No. 115/2023

HUMBOLDT KOSMOS

Research – Diplomacy – Internationality

STRICTLY CENSORED
How autocrats control the internet

HIGH MARKS
Study on Germany as a research location

Deutsche Version: bitte wenden

What's next?

The Humboldt Foundation looks ahead – to the tasks awaiting the Foundation and its research network.

Alexander von HUMBOLDT STIFTUNG

WHICH MOVE WILL WIN THE ELECTION?
Abeer Kapoor playing his political game The Poll

LEARNING BY PLAYING

In the photo you can see me with my game The Poll. Really, I'm a journalist. But for a number of years, I've been developing games. In The Poll you slip into the role of a politician and learn how the electoral system in India works, how you find political solutions to an issue, negotiate compromises and, finally, win majorities. Another example is the smartphone game Farsi, which is about differentiating between rumours and fake news on the one hand and real news on the other.

What really matters to me is the lessons you learn when you're playing, about how our society functions, for example, or how to eat healthily, which is the point of another game I invented. Whereby, I still think like a journalist: find the truth, talk to people, argue. All my games have news built into them.

As a journalist, when you travel around a country like India, it really exposes you to a lot of problems and you write about them. But articles in a newspaper are unidirectional. You can't ask a newspaper to give you back answers. But in a game, you can grapple with a topic, communicate with one another.

With our nutrition game and our fake news quiz Farsi, we visit schools and colleges in India. So far, we have reached about 80,000 players. The games are really popular. We sold over 500 copies of the board game The Poll in a matter of six months. But you're not going to make money with games that train your civic muscle. Like Germany, India is in the hands of large, often American, firms that dominate the market.

At the moment, I'm a German Chancellor Fellow in the Cologne Game Lab at TH Köln. When I play with Germans, I notice how important it is to them to follow the rules of the game and that they talk about them a lot. That's why games often last much longer than they do in India. The Indian mind appreciates chaos. But a game like The Poll can be exported to Germany, you need little tweaks here and there to accommodate political differences, but democracy is something that has been exported the world over.

Personally, I really like strategy games like the board game Splendor, where you become a gem merchant, or Polytopia, which you play on your smartphone. It's about building cities and waging war on other tribes. And I love detective stories. My Master's thesis was on colonial detective fiction. When I came to Bonn, the first thing that hit me was the stillness. What a contradiction to the hecticness of New Delhi. A murder in this quiet town and a police officer from India investigating. That would be a thrilling story. ● *Recorded by* **GEORG SCHOLL**

ABEER KAPOOR has been a German Chancellor Fellow in the Cologne Game Lab at TH Köln since 2022. Trained as a journalist, he previously worked for various Indian newspapers and, most recently, for the SMART Civic Games Lab in South Delhi, India.

Photo: private

Photo: Henning Mack

Dear readers,

This year, the Humboldt Foundation is celebrating its 70th anniversary. On such occasions people are fond of looking back. We want to grasp the opportunity, above all, to look forward, which is why the title of this edition is "What's next?" – the question all researchers ask themselves again and again.

What discovery will the next experiment bring? What secret is contained in this new find? What insights are hidden in that apparently unsolvable problem and how does today's supposedly useless knowledge become tomorrow's groundbreaking application? We asked members of our worldwide network what they consider to be the most important tasks facing us in the future and what problems they want to solve next.

"What's next?" is also a question for our new president, the chemist and energy expert Robert Schlögl. In the interview, he talks about his plans for the Foundation's future.

But we do allow ourselves a bit of retrospection when we seek to explore the formula for success that has evolved during these 70 years of the Humboldt Foundation and to discover what the Foundation has in common with Coca-Cola.

The question "What's next?" also refers to me personally. After 30 editions of Humboldt Kosmos as editor-in-chief, I should like to take this opportunity to bid farewell to you and the Foundation. I look forward to continuing my association with the Humboldt Network. It has been a pleasure.

GEORG SCHOLL

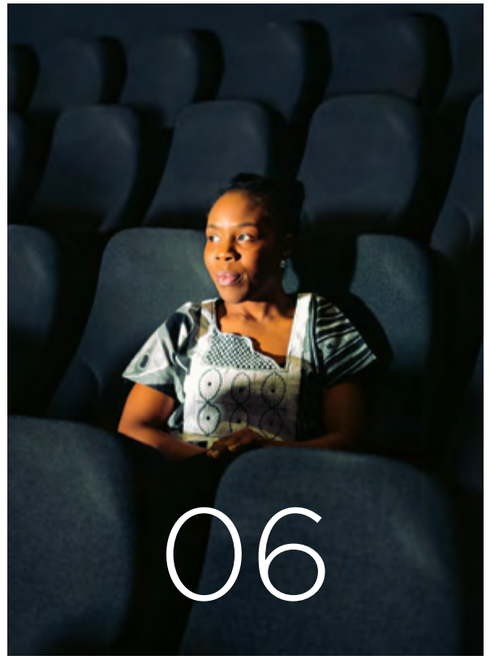

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Photo: Humboldt Foundation/David Spaeth

WHY SHOULD WE INDULGE IN IDLENESS MORE OFTEN, MR MURAYAMA?

Don't always grab your phone when you're waiting for a bus. Instead, just sit there and let your thoughts run free. This kind of activity – or inactivity – is completely underrated nowadays, says psychologist Kou Murayama.

In fact, most people are afraid of being bored if they have nothing particular to do, says Murayama, who conducts experiments to study inactivity: for example, he got participants to sit in a dark, empty room for 20 minutes with no way of amusing themselves. They were asked what they expected from the quiet time ahead and then had to evaluate it afterwards. "Most of them feared that it would be unpleasant but were surprised that they didn't find it so bad after all," says the researcher. They had had time, for instance, to think about the things they still had to do that day.

In another experiment he gave the participants the choice of spending the quiet time doing nothing or surfing the Internet. Most chose the Internet. But in the subsequent evaluations there were no differences between the two groups. Murayama concludes that we underestimate the joys of inactivity and thus avoid it. But this means we also miss out on its benefits, such as thinking up creative solutions to tasks or really relaxing. "People who let their minds wander now and again often make better decisions in life," says Murayama. ●

Text **JAN BERNDORFF**

The Japanese psychologist **PROFESSOR DR KOU MURAYAMA** investigates human motivation. In April 2021, he relocated from the University of Reading, UK, to the University of Tübingen to take up an Alexander von Humboldt Professorship.

HOW ARE YOU IMPROVING GENETIC SCISSORS, MS MADARIAGA MARCOS?

