temporal resolution of one hour to one day. "It is used, for example, to simulate water flows that change as animals graze." The medium model has the size of a typical land use unit, such as a farm of 5,000 hectares, and takes into account larger time intervals. The researchers have used it to study, for example, how biomass production changes with increasing wildlife grazing. "This enables us to determine quite well which herd composition is particularly favorable for avoiding scrub encroachment," says Dr. Dirk Lohmann, who worked on the model with Blaum. Without browsing animals, i.e. wild animals that feed on leaves, the areas start to turn into bushland. "If we increase the proportion of these browsing animals, this dynamic can be mitigated. But if they make up more than 40%, they damage the balance of the system." The same simulation is also possible for herds that feed predominantly on grass (so-called grazers) – and mixed feeders – those that eat both leaves and grass. "In this way, ideal compositions of wildlife populations can be determined for different vegetation types," she explains.

In the largest of the three models, which covers an entire region of up to 100,000 hectares, the ORYCS makers simulate the complex functional structure of the ecosystem over longer periods of time. "It provides us with an overview," Blaum says. "We are integrating GPS data from our animals with transmitters and looking at how degradation can be pushed back or prevented on a large scale." To do this, the researchers are experimenting virtually with specific herd com

and purposefully placed water points. "The first simulations show that areas that have become overgrown can be restored locally in this way and that the areas covered by bush will decrease significantly in 50 years."

Taking findings to the savanna

With the results of four years of work in their files, Niels Blaum and his colleagues set out in October 2022 to meet those they are supposed to help: those responsible for Namibian national parks, farmers, politicians, conservationists, and ministry officials. "We presented our findings at an initial roadshow," says the researcher. "The farmers were extremely interested and at the national park, they wanted to keep our presentation posters." The researchers are currently developing information materials to prepare their findings for the various actors in a concise but suitable manner. This is where the Institute for Social-Ecological Research (ISOE), led by Dr. Stefan Liehr, contributes its expertise.

For Blaum, however, the work in Namibia does not end there. After all, the animals fitted with a transmitter in 2019 are still providing data – and these are constantly raising new questions. "Just when we think we have understood everything, something new comes up," the ecologist says excitedly. Thanks to the good cooperation with the Namibian partners, the Potsdam researchers continue to receive movement profiles and will be able to evaluate them in the future. For Blaum, in any case, the journey through the savanna will continue.

MATTHIAS ZIMMERMANN
TRANSLATION: SUSANNE VOIGT

THE RESEARCHERS

PD Dr. Niels Blaum studied biology in Nice and Frankfurt/Main. Since 2004, he has been research assistant at the Plant Ecology and Nature Conservation Chair of the University of Potsdam.

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Dr. Katja Geißler studied biology in Berlin and Aberystwyth. Since 2009, she has been research assistant at the Plant Ecology and Nature Conservation Chair of the University of Potsdam.

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Photos: Dr. Niels Blaum (Hintergrund), Tobias Hopfgarten (2, o., M.), privat (u.)

THE PROJECT

The project **"Military Cultures of Violence: Illegitimate Military Violence from the Early Modern Period to the Second World War"** is funded by the German Research Foundation (DFG) and includes eight sub-projects. Six of them are intended for doctoral studies. The research group involves Humboldt-Universität zu Berlin, Freie Universität Berlin, the Leibniz Center for Contemporary History (ZZF), and the universities in Göttingen and Bochum. The research group is also collaborating with the Centre for Military History and Social Sciences of the Bundeswehr (ZMSBw) in Potsdam. Spokesperson of the research group is Prof. Sönke Neitzel.

✍ www.uni-potsdam.de/en/military-cultures-of-violence

Cultures of Violence

Insights from work towards a systematic approach to military violence

Deportation, torture, and killing: How has the use of violence changed or even become radicalized in the armies of the great European powers? What has been distinctive? Which patterns have played a decisive role? These are the questions that the DFG project "Military Cultures of Violence" is investigating – with the aim of creating a systematic description and explanation of the different patterns of soldiers' actions in war. The research focuses on the use of physical violence in times of war as well as in times of peace. In an interview, historians Prof. Dr. Sönke Neitzel and Dr. Alex Kay explain the project.

Prof. Neitzel, your chair not only does research on military history, but also on the cultural history of violence. What does that mean?

Neitzel: The expansion of military history at the University of Potsdam by the cultural history of violence goes back to my predecessor Bernhard R. Kroener. He changed the denomination of the chair, and I think this addition makes a lot of sense. When we ask what culture is, we could talk about it endlessly. It is not about high culture. We rather understand culture as collective patterns of thought, perception, and action that characterize a society, and thus also the use of violence. Violence does not just happen. It is determined and framed by collective patterns. We are interested in exactly these patterns that both define the discourse on violence and evoke action. That is why we ask what is behind the use of violence. In this respect, the cultural history of violence provides the ideal framework for our research project.

When historians work on violence, genocide, war crimes, and massacres, the focus is on individual phenomena that were extremely brutal and were often committed far away from the big empires, for example in colonial wars. The regular military forces of the major European powers have not yet been considered under this question. Thus, the use of violence in the Seven Years' War in Europe has not been a topic so far; for example, how brutally the Prussian and Russian armies are said to have fought each other. This is where the DFG project comes in. We know from propaganda that things were supposedly more brutal in the so-called Turkish Wars, when the Habsburgs fought against the Ottoman Empire. We can reconstruct the discourses, but was it really like that? We hope to find relevant sources and to look behind the scenes of public discourse.

How do you proceed?

Neitzel: Due to a rather long timespan from 1683 to 1945, we cannot examine everything. That is why we first had to narrow down the concept of violence. We concentrate on physical violence. It is mainly about the killing of soldiers and civilians, and about rape. Then we focus on three areas: direct combat at the front, behind the lines in the occupied territories, and violence against one's own soldiers. Especially in the

Dr. Alex Kay

Prof. Sönke Neitzel

Photos: Kevin Ryl (2)

early modern period there was corporal punishment; deserters were put up against the wall and shot. These are also forms of violence that will be examined. We are only looking at the regular armed forces. Other historians have studied irregular armies such as auxiliary forces or militias. By now, there are several studies on this. We, however, want to close the research gap and focus on the large armies in Europe: What did the military forces do in the wars and what did they not do? Surprisingly, this has not been researched. So, it is not about the Boer War or the Herero Uprising – at most, how this influenced the wars in Europe but not about the colonial wars per se.

Kay: For my habilitation, my post-doctoral qualification, I am examining the culture of violence in the British armed forces and comparing it to the Canadian army to see if there was an Empire-wide, common culture of violence or whether there are differences between the British and the Canadians.

Neitzel: We also have a PhD student from Stellenbosch in our team who is studying the culture of violence among South African soldiers during the same period.

Kay: For me, this means examining the two world wars as well as the years between them. It is important to note that we focus on land forces. We don't look at atrocities committed from the air. There was no air force in the early modern period, so we have a level playing field for all sub-projects. I've only recently returned from London, where I spent eleven weeks in archives, mainly the National Archives. I looked at many war diaries, both of individual soldiers and officers and of units, memoirs and letters sent from the front back home to families. And I found some sources that I will work with. That is always a special moment when you discover something you haven't seen in the literature before. In London, there were moments like that …

What are the topics of the sub-projects and how did you decide on the priorities?

Neitzel: It is a complex task to plan such a research group with eight sub-projects. The members must have expertise in the topic and must not be spread across too many locations. They should be able to reference each other in their studies. For example, we cooperate with the historian Prof. Dr. Marian Füssel from the University of Göttingen. So, the Seven Years' War was set. Dr. Alex Kay and I have already done a lot of work on the Germans in the First and Second World Wars and numerous studies are available about them. Therefore, the topic is excluded from the sub-projects, but will be taken up again in the final volume. There

THE RESEARCHERS

Prof. Dr. Sönke Neitzel has been Professor of Military History/Cultural History of Violence at the University of Potsdam since 2015. His research focuses, among other things, on the history of the German Armed Forces (Bundeswehr) in an international perspective.