Photo: Humboldt Foundation/Marco Warmuth

You're banned! With the help of CRISPR/Cas systems, bacteria protect their genome from mutations or destruction caused by pathogens. Biotechnology has adopted the mechanism of the bacterial defence system – also known as genetic scissors – using it to specifically modify the genome by deleting or inserting certain DNA sequences.

The Spanish physicist Julene Madariaga Marcos is searching for ways of making genetic scissors even more reliable. "One of the problems with genetic scissors is off-targeting," she explains. "They also cut through DNA that is similar, but not identical, to the actual target sequence." This can have serious side-effects – through to genes losing their functionality. To ensure that tomorrow's genetic scissors work more precisely, Madariaga Marcos has developed a nano sensor to trace what happens when off-targeting occurs at a molecular level. "The sensor helps us to investigate the mechanisms CRISPR/Cas systems use to dock onto DNA sequences from a biophysical perspective." To this end the researchers purposely expose CRISPR/Cas to DNA sequences to which the genetic scissors are not supposed to respond. "Ideally, our research will help us to understand how we can seriously reduce the side-effects of the technology or even remove them altogether. This would take us a step closer to being able to treat genetic diseases." ●

Text **NORA LESSING**

DR JULENE MADARIAGA MARCOS was a Humboldt Research Fellow at the Peter Debye Institute for Soft Matter Physics at Leipzig University until the end of January 2023.

HOW PRECISELY CAN SUPERCOMPUTERS FORECAST HEAVY RAINFALL, MR STEVENS?

Photo: Humboldt Foundation/Frank Siemers

Using computer simulations, researchers can both predict the climate in the coming decades as well as produce short-term weather forecasts for specific regions. But so far, they are not as precise as they might be. In order to calculate the complex processes in the atmosphere and identify local extreme weather events such as heavy rain at an early stage, enormous computing capacity is required. New supercomputers could provide it. The atmospheric physicist Bjorn Stevens is working on it.

In 2022 at his institute in Hamburg, for instance, "Levante" went into operation. The supercomputer can handle 14 quadrillion operations per second. "It will enable us to do long-term simulations with climate models with a grid resolution of three kilometres, for example," says Stevens. The researcher is modifying Levante's code so that simulations run at their optimum. Up to now, global simulations based on models with such fine grids could only be achieved for up to a few months. Levante, however, will make them calculable for several years.

But if you want to understand how heavy rainfall will change with global warming, for example, you need computers that are hundreds of times more powerful than Levante. Stevens and some of his colleagues are calling on climate computing centres internationally to join forces in order to get access to this new generation of supercomputers. In 2024, a machine of this kind is scheduled to go into operation at Forschungszentrum Jülich. ●

Text **JAN BERNDORFF**

In 1998, **PROFESSOR DR BJORN STEVENS** was a Humboldt Research Fellow at the Max Planck Institute for Meteorology in Hamburg where he is now the managing director.

HOW CAN YOU TREAT DANGEROUS CO-INFECTIONS, MR ELMOWAFY?

Photo: Humboldt Foundation / David Spaeth

It is one of the complications of operations like organ or stem cell transplantations that everyone dreads: a simultaneous infection by various pathogens, such as bacteria, viruses and fungi, known as a "co-infection". A patient's weakened immune system is often unable to fight back.

Mohammed Elmowafy, however, is working on a new counter strategy. His research focuses on bacterial infections that are followed by a fungal infection. "We have all sorts of antibiotics for bacteria, which usually work well, but if a fungus then comes along, which the patient normally catches from someone else, the list of possible countermeasures is short – because there are only very few effective antimycotics, i.e., drugs to treat fungal infections."

Elmowafy is investigating how the bacteria interact with the fungi in this kind of co-infection and how they jointly affect the immune system. His approach is to stop the fungus with so-called monoclonal antibodies. They are grown from a specific cell line, dock onto the protein receptors on the surface of the fungus and thus deactivate their function and the fungal proliferation.

In his research, Elmowafy compares how the immune response develops with and without such treatment. "If initial successes are confirmed," he says, "this would mean, for example, new ways of treating Covid-19 patients who catch a fungal infection in intensive care." ●

Text **JAN BERNDORFF**

The immunologist **DR MOHAMMED ELMOWAFY** of Mansoura University in Egypt is currently a Humboldt Research Fellow in the Institute for Virology and Immunobiology at the University of Würzburg.

DO FILMS CREATE OPPORTUNITIES, MS EZEPUE?

Photo: Humboldt Foundation / Jann Höfer

Up to now, most of the films made on the continent of Africa have been low-budget filmed entertainment. But now, investors and streaming services are opening up the market in African films to an international audience. The Nigerian film scholar Ezinne Ezepue sees this as a great opportunity. Through her research, she wants to help develop high-quality African stories and more differentiated images of Africa.

"Whether in films, books, in national or international media – so far, Africa has usually been presented as exotic, poor and sick," says Ezepue. "Presentations like this prevent Africans from dreaming, curb their ambitions." The researcher is convinced that more ambitious films could help to fight clichés and paint a more differentiated picture of Africa. At the ifs Internationale Filmschule Köln, Ezepue is therefore currently working on ways in which African myths, stories and folktales could enhance contemporary African films.

In her quest to achieve her goal, the researcher is evaluating, amongst others, films, literary texts and interviews with historians. She wants to present the results to students of film in Nigeria. Her research aims to generate ideas for telling more ambitious African stories that are able to captivate an international audience. "What I want to do is change the image of Africa whilst contributing to economic growth in the region." ●

Text **NORA LESSING**

Since August 2022, **DR EZINNE EZEPUE** has been a Georg Forster Research Fellow, conducting research on African storytelling at the ifs Internationale Filmschule Köln.

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THE SECRET FORMULA

Seventy years – between tradition and innovation.
Or why the Humboldt Foundation is like Coca-Cola.

Text **GEORG SCHOLL**

There are not many international brands that have retained their essence for the last 70 years. Market conditions change ever faster and more radically. Disruption reshuffles the deck. Firms that are not quick enough to respond to technological change disappear, which is why former market leaders like the film manufacturer Kodak are history. Or, like the Finnish tech producer Nokia, they become insignificant in what was their specialist field. Even today's powerful tech giants like Meta (formerly Facebook) or Alphabet (Google) are wondering how long their business model will last given the way AI is transforming the online world.

If you were looking to compare the Alexander von Humboldt Foundation with a brand, you might hit on Coca-Cola. The American concern has been successfully marketing its soft drink around the world for decades. Sometimes with sugar and caffeine, sometimes without, but effectively unchanged according to the same secret formula allegedly hidden away in a safe.

Just like the soft drink giant, the Foundation has not fundamentally altered its portfolio since it was established in 1953: it grants fellowships and awards to talented junior researchers as well as to top scientists and scholars from all over the world who come to Germany to work and become part of a world-spanning research network on the strength of this sponsorship.

What is it that makes this portfolio so successful to this day? Does the Foundation have a well-kept secret formula of its own?

There is nothing very secret about the first part of the winning formula. It is the Foundation's adaptability and willingness to drive change (see the timeline): from inventing the culture of welcome via introducing the multi-million Alexander von Humboldt Professorship for the strategic internationalisation of German universities through to the safeguarding programmes for researchers at risk or peer circle reviewing, which is set to take the pressure off the review system.

The second part of the Humboldt winning formula, on the other hand, includes ingredients that are unique in their composition and have indeed remained unchanged for the last 70 years. Unlike most research funders, the Foundation does not sponsor projects, but people. And it does so on a permanent basis, usually for the researcher's entire working life. It extends trust and independence irrespective of discipline or nationality and fosters a network in more than 140 countries. In doing so, it regards research as a means of international understanding and diplomacy.

Recently, however, the concept of (re-) establishing relations through dialogue has come under criticism. Does Russia's war with Ukraine, do system conflicts with countries like China and the trend towards deglobalisation herald the kind of disruption that could fundamentally alter cross-border research collaboration and thus the Humboldt Foundation's very formula for success?

The Foundation is responding by honing its tools to ensure fair cooperation with regard to data protection and intellectual property and to rule out cases of dual use, that is, the military use of research results. But it is not changing its basic formula. It will continue to focus on international exchange and the freedom of science.

The continuing high demand for Humboldt Fellowships, the kudos, the positive effect on academic productivity and cross-border networking evidenced in evaluations and, last but not least, the positive feedback from sponsorship recipients themselves all confirm the effectiveness and attractiveness of the formula. Trust, independence and diverse perspectives fuel academic performance and creativity. Both are urgently required if we are to meet the cross-border challenges inherent in climate change, ageing societies, pandemics and the societal impact of new technologies like artificial intelligence. The Humboldt brand is still needed. ●

Photo: Getty Images

70 YEARS ALEXANDER VON HUMBOLDT FOUNDATION

1953 **Mission: to build trust** During the first year in operation, 78 fellows come to Germany. The Secretary General welcomes every one of them with a handshake. Germany's image is still dominated by the Second World War and the Nazi period; the Foundation's principal task is to build trust. Physicist Werner Heisenberg is the first President of the Foundation, one of several Nobel Laureates to hold this office.

1959 **First cracks in the Iron Curtain** In 1959, the Foundation welcomes its first two fellows from the Eastern Block – one from Poland and one from Hungary. A diplomatic coup: freedom of travel is unheard of, and a research stay with the enemy in the West the absolute exception.

1972 **BMWs for the brightest minds from the United States** Initially only intended for natural scientists from the US, the Humboldt Research Award is introduced in 1972. For the first time, the Foundation is also able to reach experienced researchers. In the early days, the award is valued at DM 6,000 plus special conditions when buying a BMW – a perk enthusiastically embraced by around one in three award winners.

1981 **Regulars in the President's garden** Beginning in 1955 and continuing to the present day, the Federal President hosts a reception every year for current Humboldtians in the grounds of the official presidential residence as part of the Foundation's annual meeting. By 1981, the originally modest attendance figures grow to over a thousand Humboldtians with kith and kin.

1996 **Development policy on the agenda** In 1996, the Georg Forster Fellowship is established specifically to meet the needs of developing countries. It is designed to assist in the reciprocal transfer of methods and knowledge.

2002 **The culture of welcome is invented** The Foundation begins its campaign to establish a culture of welcome in Germany in 2002 by holding a competition to find the Friendliest Immigration Office. Researchers from abroad should be made to feel at home and welcome. Other initiatives follow.

2008 **New award draws international stars to Germany** From 2008, the Foundation's Alexander von Humboldt Professorship brings the international research elite to German universities. Up to ten professorships are endowed with five million euros each. The funding comes from the Ministry of Research.

2016 **Campaign for academic freedom** The Philipp Schwartz Initiative offers foreign researchers, who are threatened by war or persecution in their own countries, a safe haven at German universities and research institutions. Financed by the Federal Foreign Office, the initiative is a model for other programmes in Europe.

2019 **Alexander von Humboldt Professorship for Artificial Intelligence** By 2024, an additional 30 Humboldt Professors for AI are set to be appointed. The Foundation is thus making a contribution to the Federal Government's national AI strategy.

2020 **Ideas lab for science communication** Humboldt Foundation fellows and alumni of the International Journalists' Programmes work together on joint media projects. The aim is to learn from one another. The Communication Lab for Research and Media is just one of the Foundation's science communication initiatives.

2022 **Support for researchers from Ukraine** The Humboldt Foundation implements the EU's MSCA4Ukraine programme for at-risk researchers from Ukraine. The EU provides funding of 25 million euros for fellowships.

More on the history of the foundation at **www.humboldt-foundation.de/k115-70years**

WHAT'S NEXT?

For the last 70 years, the members of the worldwide Humboldt Network have been working on solutions to the challenges of our times. We asked six of them which they considered to be their most important future tasks.

Illustrations **SKIZZOMAT**

"AFRICA'S YOUNG PEOPLE ARE OUR GREATEST ASSET"

How can Africa feed its growing population when climate change and environmental degradation are making agriculture ever more difficult? African researchers are working on solutions.

Looking to the future, the biomathematician Romain Glèlè Kakaï identifies three particular challenges: how to feed a growing population, how to protect the environment and how to contain pandemics like COVID-19. These are the questions that also occupy him in his roles as head of both the Laboratoire de Biomathématiques et d'Estimations Forestières at the University of Abomey-Calavi in Benin and the Humboldt Research Hub "Socio-ecological modelling of COVID-19 dynamics in Africa".