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Dr. Alex Kay studied history in Huddersfield, Sheffield, and Berlin. He has taught at the University of Potsdam since 2017. Since 2022, he has been a fellow in the research group "Military Cultures of Violence". He has written several books about the extermination policy of the Nazis.

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are still no studies at all on British war crimes in the Second World War …

Kay: What really surprised me – and what I recently presented my initial research findings on – was the extent of prisoner killing on the part of the British in the First World War. This was a widespread phenomenon but has hardly been mentioned in the literature so far. There are a few articles on it but no systematic study. Many historians still see the First World War as a "gentleman's" war, in which there were hardly any atrocities and something like the shooting of prisoners only happened occasionally. But that was not the case, as I have now been able to discover in the archives. This will be a focal aspect of my habilitation. Interestingly, there were far fewer atrocities committed by the British during the Second World War than by the Canadians.

Neitzel: Dr. Kay already addressed elsewhere that the British were apparently the only ones who showed restraint and scaled down violence in the Second World War, while all other military forces became radicalized. Kay: Except for aerial warfare – there, things looked different. But I have also discovered sources about the war on the ground regarding the actions of the British in Greece. At the end of the Second World War (1944/45) – after the withdrawal of the Wehrmacht – the British became the occupying power in Greece and deported young Greeks to Egypt. I didn't know that before. The British set up a prisoner-of-war camp

in Egypt and deported thousands of Greeks, including hundreds of children and adolescents. I discovered this in the archives. Among them were suspected insurgents and communists. I am also planning a section on this in my study. I will also look at the Burma campaign in the Second World War. Here, the British fought against the Japanese in what is now Myanmar. It is said that there were executions of prisoners. But it is difficult to verify this because there were very few prisoners. The Japanese rarely surrendered.

Why can the research project close a gap?

Neitzel: Individual massacres in wars have already been studied. But what are the implications? That humans are capable of terrible acts? We know that. Or are there situational explanations for why people commit massacres in wars under certain conditions? General conclusions have been a taboo until now

Johann Jakob Schalch: A scene from the Seven Years' War, battle between the Prussians and Austrians

because no one wanted to be accused of an existentialist understanding of culture – along the lines of "Germans always act in a particularly barbaric way or 'the Russian' is cruel." But how do the so-called long lines present themselves? Are there specific national discourses, patterns of action, or an understanding of law that does not exist in other countries? Or does it all depend on the specific circumstances of a given period? The aim is to bring together the findings on military violence in a comparative way in order to find answers to the open questions: Do certain cultures of violence exist in a nation or state? How do they develop? Are they similar in different countries or do they differ depending on the culture? What acts of violence result from this? Individual researchers cannot do this. No one can scientifically study six countries based on these questions. The format of a research group is a huge advantage here. Historians usually tend to be loners who retreat to their offices and ar-

Photos: Wikimedia/gemeinfrei (3)

Wounded German soldiers at Cléry in September 1916

Australian soldiers near Ypern in October 1917

Survivors of the concentration camp Buchenwald in April 1945

Graves at the garrison cemetery in Brest

chives, are not seen for three years, and then publish a book. But this kind of project would not be possible without collaborative research.

Kay: I joined the project when it was already clear that the British would be part of the research. So far, I have mainly worked on National Socialism and the Weimar Republic. I focus on state-organized violence: What are the mechanisms behind it? Are orders or action on the spot decisive? What forms of interaction exist? Originally, my sub-project was supposed to be about the Second World War and the Korean War. But the temporal focus seemed too short to me. It is more exciting to include the First World War and the interwar period. In this way, important discourses can be included – such as the violence of the British in Ireland and India. There were debates in British politics and society, for example, that may have contributed to a reduction in the use of transgressive violence in the Second World War. But I need to study that in more detail.

How can the current war in Ukraine be included in the research project?

Neitzel: We also have two sub-projects dealing with Russia, one on the Seven Years' War and the other on the role of the Cossacks in the regular armed forces of the First and Second World Wars. The latter is led by Prof. Dr. Jan C. Behrends from the Leibniz Centre for Contemporary History Research in Potsdam and the European University Viadrina. As an expert on Russia, he closely follows the use of violence in Ukraine. Comparative aspects will certainly be integrated. For example, whether there are patterns of action or parallels that emerged in the world wars and are being continued by the Russian army today. Here we again return to the fundamental central questions about continuities: Are there national cultures of violence or not? Are there particular moments – situations – of a war that determine the use of violence? Such comparisons, especially with regard to Eastern Europe, do not yet exist in the schol-

arship. We can also provide our analytical framework and show how we study violence. Of course, we do not know exactly what happened in the Ukrainian town of Bucha. The empirical evidence must be provided by others – secret services, international law experts, the United Nations. But we can provide support through historical knowledge and methods.

What do you ultimately expect for history?

Neitzel: The result should be more than just the bundling of sub-projects. It is about finding answers and perhaps even a systematic approach to the big questions about the patterns behind violence. That is why the exchange in the research group is so important. We had various workshops where we presented and discussed the sub-projects. In addition, lectures by external historians, who are not involved in the research project, gave new impulses. In the winter semester 2022/23, we had the work phase and so discussion rounds took place less frequently. We are planning more intensive exchange in the coming months.

Kay: It is important that we all discuss the various sub-projects together as a group. This is a very lively process and provides the researchers with ideas and feedback for their own studies.

Neitzel: We will certainly apply for a second funding phase. Especially for the two postdoc projects, the schedule is extremely tight. But I am optimistic that Dr. Kay will keep to the schedule. He has already published several books and is an experienced colleague. For the PhD students, on the other hand, it's their first book, which is always a big challenge. But the overall conditions could not be better.

DR. SILKE ENGEL
TRANSLATION: SUSANNE VOIGT

Can **Artificial Intelligence** Prevent Diseases?

With the help of self-learning methods, researchers analyze which risk of disease lies in our genes

About 1.7 million people from Europe and the US provide the database for a large-scale interdisciplinary research project. Their genetic information and health data are precisely analyzed and interlinked. With the help of new artificial intelligence methods, researchers want to find out how genetic predispositions influence the risk of disease and how medicine can make use of this knowledge.

It was a mammoth project in the history of genetics and took more than ten years: in 1990, a research consortium ventured to completely decode the human genome. Over 1,000 scientists from 40 countries took part in the Human Genome Project. Biochemist Craig Venter's private corporation Celera also accepted the challenge and worked on sequencing the genetic material at the same time as the research teams. In 2001, both the corporation and the researchers could pop the corks: They had both arrived at the result in different ways and deciphered the exact sequence of the approximately 3.4 billion base pairs that make up human DNA – albeit still somewhat incompletely.

The interplay of genes and living conditions determines the risk of disease

More than 20 years later, the sequencing of the human genome has become routine in biotechnology laboratories. Even the gaps have largely been closed due to improved procedures and technologies. Today, sequencing takes only 24 hours and, at a few hundred dollars, costs only a fraction of the initial sum. This opens up completely new possibilities for medicine – there is, after all, also a lot of health information in our more than 19,000 genes.

"If I sequence your genome, I will most likely discover risks for certain diseases," explains bioinformatician Christoph Lippert, Professor of Digital Health and Machine Learning at the University of Potsdam and research group leader at the Digital Health Center of the Hasso Plattner Institute (HPI). Which diseases these are, how high the risk of disease is, how it can be reduced through prevention and how the disease is best treated – the scientist investigates all this in the INTERVENE research project, which is funded by the European Union with ten million euros over five years and which includes 17 institutes from all over Europe and the US.

Whether cardiovascular diseases, diabetes, breast cancer, or prostate cancer, there are numerous diseases that have a high genetic component. Mutations in certain parts of the genetic material increase the risk of disease. Changes in the so-called "breast cancer genes" BRCA1 and BRCA2, for example, which are responsible for the outbreak of the disease in 5-10% of all breast cancer patients, are well known and researched. Women with certain genetic changes in these high-risk genes have a 50–80% higher risk of developing breast cancer. In addition, they develop the disease about 20 years earlier than women who do not have these mutations. However, it is often not only individual genetic variants that determine whether we get diabetes or cancer. Rather, the risk of disease is influenced by the interaction of numerous genetic components and living conditions.

Health data from several decades

In order to link and decode all this health-relevant information, the INTERVENE researchers count on artificial intelligence. Their goal is to develop new methods to accurately measure which risk for developing certain diseases can be read from the genome. To do this, the researchers can draw on genome and health data from a total of 1.7 million people from Europe and the USA.

These data come from so-called "biobanks", which are comprehensive databases from large health studies with voluntary test subjects. The two largest with

Prof. Christoph Lippert

data sets of 500,000 people each are from Great Britain and Finland. In addition, there are smaller biobanks of other European countries and the US, which represent a cross-section of the population. The subjects are usually observed over a period of several decades and undergo medical checkups on a regular basis. This includes taking blood or saliva samples, from which the genome is read. This provides researchers with very comprehensive data on various diseases, living conditions, and risk factors, which can be linked to genetic information.

Artificial intelligence identifies important biomarkers

"The big goal is to improve medical care," says senior medical scientist Dr. Henrike Heyne. She and her team take a close look at genetic risk factors for various diseases. "We are investigating polygenic risk scores," she explains. In this process, the researchers examine thousands of common genetic variants that individually do not increase the risk of disease. Taken together, however, such small mutations can have a major impact on the onset of diseases such as cancer, diabetes, or heart attacks. "If we are able to better predict who has a higher risk of falling ill, we can optimize screenings and prevention programs", Heyne explains. This is not only of great benefit to the individual, but also to the community.

Remo Monti, who is doing his doctorate in the project, examines the genetic foundations of diseases and analyses them with artificial intelligence. With the help of AI models, he has identified genes from

THE PROJECT

"INTERVENE (International consortium for integrative genomics prediction)" is an international and interdisciplinary consortium of 17 leading research and other organizations. The researchers are developing new technologies to better diagnose, treat, and prevent diseases. To do this, they use data from genetic information, which they analyze with new AI-based methods.

Funding: the European Union's Horizon 2020 research and innovation program
Duration: 2021–2025
Participants: University of Helsinki, European Molecular Biology Laboratory, University of Siena, Norwegian University of Science and Technology, University of Tartu, BBMRI-ERIC, Technical University of Munich, CSC – IT Center for Science, Hasso Plattner Institute, Aalto University, HUS Helsinki Biobank, University of Cambridge, Massachusetts General Hospital, University of Turin, European Cancer Patient Coalition, Ttopstart, Queen Mary University of London

✍ https://www.interveneproject.eu

biobank data that are associated with certain blood biomarkers. These biomarkers are the body's own signal substances and molecules that can indicate diseases. In total, Monti identified 117 genes in which genetic variants can potentially affect blood biomarkers such as cholesterol. "The great thing is that we can also analyze how very rare mutations influence blood biomarkers with this method and the large data base," Prof. Lippert emphasizes. These rare gene mutations can have a major impact on a person's health, but have hardly been researched because of the still insufficient data situation. New models are intended to close this gap and help to predict the functions of these rare mutations at the molecular level.

Ethical questions are the most difficult aspect

It is a first, encouraging result that the Potsdam researchers can already enter in the books after just one year of work. While machine learning tools and theories on artificial intelligence are being developed and the methods are being further optimized and applied in Potsdam, other INTERVENE groups are also working on concrete clinical applications of these tools. Patients who have a high genetic risk for breast cancer and certain cardiovascular diseases are to be informed about this and given medical care in the pilot studies. In these intervention studies, those who are already ill will be treated with adapted therapies and those who are still healthy but have a high risk of disease will get preventive medical supervision. The comparison of high-risk groups and low-risk groups, finally, is expected to show whether the measures are successful and can reduce the disease rates.

"I am a computer scientist. For the biological and medical questions and for interpreting our results, it is necessary to cooperate with other research partners," Lippert emphasizes. Accordingly, he closely cooperates with Charité Berlin, for example. But the most difficult questions to answer – according to the researcher – are the ethical ones. This involves data protection and privacy, but also how resources for early screening are best distributed, at what point treatment actually becomes necessary, and how each individual deals with the knowledge of his or her personal risk of disease. "A lot of research and learning is still to be done," Lippert says.

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TRANSLATION: SUSANNE VOIGT

THE RESEARCHERS

Prof. Dr. Christoph Lippert studied bioinformatics Ludwig-Maximilians Universität München and obtained his doctoral degree at the University of Tübingen. Since 2018, he has been Professor for Digital Health and Machine Learning at the University of Potsdam and research group leader at the HPI.

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Dr. Henrike Heyne studied medicine at Leipzig University and obtained her doctoral degree at the Max Planck Institute for Evolutionary Anthropology. Since 2020, she has been Senior Researcher at the HPI (University of Potsdam) where she is a research group leader.

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Remo Monti studied biotechnology at the ETH in Basel. He is doing his doctorate in the group of Prof. Lippert at the HPI and Prof. Ohler at the Max Delbrück Center.

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Photos: Tobias Hopfgarten (o.); Kay Herschel (2. v. o.); Prof. Dr. Christoph Lippert (2. v. u.); AdobeStock/ipopba (u.)

"HI GUYS! WELCOME TO MY NEW VIDEO . . ."

Roland Verwiebe and his team investigate the working conditions of YouTubers

Putting on makeup in front of the camera, upload-ing sketches, giving extra history lessons – the range of videos on YouTube is as diverse as the people behind the content. The fact that some people make their living with self-made video entertainment has long ceased to be an oddity. But how does the pro-fession of a YouTuber define itself? The Potsdam researchers are investigating this question in the project "TubeWork – the new occupational field of YouTubers in Germany – Inequality and self-econ-omization in algorithm-based markets". Prof. Dr. Roland Verwiebe and his team thereby close the gap that has existed in sociological research on the video giant in Germany.

"Many who pursue the profession today no longer call themselves YouTubers. They rather call them-selves 'content creators'", Prof. Verwiebe describes the self-image of the respondents. "They say, 'We are artists, entrepreneurs, and documentary filmmakers and comment on our time'." The platform is constant-ly changing and the tasks and self-perception of the content creators have to keep up at the same pace. The new designation is just one indication of this. "Usual-ly, there is a precise definition of what constitutes a job. In the case of YouTubers, the job description con-tinues to develop. Those active cultivate it themselves and the community mystifies it," he explains. Since August 2022, the research team in the DFG-funded project has been exploring the special features of the profession.

Quantitative and qualitative analyses

To do this, they rely on both qualitative and quantita-tive methods. Studies in sociology are usually limited to one or the other approach. "To me, this is unper-suasive," says Verwiebe. Particularly when it comes to the self-perception of the respondents, the team can-

THE RESEARCHER

Prof. Dr. Roland Verwiebe studied social sciences at Humboldt-Univer-sität zu Berlin and Columbia Uni-versity in New York. He received his PhD in Berlin in 2003. His research has brought him to Hamburg, New York, and Vienna, among other places. Since 2019, he has held the Chair for Inequality Research and Social Stratification Analy-sis at the Faculty of Economics and Social Sciences at the University of Potsdam.