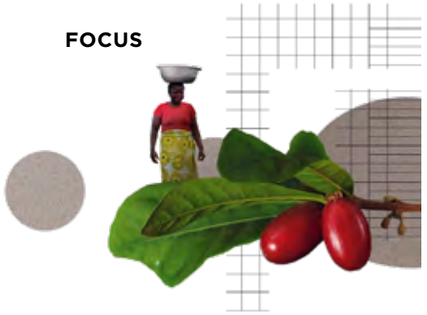
In Benin, as in many African countries, population figures are rising significantly. At the same time, the forests and agricultural land are disappearing – not only because climate change is increasing temperatures and aridity but also because of overexploitation of the soil and forests by humans. It is thus becoming ever more difficult to provide enough food for everyone. To remedy this, researchers in industrialised countries often think in terms of genetic engineering or multilevel vertical greenhouses in cities. But Glèlè Kakaï thinks there is a much simpler solution in Africa: instead of focusing on modern varieties of forced crops that cannot cope with the changing climate, we should be falling back on plants like *Synsepalum dulcificum*, known as the miracle berry, or the horseradish tree, which are both drought- and heat-resistant and highly nutritious. "They've been around for ages. Farmers in the countryside have been growing them for many decades in some cases. With targeted cultivation, we could keep developing these plants and cultivate them on a larger scale."

FIGHTING FOR THE LAST FORESTS

Another way of meeting the challenges in Africa, Glèlè Kakaï believes, would be to not only give young researchers a good education but also to offer them a future in their own countries, as well. "We have so many talented young people here in Africa. They are our greatest asset. And now we need to utilise it." He, himself, recently conducted a national forest assessment of Benin forest reserves for the government. He travelled to rural regions of the country with several graduates and postdocs and recorded structural parameters of tree stands in order to be able to better protect the surviving forests in his country. "When we're working, it is common to meet

Photo: private

PROFESSOR DR ROMAIN GLÈLÈ KAKAÏ from Benin teaches and conducts research at the Faculty of Agronomic Sciences at the University of Abomey-Calavi. He is the head of a Humboldt Research Hub with a budget of 750,000 euros and chairman of the African German Network of Excellence in Science (AGNES). From 2008 to 2009, he was a Humboldt Research Fellow at the University of Freiburg.



local people who think we are on their land and we want to take their forest away from them. You need a good deal of tact and cultural knowledge to convince them how important it is to protect the forest both for themselves and everyone else."

Young researchers from the area who know their way around and are trusted by the people there are the best way of convincing them. This is why, according to Glèlè Kakaï, it is essential to prevent university graduates from permanently moving abroad to find more lucrative work. And that, he believes, is also why the Humboldt Foundation's activities are so important: "They offer incentives to African postdocs to return home at the end of the fellowship and use the knowledge they have gained to drive development in their own countries."

DEFYING THE NEXT PANDEMIC

In his capacity as head of the Humboldt Research Hub, Glèlè Kakaï also works together with young research talents. "By investigating how COVID-19 has spread in Africa, we are learning how to manage future pandemics like that even better." Admittedly, COVID-19 never acquired the dynamic in Africa that it did in Southeast Asia, Europe and America. "Probably because, among others, we have a long experience with epidemics like Ebola and Lassa," Glèlè Kakaï suspects. "Apart from this, other continents were hit first, and we had more time for epidemic preparedness." Even so, he now considers it important to analyse the effects of the various control measures such as vaccinations and social distancing, so as to be better equipped to deal with pandemics in the future.

Glèlè Kakaï is certain: "If we are going to overcome the global challenges, science must cooperate internationally. And this also means that young researchers with their knowledge of the local situation should be active in their own regions. This would benefit the international academic community, as well." ●

Text **JAN BERNDORFF**

PROFESSOR DR KATRIN KINZELBACH is a professor for the International Politics of Human Rights at FAU Erlangen-Nürnberg. She has been a member of the selection committee for the Humboldt Foundation's Philipp Schwartz Initiative since 2019.

FREEDOM EQUALS EXCELLENCE? THERE WAS A TIME.

Repressive science systems have become serious competitors for western research nations.

When considering the future of academic freedom worldwide, Katrin Kinzelbach has mixed feelings. "We can see a decline in the freedom of science," says the professor for the International Politics of Human Rights at FAU Erlangen-Nürnberg, who is one of Germany's leading advocates of academic freedom. "That said, people are very willing to campaign more for the freedom of research and teaching."

Kinzelbach helped to develop the Academic Freedom Index, a measuring tool produced jointly by researchers at FAU and the V-Dem (Varieties of Democracy) Institute at the University of Gothenburg, Sweden. Based on a range of criteria, the Index compares the development of academic freedom in various countries since 1900; it is considered to be the most comprehensive dataset on the state of academic freedom worldwide. Until a few years ago, the development was positive, says Kinzelbach, but in the 21st century, the trend has been downwards.

"This has to do with the autocratic wave we have been witnessing for the last ten years or so. It constitutes a major challenge to science, which is increasingly global." Currently, Russia is the most prominent example of advancing autocratisation; in political science, India, Turkey and Hungary are no longer considered to be democracies, whilst elected governments in countries like Brazil, Poland and South Africa curtail democratic norms and institutions. "Academic freedom is reliant on democracy and the rule of law," Kinzelbach warns.

CHINA: STRATEGY URGENTLY NEEDED

Moreover, the scientific community is facing a completely new challenge, she notes: nowadays, top-level research is also being conducted in autocratic systems. "You can't just lean back anymore and claim the greatest freedom produces the greatest excellence," says the political scientist. "For the first time, we are now witnessing repressive academic systems, especially China, turning into serious competitors."

"At the level of individual researchers, we have found some really good answers to repression," says Kinzelbach, referring to programmes like the Humboldt Foundation's Philipp Schwartz Initiative for researchers at risk. Kinzelbach is a member of the programme's selection committee and thus knows it well.

> A LACK OF ACADEMIC FREEDOM RESTRICTS THE SELF-REGULATION OF RESEARCH.

"But structurally and institutionally there are still a lot of unanswered questions," she says. What sort of partnerships can we have with universities where the research is controlled by narrow political requirements? The biggest problem is for the researchers and students on the spot, of course, Kinzelbach emphasises. But, globally speaking, a lack of academic freedom also restricts the self-regulation of research – for instance, when technical progress and ethical issues collide, as in the case of genetic engineering or collecting sensitive data. "Of course, that's much harder to balance out in a context where not all academic disciplines are free to participate in the knowledge process," says Kinzelbach.

"I still think the answer lies in continuing to foster networking and exchange between individuals, but I would be a lot more careful when it comes to institutional collaborations with autocracies because then there is a much greater risk of instrumentalisation," says Kinzelbach. "Apart from which, I would like to see us engaging much more with countries where, according to the relevant rankings, excellence is not yet so well developed," she says. "This means linking research both with social responsibility and the idea of participation – and recognising excellence amongst those who conduct research under difficult conditions." ●

Text **MARLENE HALSER**

Photo: FAU / Pöhlein

“EXCELLENT SCIENCE SHOULD NOT BE A QUESTION OF GEOGRAPHY”

Encouraging cooperation with Africa, defining clear rules for dealing with difficult partners like China and utilising the Humboldt Network to combat climate change: a conversation with the chemist and green energy expert Robert Schlögl about his goals on becoming the new president of the Humboldt Foundation and how you can complete your school leaving examinations and do a bricklaying apprenticeship at the same time.