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not do without the data obtained from both methods. "For example, participants expressed that a specific training was not that relevant. In the course of the in-terview, however, it turned out that they felt what they had learned was 'extremely' important. Such a thing will only be noticed in a qualitative study," he says. "At the same time, we found that many of those who are successful on the platform had a university degree in the field of media. That was different in the past. You-Tube was seen as an entry point for people with little education." What unites past and present YouTubers: Almost 20 years after the founding of the platform, many still start their career as a hobby.

The quantitative data is collected by PhD students Sarah Weißmann and Aaron Philipp. They retrieve the values automatically from the YouTube Data API – short for Application Programming Interface. The video platform actually provides the interface for inte-grating its data into apps. The researchers evaluate the publicly accessible data of all 120,000 German-lan-guage channels in an anonymized way: from the gen-der of the creators to the comments of the community.

The team obtains qualitative data from interviews with YouTubers. So far, they have interviewed al-most 20 people, men and women, most of whom are between 20 and 40 years old. They are aiming for a total of 30-40 interviews. Because many crea-tor personalities are clustered on the video platform, it is important to the research team to get a diverse selection of interviewees. They interview people of different genders, channel sizes, industries, etc. With their questions, they want to find out how the YouTubers deal with the algorithm, how they inte-

Discussing the results among the team members

grate video making and editing into everyday life and how their income is generated. The researchers will conduct the interviews until they reach "theoretical saturation". "We can't create a representative picture but want to work out the contrasts of the job profile," Verwiebe explains.

Women earn more on YouTube

The researchers asked the full-time YouTubers about their networks, their social and educational backgrounds, but also about how they perceive inequalities. The respondents felt the latter to a greater or lesser extent. Based on the data, the research team already suspects that "inequalities depend on beauty standards and startup capital when opening a channel", says research associate Claudia Buder. "Beauty" is also the keyword for the study's first findings. "Our findings so far suggest that women earn more on YouTube than men," Philipp explains. Established niches for female creators are, for example, gaming or the beauty sector. Large companies that provide products and pay for their placement stand behind the channels as cooperation partners. This creates an additional source of income – in addition to the opportunities that YouTube itself has offered through advertising since the 2010s.

After the interviews, the researchers regularly come together and discuss what insights the interviews offer. They do not always agree, but their work benefits from the team dynamic. "We need the exchange for interpreting what is said," says Verwiebe.

THE PROJECT

TubeWork – the new occupational field of YouTubers in Germany
Inequality and self-economization in algorithm-based markets

Funding: German Research Foundation (DFG)
Duration: 2022–2025
Principal investigator: Prof. Dr. Roland Verwiebe; scientific staff: Claudia Buder (MA), Sarah Weismann (M.Sc.), Aaron Phillip (MA), Marie Theres-Hesse (BA), Chiara Osorio Krauter (BA)

Moody algorithm

YouTubers have to be able to deal with the specifics of their profession: As great as the personality cult around individual channel operators may be, they are dependent on two factors: the people who watch and the algorithm. "There is direct feedback for everything," says Sarah Weißmann, who is a member of the TubeWork team. Users write comments, give "thumbs up" or decide to subscribe to a channel. The algorithm uses unknown criteria to calculate which videos are played to whom. "Nowadays, people have to deal with complex, self-learning algorithms. It is difficult to understand how they work. The algorithm is a capricious god," Verwiebe summarizes how the respondents feel about the technical regulations. "But the creators themselves also contribute to the myth of the 'algorithm': Information about it is shared and different strategies are developed for dealing with it," adds Nina-Sophie Fritsch.

The creators often run a channel on their own and determine the topics themselves. In general, the content that is conveyed through the videos is very strongly linked to the individual person, Buder explains. However, working according to personal preferences and turning one's personal interests into a profession does not only have advantages. "Boundaries between work and private life often dissolve," Nina-Sophie Fritsch says. "We notice this with self-employed people in general and with YouTube creators even more." This already becomes evident

in the use of space at home, she says. "People often work on their laptops in bed or their desks are right next to their beds." What other insights the team will gain remains to be seen. One thing is clear, however: "The data is extremely rich," Verwiebe says. There is a lot to do for him and his team, who want to use the results in an interdisciplinary way and internationally. The profession of the YouTuber has reached German academia.

LUISA AGROFYLAX
TRANSLATION: SUSANNE VOIGT
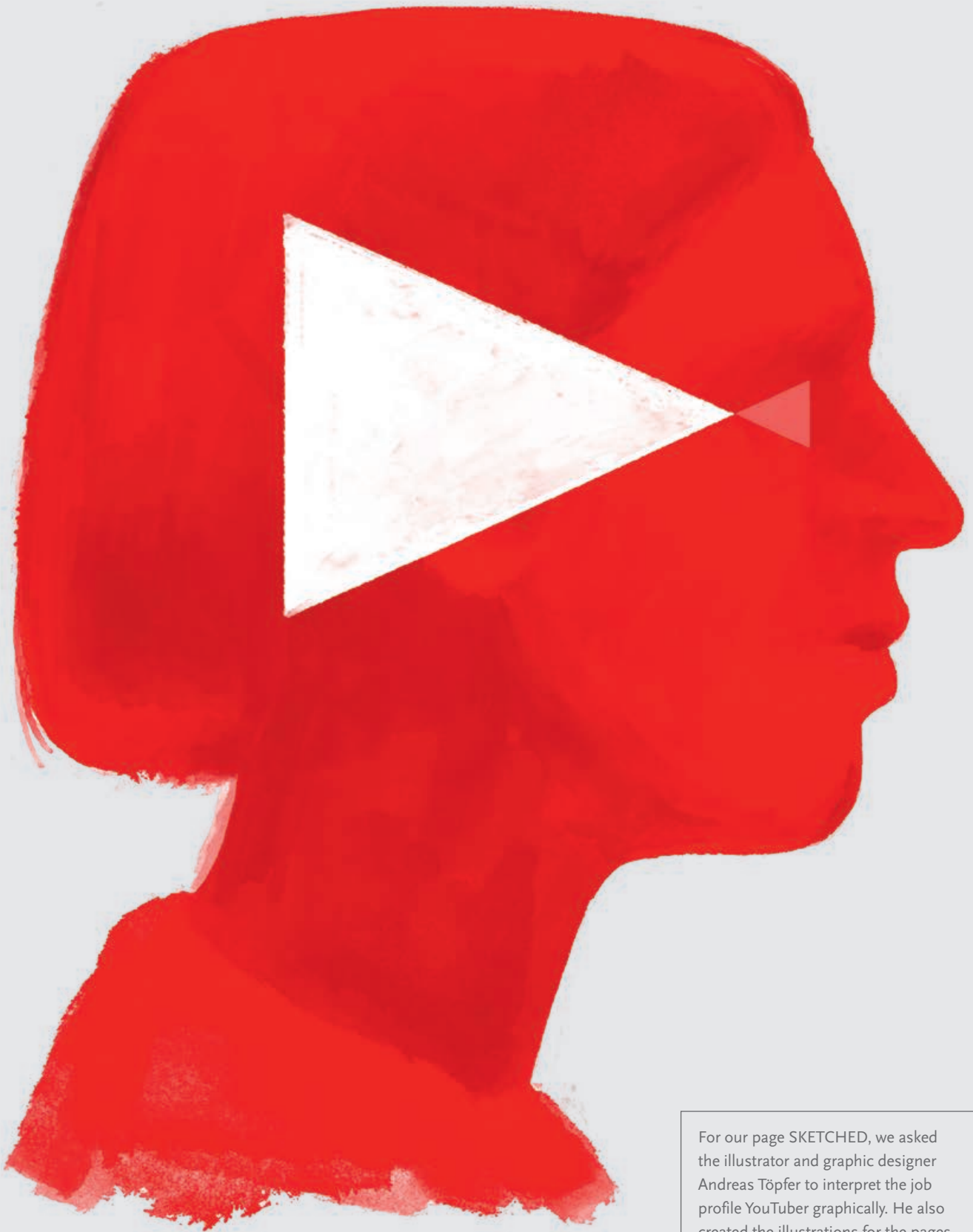
For our page SKETCHED, we asked the illustrator and graphic designer Andreas Töpfer to interpret the job profile YouTuber graphically. He also created the illustrations for the pages 4, 10, and 56.