Mr Schlögl, you are assuming office in the Humboldt Foundation’s 70th anniversary year, which falls in troubled times. Politicians are having to cope with a remit that ranges from restructuring power supplies to a new security regime. Science diplomacy and, by association, the Humboldt Foundation are faced with the threat of budgetary cuts in the coming years. What challenges are awaiting you as President of the Foundation?
Currently, the most important one is indeed to secure reliable financing. At the moment, the value of the Alexander von Humboldt Foundation is not sufficiently recognised in the political arena. Of course, they all know the name. But if you ask what the Foundation actually does, you are met with silence. And the thinking goes like this: if something has a budget of 150 million euros, it doesn’t matter if you take away the odd five million.

How do you want to persuade the politicians otherwise?
I have been advising politicians on the energy transition for a long time and I know my way around the business a bit. One should never suggest that parliamentarians don’t value science. But when it comes to setting priorities, they plump for things they feel confident about. After all, they have to be able to defend their decisions. I want to do more to ensure that the politicians who are responsible for the Foundation feel confident that they are espousing a good cause.

That’s easy when you are dealing with applied research, like green energy. The value of the Foundation’s worldwide network seems pretty abstract by comparison. How would you explain its usefulness to politicians?
Science only functions when it is a global undertaking. Gaining knowledge by falsification only works if you look at one and the same thing from different perspectives. If those perspectives are subject to discipline-specific or national restrictions, the bigger picture quickly gets lost. Climate change, for instance, touches on so many different aspects that it would be completely hopeless to try and fight it without adopting a holistic approach. The Alexander von Humboldt Foundation’s network is exceptionally well positioned because it is neither oriented to a specific discipline nor along national lines. Everything is connected to everything else, as Humboldt once established.

PROFESSOR DR ROBERT SCHLÖGL became the president of the Humboldt Foundation in January 2023. Until the end of March 2023, he was the director of the Fritz Haber Institute in Berlin, having previously taught and conducted research on inorganic chemistry as a professor at Goethe University Frankfurt. Until 2022, he was the founding and managing director of the Max Planck Institute for Chemical Energy Conversion in Mülheim an der Ruhr. He is the vice president of the National Academy of Sciences Leopoldina and a member of various other academies, such as a fellow of the Royal Society of Chemistry in London.

The Global South is being particularly hard hit by climate change. At the same time, these countries are under-represented in top-flight research, even to some extent in the Humboldt Network …
And to change that is one of my goals. Excellent science should not be a question of geography. But the conditions under which people work are very different. What we here consider to be excellent is simply difficult to accomplish when you are not working in a highly developed country. I have huge respect, for example, for the researchers I have met in Africa who achieve great things under really difficult conditions. Africa has enormous potential, not just as a source of green energy but also in the concomitant research and development. Research in Germany is missing out by not integrating this potential sufficiently.

In its 70-year history, the Foundation has managed to recruit researchers from more than 140 countries for its “network of trust”. In the case of Russia or China, people are now asking whether Germany has been too trusting of its partners …
The accusation of being too trusting is absolutely justified, in my opinion. I think Germany sometimes goes over the top in its desire to be international. And that even goes so far as to betray its own interests.

What needs to change in our dealings with a country like China?
This has nothing to do with individuals from China with whom we cooperate on a basis of trust. But in the last resort, a science system is, of course, part of a state system. And if the latter is geared towards autocratic world dominance, we must also ask ourselves whether we really want to place our trust in its hands. I don’t think so. I’m not in favour of isolation, but we have to agree on clear rules, first and foremost on the issue of intellectual property.

The federal government strives for value-based foreign policy. Should the Foundation be taking an interest in human rights as well as academic standards?
The system of values in academia is based on respect. When I’m working with a researcher from a system in which the individual is not respected, I am faced with a fundamental conflict. Human dignity should be protected everywhere. We must make that absolutely clear to our partners. We are part of the western system of values and this system of values must be defended.

> “THE WESTERN SYSTEM OF VALUES MUST BE DEFENDED.

One problem common to all science systems is the pressure to compete and publish. What does this mean for the Foundation’s work?
This is a real failure in our system. If the aim is to gain knowledge, it is totally unproductive for researchers to always have to be on the lookout for the next paper in Science to be able to achieve the h-index score for their ongoing funding application. This makes the Humboldt Foundation’s task of identifying excellence ever more difficult. Is selling science an indication of excellence? Is that what impact means? When we are talking about genuinely original research, that is a very, very difficult question to answer because initially, at least, it has no impact whatsoever in terms of multiple citations.

So how can we go about making fair funding decisions?
You have to make the effort to evaluate individually, be absolutely clear about the selection criteria and come to a decision on the basis of verifiable arguments. Generally, I would like to see more discussion of content rather than who has written what about whom. I really dislike expert opinions that force you to study the precise choice of words in the very last sentence in order to discover what the reviewer is actually trying to tell you.

The precise, or rather, the supposedly correct choice of words is becoming ever more important in university debates, too. How important is political correctness to you?
I think there is a tendency to expect academia to buckle down and behave exactly as certain segments of society want it to. That’s dreadful – because academia should really be a place for open and free debate, and universities a place where people learn to tolerate and thrash out differing points of view.

There is evidence to suggest that diversified teams produce better results. Is diversity an indispensable goal in enhancing the quality of research?
If we were to select people totally impartially, solely on the grounds of quality, the problem would solve itself. I know this happens with musicians. They have to audition behind a black curtain, so no-one knows anything about their attributes. Their music is heard, and a decision is made. I sometimes wish it were like this in science because we all have prejudices and let ourselves be influenced by them. German society in particular is not free of prejudice.

Which countries are better?
The United States, for example, Australia, and England, too, three countries in which I gained some experience of life and observed less prejudice. This may only be true on the surface, but integrating people from other cultures is certainly easier there than it is here.

You trained as a bricklayer. Did you yourself meet with resistance in academia?
No. But I have to say that I did my apprenticeship while I was still at school. I wasn’t the least interested in my schooling at the time, so I skived off and headed for the building site. My parents had to write a lot of excuse letters. Despite that, my final grades were still quite good, although I ended up with serious gaps in my education, of course

Photo: Humboldt Foundation/David Ausserhofer

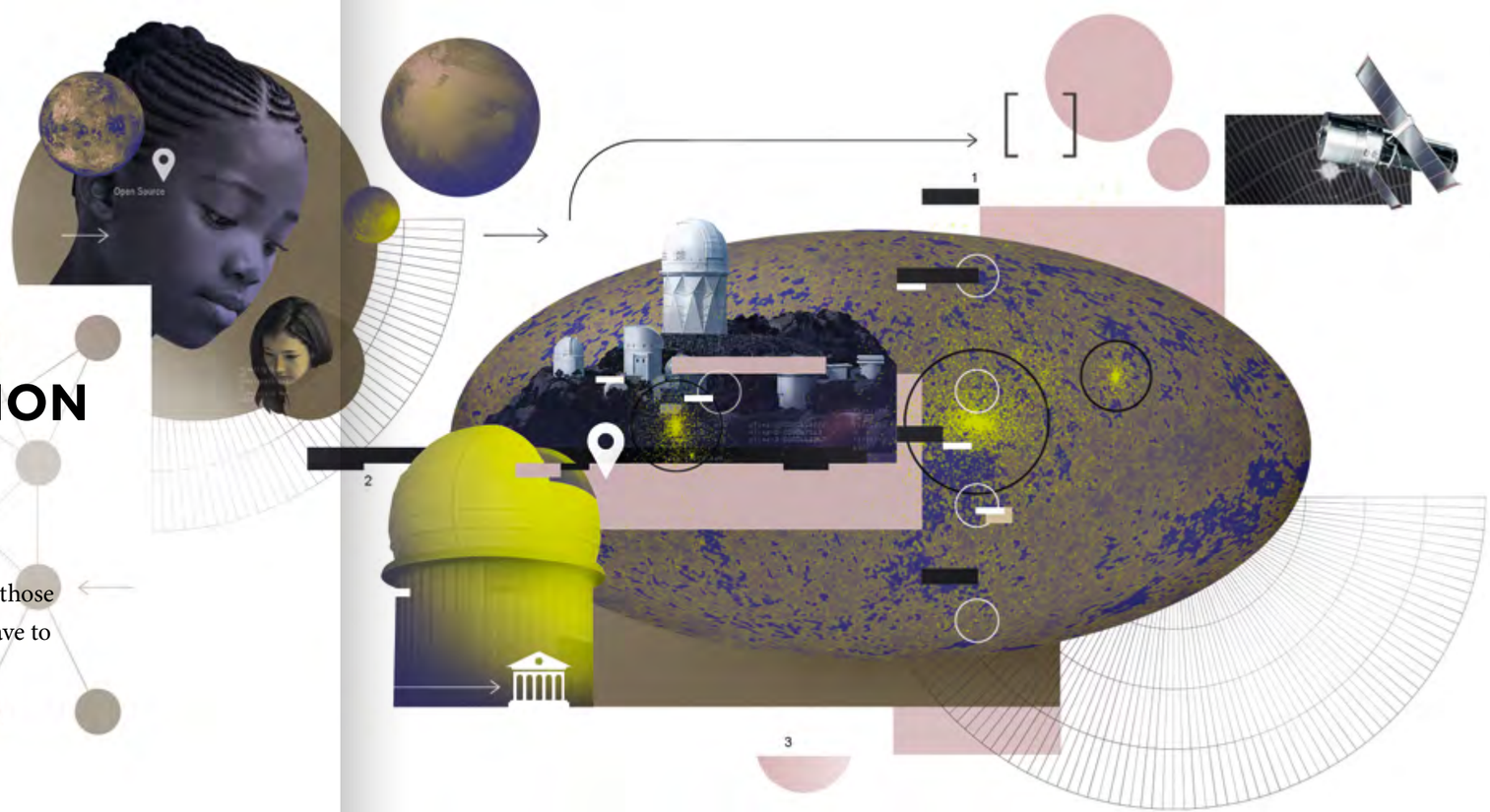
(laughs). But I did get to know another type of everyday reality and I'm very grateful for that opportunity.

Your field of research is the energy transition. How well equipped is Germany for the transition?
When it comes to the energy transition, reliability is extremely important – because we are talking about facilities that are large, expensive and dangerous. You can't afford to make mistakes. This is something we in this country are good at, dealing with large-scale, complex systems and designing them to be reliable. Where we fall down, is getting the intersection between regulation and technology right.

In what way?
Every day, we hear that we need to speed up. And, at the same time, we create new regulations in Germany that slow things down. New LNG terminals go into operation and then for some reason are initially only granted a licence to operate for four hours a day. What's the point of that? No country in the world would hit on the idea of imposing such a limit on remedial action if there were a gas emergency.

Is over-regulation a locational disadvantage for Germany?
We simply restrict ourselves to a ridiculous extent with our regulatory framework conditions. There's a lot of ideology floating around and that is completely useless when you are searching for new solutions. It's a disadvantage in comparison with competitors like the United States. There they are much more casual about things and maybe end up making a load of mistakes. But they get on with it – quickly and pragmatically. Neither of these is typical of the German system. We need a healthy combination of German thoroughness and American hands on! That is one of the good things about academic exchange à la Humboldt. We can learn a great deal from each other. ●

Interview by **GEORG SCHOLL**



DISCRIMINATION DAMAGES PROGRESS

Science benefits from diversity. But those who don't comply with the norm have to risk being disadvantaged.

The British astrophysicist **PROFESSOR DR CATHERINE HEYMANS** teaches and conducts research at the University of Edinburgh in Scotland. In 2018, she was granted the Max Planck-Humboldt Research Award, valued at 1.5 million euros, for her investigations into dark energy. In the context of a visiting professorship at Ruhr-Universität Bochum, she is one of the directors of the German Centre for Cosmological Lensing.

"If we are going to resolve global crises, the worldwide research community will have to become more fluid, interdisciplinary and transparent," says Catherine Heymans, astrophysicist from the UK and Max Planck-Humboldt Research Award Winner. This would also require more diverse teams. Today's most important, most pressing issue for the future is climate change, says Heymans. "What we need for that is the will to cooperate on solutions in cross-disciplinary teams that are as diverse as possible."

"The great thing about science is that you're allowed to ask big questions," says Heymans. "To answer them, we need teams of researchers involving as many diverse perspectives as possible, who have grown up differently and gone through various education systems. Teams like this are able to approach a problem from quite different directions." Heymans emphasises that diversity in science and research is not only in tune with the zeitgeist but also politically correct. "In business it's long been accepted as common sense that a diverse workforce that feels appreciated and at home in the workplace demonstrably improves results."