UNDERSTANDING EXTREMES

The Research Training Group NatRiskChange developsmethods for the analysis and quantification of natural hazards and risks in a changing world

Changing conditions, such as global warming and land use, can strongly influence the occurrence of natural hazards and the risk they pose. "It is the goal of NatRiskChange (Natural Hazards and Risks in a Changing World) to develop methods that improve the analysis of the frequency, magnitude, and impact of natural hazards," says Prof. Annegret Thieken, speaker of the Research Training Group.

"A natural hazard is a physical process that negatively impacts society," says Lisa Luna, a PhD student in the second cohort of NatRiskChange, which started in 2018. Some of the PhD students are looking at the risks posed by landslides. Others are investigating the risks of floods, droughts, heavy rainfall, or earthquakes. In addition to assessing hazard, they also research the risks, that is, the possible effects and damage caused by natural events. The primary question here is vulnerability: How resilient is society to a particular hazard? "For example, how might a flood in a certain area affect the people and infrastructure there?" Luna summarizes. Her own project focuses on how to better predict landslides. "So far, I've looked at the seasonality of landslides, i.e. during which times of the year they are more or less likely to occur, and how many can be expected."

The water engineer Joaquin Vicente Ferrer, on the other hand, is interested in the anthropogenic triggers of landslides, i.e. whether changes in land use by humans result in more landslides. "It is quite conceivable that companies build a dam downstream without knowing that this can trigger a large landslide elsewhere along the river." In recent years, he already dealt with various natural disasters such as floods, typhoons, and tsunamis. "In my doctoral thesis, I am now looking at the largest landslides worldwide. These have always interested me," he says. "They have a low probability but can have devastating impacts."

Like Ferrer, Amelie Skålevåg started her doctoral studies in 2021 with the third cohort of "NatRiskChange". She is researching changes in freeze-thaw regimes in alpine regions and the effects of global warming on glacier retreat and erosion processes. "I want to know how temperature change in high mountain regions affects sediment production and influences the dynamics of the system," she says.

To this end, she has conducted fieldwork in the Tyrolean Ötztal. With the help of statistical methods, she wants to determine and analyze trends in these processes.

Very close with the help of task forces

To ensure that the PhD students in the Research Training Group work together in an interdisciplinary way and also contribute to the understanding of current damaging events, application-related task forces have been set up as an integrative part of the qualification program. "In a task force, PhD students and supervisors come together to work on a recent natural hazard that has come to their attention," Luna

THE RESEARCHERS

Prof. Dr. Annegret Thieken studied geoecology at Technische Universität Braunschweig and environmental sciences at the University of Amsterdam. Since 2011, she has been the head of the working group Geography and Disaster Risk Research at the University of Potsdam. She is the Speaker of "NatRiskChange".

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Lisa Luna studied geology at Middlebury College (USA) and geosciences at the University of Potsdam. Since 2019, she has been doing her doctorate in the Research Training Group "NatRiskChange" on improving predictions of landslides.

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Joaquin Vicente Ferrer studied water science and water technology at IHE Delft Institute for Water Education and civil engineering at the University of the Philippines Diliman. Since 2021, he has been doing his doctorate in the Research Training Group "NatRiskChange" on predictions of large landslides in a changing world.

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Amalie Skålevåg studied geoecology at the University of Potsdam and environmental modelling at University College London. Since 2021, she has been doing her doctorate in the Research Training Group "NatRiskChange" on changing water and energy conditions and their relevance for water and sediment transports in the Alpine areas.

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summarizes. "This was one of the highlights of my PhD years." Skålevåg adds, "Whoever is interested and has time can contribute. In the end, there has to be a product such as a report, a publication, or a website." PhD students are required to participate in at least one task force during their time with the research training group. In recent years, task forces were set up following the Eifel floods in Germany in summer 2021 and the 2019/20 wildfires in Australia, among other events. In a current task force, Ferrer is investigating flash floods in Italy in summer 2022. "Coming together to see what others are doing and what methods they are using gives me new insights for my own project," he explains.

Another applied research opportunity arose for Luna when she was able to contribute to an early warning system for landslides. In a joint project with the University of Oregon, her knowledge of statistical

modelling was implemented in a real-time online dashboard that estimates landslide hazard based on observed rainfall data and weather forecasts in the city of Sitka, in southeast Alaska, USA. "I really liked the applied aspect," she says. "I thought if we did our job well, we could really get better information about landslide risk in Sitka."

Strong team spirit

The PhD students agree that the most important aspect of working in the Research Training Group is the supportive network of young researchers. "The collaborative concept of NatRiskChange was a big motivation for me to do a doctorate in the first place," says Skålevåg. "We are lucky to always be able to exchange ideas with the PhD students from the first two cohorts," adds Ferrer. "This overlap made me feel less lost in my first year." Networking among the PhD students is also promoted by two- to three-day closed-session meetings held twice a year, where all projects are discussed with the supervisors. "This not only promotes team spirit but also an interdisciplinary understanding and better management of natural hazards," Prof. Thieken is convinced. The network, which was built over the past few years, is also a great asset for the future of natural hazard research worldwide. Some alumni carry the ideas and concepts of the Research Training Group into international companies or other research institutions. Among other things, the University of Potsdam's collaboration with the Indian Institute of Technology Roorkee was intensified in this way and is to be continued in future joint projects.

STEFANIE MIKULLA
TRANSLATION: SUSANNE VOIGT

Her fieldwork took PhD student Amalie Skålevåg to the Ötztal valley.

Forging New Alliances

The Research Training Group
minor cosmopolitanisms wants to
encourage dialogue

Cosmopolitans are at home everywhere; the world is their home. Neighbors, friends, like-minded people, and peers all around. A charming idea that, in contrast to nationalisms, abolishes borders and provides freedom. But does it work? Are we really all in the same boat? Are we moving forward as a global community or are we just sinking together, some faster than others? The Research Training Group (RTG) *minor cosmopolitanisms* **was launched in 2016 to investigate whether the celebrated concept of cosmopolitanism works. The research group led by Prof. Dr. Anja Schwarz and Prof. Dr. Lars Eckstein from the Potsdam Institute for English and American Studies believes: No. Genuine togetherness is based on many perspectives, many opinions, genuine exchange, and real equality. All this is lacking in the cosmopolitanism of the "old white man of Eurocentric upbringing". Instead, the researchers set out to find other, marginalized – minor – forms of cosmopolitanism and put them in the spotlight. In the meantime, the RTG has reached its second funding phase and cosmopolitanism is in a new crisis, say Schwarz and Eckstein. That is why a new approach is needed for the orientation of the RTG but also in the effort to achieve genuine cosmopolitanism.**

In fact, the cosmopolitan idea is not new. 2,500 years ago, the Greek philosopher Diogenes of Sinope already called himself a citizen (polítes) of the world (kósmos), i.e. a cosmopolitan. He was one of the first to formulate this idea but definitely not the only one. In many places around the world, concepts of global togetherness emerged over the centuries based on the recognition that others are largely equal. But they all remained limited in their prominence in one way or another. The vision of a world community only became globally influential in the course of the Enlightenment through Immanuel Kant and others. And that is precisely the problem, the researchers of the RTG *minor cosmopolitanisms* stress. "The cosmopolitan ideal contains the big promise of universal rights for all people," says Anja Schwarz. However, in reality these rights mainly applied to Europeans, white people, men. "People from many regions, with certain origins or genders were left out." The RTG wanted to show that these people also live, produce, and communicate cosmopolitanism, albeit in niches, regionally or simply less prominently. In their research projects, the PhD students uncovered such often-buried evidence – in history, politics, culture, and science. Irene Hilden, for example, searched for the buried voices of imprisoned colonial soldiers from World War I in a prison

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THE PROJECT

Research Training Group *minor cosmopolitanisms*

Funding: German Research Foundation (DFG)
Duration: 2016–2025
Participating institutions: University of Potsdam (lead), Freie Universität Berlin, Humboldt-Universität zu Berlin

camp near Berlin in the sound archive of Humboldt University. Anouk Madörin investigated films made by refugees on their way to Europe with their mobile phones. How do they experience flight and the European border regime? What images do they use for their cinematic self-documentation?