Heymans is a professor based at the Royal Observatory in Edinburgh where she teaches and explores dark energy. Almost three quarters of the universe is made up of this mysterious substance, which is thought, amongst other things, to explain the accelerated expansion of space. In May 2021, the 45-year-old's research earned Heymans the honorary position of Astronomer Royal for Scotland, the first woman to hold the title which recognises astronomers for their achievements and enhances their visibility at the same time. When Heymans was awarded the title, she said she wanted to install telescopes at all of Scotland's remote outdoor learning centres, where most of the country's school pupils spend a week during their last year at primary school. This would enable them to gain access to a telescope irrespective of their parentage and background.

SCIENCE IS TOO HARD FOR YOU

In the quest to get diverse groups of people interested in science, Heymans believes that what is needed first and foremost is constant representation, for example by female scientists who deliberately reach out to the public as role models. "We have to start with the parents," says Heymans from her own experience. "They are often the ones who tell their daughters or non-white children that science is too difficult and not for them." It can help, she thinks, to see successful women researchers of colour in public.

> WE MUST DEFINE SCIENTIFIC EXCELLENCE MORE FLEXIBLY.

In addition to diversity, Heymans believes in open science. Research tends to be very competitive, she says, and therefore often shrouded in secrecy. "If we are going to solve the huge global problems, we must share our work and our findings with others – and have the courage to publicise failures," says Heymans. "This is how we may save each other a lot of valuable time."

One issue that has occupied Heymans personally for a while now is the way top-level research handles disabilities. Since catching COVID, the astrophysicist has been suffering from long COVID – a disease as yet under-researched for which there is neither a cure nor a consistent clinical picture.

"In research it's often not just the quality of work that counts but the volume of output," says Heymans, who has co-authored more than 140 scientific publications. Since falling ill, she has experienced first-hand how discriminatory academic life can be, whether towards people with disabilities, the socially disadvantaged or those with children. "A person may not be able to work 60 hours a week for various reasons but may still be an exceptional scientist." That is why, she continues, it is necessary to define our understanding of what constitutes top research and scientific excellence more flexibly. "Due to my illness, I am unlikely to be seen as competitive for research funding," she says. "You often only realise quite how discriminatory a system is when you are affected yourself." This experience has strengthened her resolve to campaign for more diversity. In the last resort, she had become more resolute, she notes. "Because I can't do as much, I concentrate on the really important things." ● *Text* **MARLENE HALSER**

Photo: RUB/Kramer

IMMUNE THERAPY AGAINST CONSPIRACY MYTHS

Extremism is booming and, in many countries, threatening democracy. The good news is that you can train resistance to propaganda and disinformation.

PROFESSOR DR CYNTHIA MILLER-IDRISS isis an extremism and radicalisation expert. She teaches and conducts research at the School of Public Affairs at the American University in Washington, D.C. In summer 2022, the former German Chancellor Fellow took on the leadership of the Humboldt Residency Programme on "Social Cohesion".

The future of democracy is what drives Cynthia Miller-Idriss. And the biggest task of our times, she believes, is to maintain social cohesion. "In social terms, we are facing greater challenges to democracy today than we did some 20 years ago," says the US American extremism researcher. "The stability of democratic systems and social cohesion are being undermined by the spread of disinformation and propaganda," she says.

With far-reaching consequences: "People's susceptibility to conspiracy stories influences election results and erodes trust in state institutions as well as in research and science." This, in its turn, reinforces systemic racism and misogyny or makes some people unwilling to believe the climate crisis is real or to show solidarity in a global health crisis like the COVID-19 pandemic. This all leads to increasing divisions in society, she notes.

NO RETURN FOR BELIEVERS IN CONSPIRACY

In the Polarization and Extremism Research & Innovation Lab (PERIL) she founded at the American University in Washington D.C., Miller-Idriss therefore investigates the issue of how to make people more resilient to conspiracy stories. "I am not aware of any evidence to suggest that you can re-convert someone who already believes in conspiracy myths," says the political scientist. "But in our experiments, we can clearly show that information can prevent people from believing such stories and becoming radicalised in the first place."

To this end, says Miller-Idriss, it is paramount to provide people with the right tools to see through the propaganda. Together with her team, she develops and tests 30-second videos, for example, designed for the public sphere, explaining the mechanisms of propaganda and disinformation. Scary music, colours and images that trigger fear and discomfort, but also rhetoric designed to manipulate and specific slogans can be identified much more easily, says Miller-Idriss, if you know what to look out for. She calls this concept "video-based inoculation". Videos like this can be disseminated on social media platforms but also on public or semi-public screens and digital advertising billboards such as on public transport.

Miller-Idriss's ideas and expertise are highly valued outside of academia, too. She regularly addresses the US Congress and informs politicians, educational institutions, the security and secret services in the United States and other countries as well as the United Nations about new extremist developments and potential prevention strategies. As recently as September 2022, Miller-Idriss was invited to the White House to give an expert presentation at the United We Stand Summit, initiated by Joe Biden, to fight violence fuelled by hate.

Miller-Idriss describes the Humboldt Residency Programme as an important source of inspiration for her work. It brings together researchers sponsored by the Humboldt Foundation and other researchers with actors in civil society, journalists, entrepreneurs and artists to work on a common topic. In summer 2022, Miller-Idriss led the programme on "Social Cohesion".

WHEN COHESION IS DAMAGING

"One important point that emerged in the discussions was that – notwithstanding the importance of social cohesion – you can also have too much of it," says Miller-Idriss. On the one hand, she states, social cohesion is currently under acute threat from conspiracy stories, propaganda and disinformation. On the other, too much homogeneity in a society can also be damaging because society thrives on the non-conformance and diversity of various groups. "Social cohesion must integrate minorities without wanting to force them to assimilate," the researcher emphasises. ●