From criticism to alternative

The intention to focus on *minor cosmopolitanisms* was to achieve two things: On the one hand, to break up the monolithic portrait of the enlightened cosmopolitan and replace it with a kaleidoscope of practices. On the other hand, also to reveal the fraught history of the cosmopolitan idea. "At the turn of the millennium, cosmopolitanism was very much in vogue, especially in philosophy and sociology. But what was largely missing was a postcolonial perspective," Eckstein explains. "In 2016, we wanted to show that the common ideal predominantly assumes and repeatedly reproduces a Western European tradition of knowledge that is intimately entangled with colonialism and imperial capitalism." The goal was therefore not only an alternative concept to the illusion of an ideal world community but also fundamental criticism of the Enlightenment and its Eurocentric heritage.

Six years later, the world has changed. "All kinds of ethnic nationalisms are on the rise," Schwarz says. "New walls are being erected and old borders are militarized across the fault lines of poverty, race, citizenship, and religion. The cosmopolitan idea is under attack." Against this backdrop, the RTG is also redefining its goals – with its third generation of researchers. "In a world where it has become almost radical again to be a cosmopolitan in the sense of the Enlightenment, there is a greater need for critical alliances against the attacks from the right than for fundamental criticism," Eckstein adds. But can the ideal of a world community be saved and critically questioned at the same time? How can people work together if they have the same goal but have grown up with opposing values? Can different cosmopolitan ideals be brought into dialogue with each other?

Together instead of alone

The PhD students trace different traditions in different discursive fields and look for existing or potential contact points. Like Mohammad Dalla, who is investigating how identity politics work when they are linked to sexual orientation and gender identity (SOGI). "I use case studies of asylum applications to examine how the identities of SOGI applicants are constructed within and perceived by the asylum system. In doing so, I also look at what effects this process has both inside and outside the asylum procedure," he says. "I am also exploring alternative forms of resistance to the political and epistemic interventions of the West through which body, gender and sexuality are defined and governed. Ideally, this will allow me to show what solidarity with sexual and gender minorities can look like outside the Global North."

THE RESEARCHERS

Isadora Cardoso studied political science at the University of Brasilia as well as globalization and development studies at Maastricht University. Since 2022, they have been a PhD student in the Research Training Group *minor cosmopolitanisms*.

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Mohammad Dalla studied English literature and culture at the Damascus University and cultural sciences at the University of Potsdam. Since 2022, he has been a doctoral researcher in the Research Training Group *minor cosmopolitanisms*.

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In the coming years, a special focus will be on the ecological crisis, which has recently come to the fore with vehemence all over the world. Isadora Cardoso, for example, is doing a doctorate at Freie Universität and the RTG, and looks at initiatives fighting for climate protection in the Global South. "I focus on the often-marginalized voices and stories of queer, BIPoC and youth groups from the Global South that have historically been relegated to the sidelines of politics, including the fight for climate justice, and today often function only as an alibi." The protest of Greta Thunberg and the "Fridays for Future" movement, which was accompanied by the media worldwide, has certainly achieved a lot. "But it is characterized by a Western-privileged perspective and ignores the connections between the climate crisis and (neo-)colonialism," Cardoso says. This is a limitation that they want to break down. "In field studies, I will investigate discourses and practices of groups that approach climate justice from different contexts and positions." Only then can climate protection also become climate justice. The goal is not to fight against each other, but with each other. And without blind spots. It is not without reason that Cardoso's project is called "One struggle one fight".

Criticism connects

"That doesn't mean that we are less critical," Schwarz comments. "But being of a different opinion does not mean that you cannot pursue the same goal." The exchange with other traditions enriches the discourse and can change one's own position. "For this, we have to listen to and also learn to understand each other." Enabling dialogue and forging alliances is not only the declared goal of the RTG but also its method. "We insist on intensive exchange of all kinds," Eckstein says. In lecture series, a summer school and the research lab, the PhD students come together in conversation, regardless of whether they are working on identity politics or climate protection. In addition, all of them spend an extended period at one of the cooperating universities and research institutions – ideally close to their topics. Like Isadora Cardoso, who wants to look at various initiatives locally. Incidentally, the RTG is also an invitation to a change of perspective and dialogue with regard to the academic world itself, Schwarz and Eckstein emphasize. "We believe that the university must constantly reflect on and expand the processes through which it produces knowledge," Eckstein says. "To do this, we bring together as many different academic traditions as possible," Schwarz adds. And not only these. Among the PhD students there are quite a few who are not only researchers but also artists or activists. Isadora Cardoso, for example, calls themselves a queer-feminist climate activist and researcher, Mohammad Dalla is not only a cultural scientist, but was also active in the Lesbian and Gay Association (LSVD) Berlin-Brandenburg and the Gunda Werner Institute of the Heinrich Böll Foundation for Feminism and Gender Democracy. "The Research Training Group can be a kind of machine that carries change into the academic system," Schwarz hopes.

MATTHIAS ZIMMERMANN
TRANSLATION: SUSANNE VOIGT

THE RESEARCHERS

Prof. Dr. Lars Eckstein studied English, German, and Sports Science in Tübingen and the USA. Since 2009, he has been Professor of Anglophone Literatures and Cultures outside of Great Britain and the U.S. at the University of Potsdam.

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Prof. Dr. Anja Schwarz studied cultural studies and did her doctorate in postcolonial studies. Since 2010, she has been Professor of British Cultural Studies at the University of Potsdam.

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Photos: Tobias Hopfgarten (2)

ALWAYS ON THE
MOVE

Legal scholar Susanne Hähnchen wants to
give people a better understanding of law
and its history beyond the ivory tower

Susanne Hähnchen has been fascinated by the history of law ever since she was a student – not only because she is interested in the legal systems of antiquity, the Middle Ages, and the last century, but also because it allows her, in a way, to look into the future. How does law come into being and how does it develop? What significance did and do jurists have in a society? How can universities train skilled professionals in the future? These are the questions that concern the scientist, who has been Professor of Civil Law and History of Law at the University of Potsdam since 2020. For Hähnchen, the focus is on the individual: in the training of young jurists as well as in research or in advising people with legal problems. From the University of Bielefeld, where she was a professor before, she brought several projects with her. And these bring a breath of fresh air into the often seemingly dusty subject.

Prof. Hähnchen also came to Potsdam because she no longer wanted to commute to East Westphalia. Born in East Berlin, the law graduate has lived in the northeast of Brandenburg for a long time. At the same time, Brandenburg's capital offers her the chance to deal with other chapters of the past. "Potsdam is a place rich in history, whether that is Prussian legal history or that of the GDR." After all, her office is located in a building that was constructed under National Socialism and was later home to the Academy of State and Law. "I was born in the GDR. Because it was so personal, I hesitated for a long time to deal with its legal system. But the longer I'm here, the more interested I become and I notice that the students feel the same way."

Legal studies as a preparation for life

Prof. Hähnchen's courses in the basic module on legal history are well attended anyway. She believes that stu-

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THE PROJECTS

✎ www.recht-kinderleicht.de
✎ www.rechtskunde-online.de
✎ www.legal-up.de

dents learn to understand the current law better if they know its origins and background. "Similar problems have existed at all times, but they were or are possibly differently solved," Hähnchen explains. In her view, law and rule are closely connected. "It is written in the law, therefore it must be like this – a widespread view. However, law is not something God-given that you can't change, it's always in motion."

Hähnchen did her doctorate and habilitation at Freie Universität Berlin and, starting in 2010, she was a professor in Bielefeld. There, she founded a legal advice service with students, which still exists. Later, Caritas approached her to support setting up another service for people who are mentally or socially in need. "I love thinking deep legal entanglements through, but you shouldn't lose touch with everyday life either," she says. That's why she and her colleagues also wrote a legal encyclopedia for the Federal Agency for Civic Education: "Many wouldn't do that at all because it's not noble science. But teaching the law is important, I learned that from my doctoral supervisor Uwe Wesel."

"Recht kinderleicht" (foolproof law) and "Rechts-kunde-Online" (legal studies online) are two other projects that have emerged from this aspiration. Why is graffiti criminal property damage? Do animals have rights? And is making a present a deal and taking it back a steal? The legal scholar and her team answer such questions for children online in easy-to-understand language. "I'm interested in children's questions: why, wherefore, and for which reason?", she explains. At "Rechtskunde-Online", teachers and learners can find teaching materials, for example on the Federal Supreme Court, euthanasia, or juvenile criminal law. "In most federal states, legal studies is now a subject for the German Abitur, but there is hardly any teaching material for it," says Mohamad Soliman, who, together with Fabienne Paasch,

works as a research assistant at the chair. That's why Prof. Hähnchen and her team also want to integrate legal studies into teacher training and work together with the Centre for Teacher Training and Education Research at the University of Potsdam. "I think it is a subject whose fundamentals should be taught to everyone," Hähnchen says. "Sooner or later, everyone is confronted with it: whether it's about the subtenancy agreement, a divorce, or a will. It belongs in school as a preparation for life." It can also give students at school a clearer idea of what they want to study before they enroll in it. "We have a terribly high dropout rate," she says. "That worries me a lot. Many students start with idealistic expectations and then drop out because their expectations are not fulfilled in their studies. Others struggle through and hate what they do. Overall, we would waste fewer resources if we gave young people a clearer picture of what to expect beforehand." This is why Prof. Hähnchen thinks the Bachelor of Laws, which now exists, makes a lot of sense. "It was always said that there was no job market for people with this degree. But there is definitely interest in public administration, insurance companies, and increasingly also in law firms."

"Everyone needs legal advice at some point"

For Hähnchen, law is an application-oriented subject. That's why it's important to her that students gain practical experience before their legal traineeship. This is also why she founded "Legal-UP" at the University of Potsdam in the summer semester 2022. "Everyone needs legal advice at some point," says graduate assistant Paasch. "But students in particular often can't afford it. With us, it's free of charge." The student legal advice team doesn't lack cases: Within half a year, they have already received 150 enquiries. "Most of them are looking for advice on problems relating to family law," Soliman says. Who has custody of a child and what about alimony? Next are contracts, for example with the rental company or a gym. Disputes among neighbors are also common: What should I do, for example, if the leaves from the tree on the property next door end up on mine? "We also recently had an

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THE RESEARCHER

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Photo: Kevin Ryl

Mohamad Soliman

Fabienne Paasch

interesting case regarding an Amazon documentary about the rapper Bushido, where a waiter contacted us who was featured in the film without having received a fee or given his consent."

Not only students and employees, but also people outside the university seek advice at the counselling center. "The word must have spread on what we offer," says Paasch. And that is also the intention. "Although university members are our primary target group, we would like to also address the city's people," Hähnchen says. "At the same time, this service is an important aspect of legal education." The students get the opportunity to perform legal counselling as a key qualification in their law studies. Paasch and Soliman give an introductory seminar on this. There, the participants get together in teams of two and are given a selected case. During a first meeting, the people concerned explain the problem to them. Then they work out the solution and present it to a lawyer. "Currently, nine lawyers support the students and guarantee that something good comes out of it," Paasch says. During the second appointment, they present the solution to the respective people. "It is not always ideal," Hähnchen reports. But that is also an important experience. "Presenting an unpleasant outcome to a client is an important skill that is insufficiently addressed in law school."

"Digitalization is applied legal history"

"The whole system is based on the voluntary work of lawyers," Soliman says. "Without them, we wouldn't be able to manage it at all." To win these for the project, they not only used existing contacts but also wrote to law firms, Paasch says. 20 students are already on board who want to volunteer long-term. "Many tell us that they recharge their batteries when they help people," Soliman says. "Because the studies

are quite hard. And here you finally see faces." They often develop sympathy and desperately want to help even if it is no longer possible. As with the client who had been suffering from a medical error for a long time and whom the students had to inform that he unfortunately was seeking legal advice 20 years too late. "In abstract cases they only give an expert opinion, but here they have to deal with emotional situations," Paasch explains. In addition, the students learn to establish facts and explain them to the clients. "After all, they are dealing with normal people. The majority of lawyers are let loose on the public and have not learned to express themselves in an understandable way," Hähnchen says. "I want to get more flexibility into their heads and get the students not only to learn a rule and its application but to think about their own actions – about what the law means to people."

Soliman and Paasch compile an electronic file for each case. "We want to be able to accompany everything digitally," Paasch says. That is far from a matter of course in legal practice. Digitalization is generally a major concern for the team. "We legal practitioners are not tech-savvy and also otherwise very conservative," Hähnchen says and laughs. She already published a book on the digitalization of law in 2007, which was met with little interest at the time. "For me, digitalization is applied legal history: We will not be able to prevent it." She repeatedly asks herself to what extent legal work can be digitized. One building block for this, she says, is legal technology – legal services that can be used online. The team plans to prepare legal advice cases for a legal tech application. "For standard cases, for example, to reclaim fees from a gym, people could enter all the information themselves into a website mask and receive initial help via an automated procedure," Soliman explains. A project for which Prof. Hähnchen would like to see permanent support. After all, the expert in legal history knows how important it is to lead the law into the future – and to shape it in such a way that it serves the people.

DR. JANA SCHOLZ
TRANSLATION: SUSANNE VOIGT
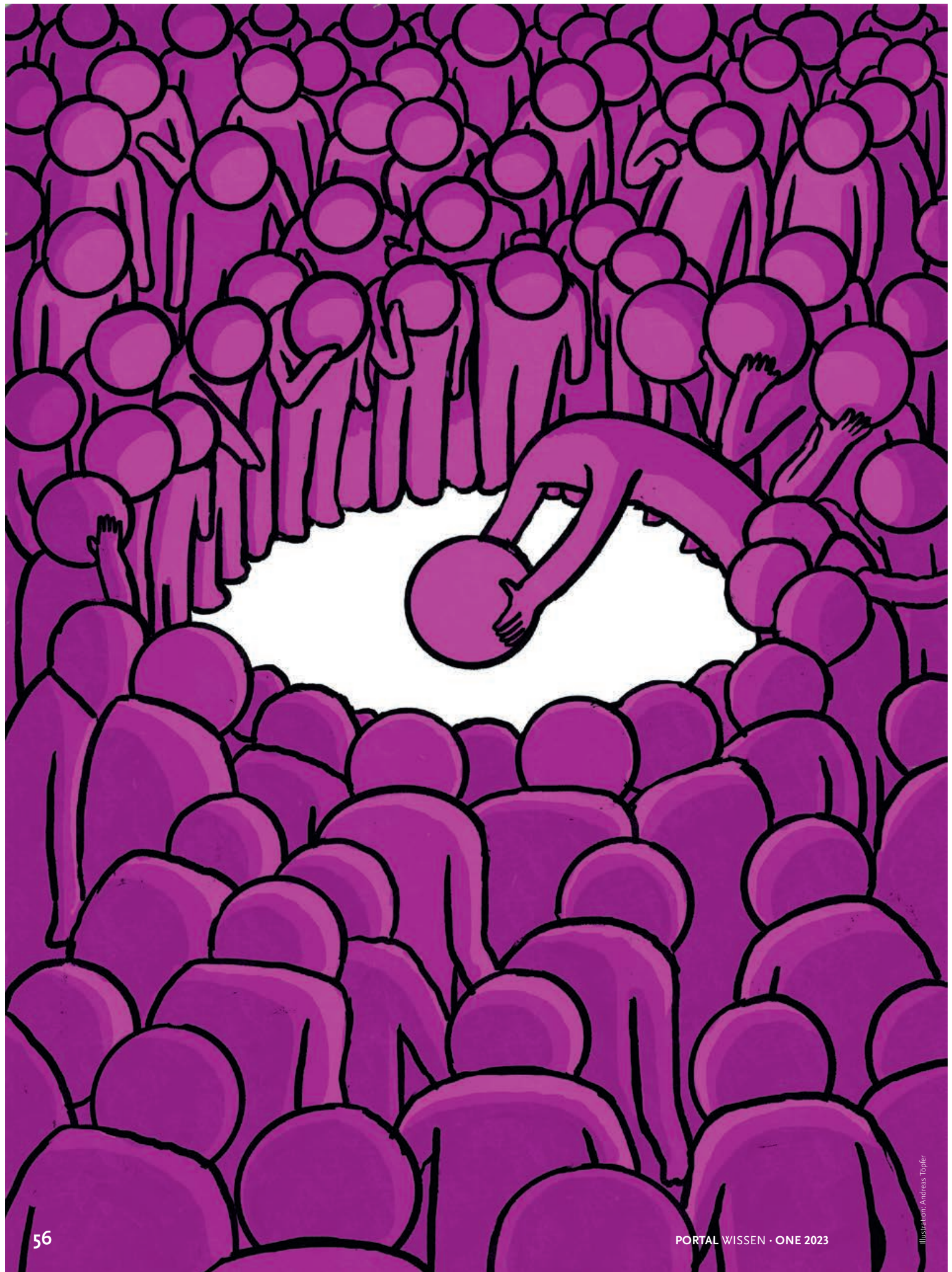
I AM OF THE OPINION THEREFORE I AM?!

Eric-John Russell Researches the Philosophy of Opinion

It's good when people agree on something instead of arguing all the time, isn't it? Otherwise, of course, everyone is allowed to have their own opinion. After all, opinions are a private matter. And as such, they are only of interest to the curious. Certainly not to researchers who – because of their profession – look for things that we can know for sure. Not so Eric-John Russell. As a Marie Skłodowska-Curie Fellow, he conducts research on the role opinions play in our society. And says, "Opinions are experiencing a dangerous boom."

Hegel and Marx, idealism and materialism – Russell has so far researched various notable philosophers of modern times. He became interested in opinions and their meaning after Donald Trump was elected 45th President of the United States. For the avowedly self-made president, his Twitter account with nearly 90 million followers was enough to initiate or direct political debates at will. Not reports, committees, and lengthy deliberations but short messages of 140 characters marked his politics. And not only his. "Opinions are on the rise," Russell says. "For many people, they form the basis of what they know about the world. Opinions, in fact, 'possess' an astonishing certainty – and a seemingly close relationship to the concept of truth." The best example, he says, is the discourse surrounding developments in the Corona pandemic. New messages, new information, and new opinions every day. "Suddenly, everyone became an expert overnight, primarily on the basis of opinions." What's special about this new power of opinion is that it holds its ground even when scientific evidence contradicts it, the philosopher explains. "It has a tremendous inalienability. When push comes to shove, people say, "This is my opinion. You have yours."

Opinion vs. knowledge?

Russell wants to examine this seemingly unstoppable boom more closely. His goal is nothing less than a philosophy of opinion. What constitutes it? How can it be distinguished from other forms of thought such as faith or worldview? What are the peculiarities of opinion as a form of communication? What role does it play in our society? And how has it changed in the course of history? After all, (personal) opinion has not always been the ultimate means of self-discovery or self-assertion. One of the first to assign opinion a place in the house of knowledge was the Greek philosopher Plato. In his "Republic", he contrasted opinion (doxa) with knowledge (episteme), although only the latter enables us to act wisely. Over the centuries, changing sources assumed the task of feeding this knowledge: first the mind, then various religions, and then reason again. Opinion was usually left to sulk in the corner of, by and large, worthlessness.

THE RESEARCHER

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opinion that he knows something.," wrote the French philosopher Montaigne in the 16th century. His English colleague Thomas Hobbes followed suit some 100 years later, He wrote that an opinion considered something said to be true, though it sometimes consisted of absurd words that meant nothing and were impossible to understand. Nonetheless, he knew of its influence. "The world is governed by opinion." 200 years later, the Enlightenment philosopher Immanuel Kant enlightened us about its meaning as well. "Opinion is a belief that is conscious of being both subjectively and objectively deficient." He considered it deficient but tolerable if it acknowledged its own limitations.

Russell begins his philosophical fieldwork a little later: with the heydays of "public opinion". Starting with classical political theory, he wants to trace the change of opinion first in the 18th and 19th century and then in the early 20th century in order to analyze, in a third step, the current boom of opinion and its peculiarities. In the 18th and 19th century, public spaces emerged in many societies where personal ideas and views were expressed, exchanged, and discussed. In English "coffee houses" and French "salons," a public opinion emerged from many opinions. The process of its formation became part of the evolving modern democracy. "The contradiction that constitutes every opinion was already inherent in the concept of that time: The basis of public opinion is not knowledge, but a multitude of opinions, which, in the worst case,

can also produce a multitude of untruths." Russell has long worked on the German philosopher Georg Wilhelm Friedrich Hegel. That continues to have an effect, he says, laughing. "Hegel would say that public opinion should be respected and at the same time despised. After all, even the will of the people behind it already contains irresolvable contradictions."

Illusion of security

In the course of the 19th and 20th century, however, these spheres, in which public opinion was gradually formed, disappeared, Russell says. What remained, was the – highly personal – opinion, which, at the beginning of the 21st century, equipped with the megaphone of social media, sounds the charge . "Opinions promise a certainty that we thought was lost, and we can draw them entirely from within ourselves," the philosopher explains. "When the world around us becomes increasingly uncertain, disasters chase one another, and one day seems worse than the next, it's quite understandable that people turn inward and trust only their opinions." But this step is tantamount to a task, the researcher is sure. "Opinions are judgments about the world that we make when we have stopped looking at it."

Russell himself sees no reason to do so and has already been around a lot. After studying philosophy in New York, the U.S. native went to Frankfurt in 2012 to get a closer look at the famous Frankfurt School and study critical theory. He then moved to London for six years to complete his doctorate. Since early 2022, he has been back in Germany as a Marie Skłodowska Curie Fellow working with Thomas Khurana, Professor of Philosophical Anthropology and Philosophy of Mind. But what could a critical theory of opinion actually do? "It could show that the security offered by the primacy of one's opinion is deceptive," he says. "Because opinions about the world are judgments about it without reference to reality. As uncertain as it may be, we should not close our eyes to it."

MATTHIAS ZIMMERMANN
TRANSLATION: SUSANNE VOIGT

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