Text **MARLENE HALSER**

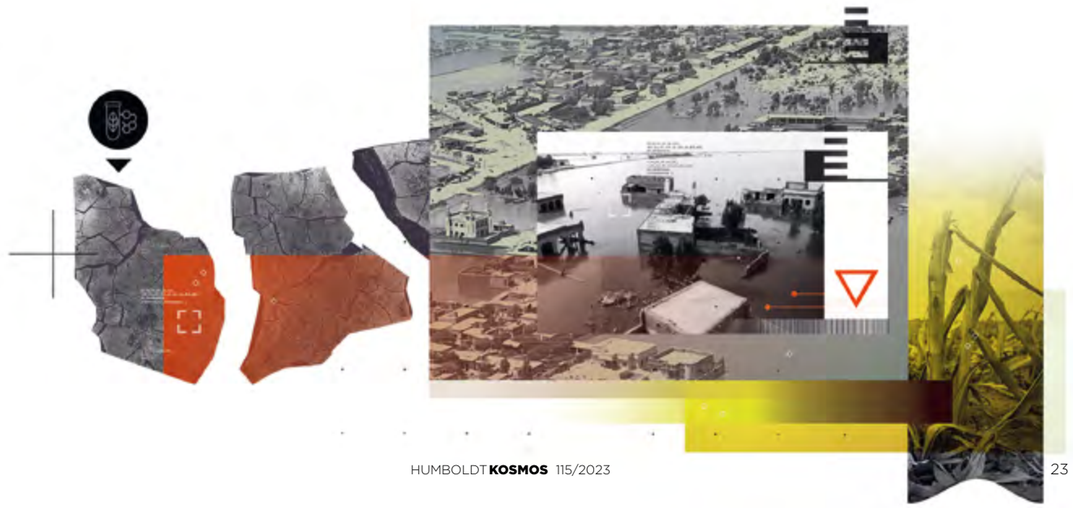
BEING BETTER PREPARED FOR THE NEXT DISASTER

Floods and drought threaten the lives of millions of people in Pakistan. Better preparedness as well as social change could alleviate the situation.

The real, everyday meaning of climate change becomes drastically clear when Faisal Abbas talks about his native country, Pakistan. Within four months in 2022, extreme drought was followed by the worst flooding since records began. The flooding alone claimed more than 1,700 lives; eight million people lost their homes. Since then, agriculture, the source of income for almost half the population, has lain in ruins. Food prices have rocketed. "Within days they trebled or increased fivefold," Faisal Abbas reports. The economist at the National University of Sciences & Technology in Islamabad continues, "For people who hardly have enough to live on in the first place, this has dramatic results. Many are starving."

Through his research, Abbas wants to mitigate situations like this. He specialises in developmental topics such as food security, health, especially of mothers and children, as well as gender-specific oppression. "During my doctorate at the University of Bonn 15 years ago, it was the first time I experienced how well women do their jobs," he reports. "In my native culture, I only knew that traditionally

PROFESSOR DR FAISAL ABBAS is an economist at the National University of Sciences & Technology in Islamabad, Pakistan. In 2017/18, he was a Georg Forster Research Fellow at the University of Göttingen. Faisal Abbas advises the government of Pakistan as a member of the Committee on Key Economic and Policy Issues as well as on the Health and Well-Being, Food and Agriculture Sector Committee.



Photos: private

women didn't go to work but stayed at home. That's all changing now," he says. "Today, you even come across more women at our universities than men. And many of them subsequently look for employment."

The greater role of women also has an impact on food security, he notes. "When women can decide independently, they make much better decisions for the health of children," says Abbas. Consequently, the shift in gender roles gives him hope in the fight against hunger but also against climate change, especially as women are increasingly represented in politics in Pakistan and help to shape it.

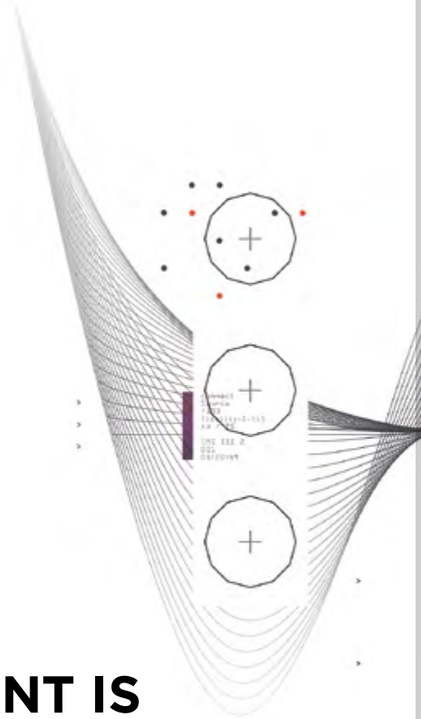
GOOD POLICIES RELY ON GOOD DATA

With a view to climate change, sustainability and food security, Abbas thinks the forthcoming challenges facing science are to advise politicians and the public on the basis of solid data. "Good policies have to be based on information and data. We must record reality as precisely as possible in order to achieve goals to improve public welfare, which should be the aim of every government."

One good example of this is civil protection in Germany from which countries like Pakistan could learn lessons: flood protection, for instance, though not always adequate, is at least clearly regulated. There are risk maps for endangered districts delineating the floodplains where building is prohibited. Flood insurance, which can mitigate the impact of a disaster, is still very rare in Pakistan, according to Abbas. It would also be possible to build more small dams in the upper reaches of rivers which would hold back the water, allowing it to be dosed and used for irrigation.

LEARNING FROM GERMANY

"We in the science and global community should share ideas far more and learn from one another," Abbas believes. It greatly benefits climate adaptation, food security and environmental protection when institutions like the Humboldt Foundation enable researchers like him to conduct research in Germany. In his own case, a Georg Forster Research Fellowship and his doctorate in Germany had helped to lend weight to his voice in Pakistan. Today, Abbas fosters close contacts with the political arena as a member of various advisory committees. "In this country, too, politicians want to be re-elected, and it is hard to score with unpopular but necessary measures," he reports. "But the more robust the scientific evidence, the greater the chance it'll be heard." ● *Text* **JAN BERNDORFF**



WELL-MEANT IS NOT NECESSARILY WELL DONE

Intervention research investigates strategies to help counter climate change and infectious diseases.

The German epidemiologist **PROFESSOR DR TILL BÄRNIGHAUSEN** is the director of the Heidelberg Institute of Global Health at Heidelberg University Hospital. In 2017, he was awarded an Alexander von Humboldt Professorship.

The health of the planet, the health of the individual and social justice – these are the three major global challenges facing us in the coming decades, according to Humboldt Professor Till Bärnighausen. And they are all closely connected. "If we use up or destroy the Earth's natural resources – pollute the air and the water and chop down the forests, for example – that also has a negative impact on our bodily and mental health." And, of course, a shortage of resources also engenders social problems. However, says Bärnighausen, progress in human health may come at the expense of planetary health when, for instance, better food supplies are achieved by environmentally detrimental intensive agriculture.

In his role as director of the Heidelberg Institute of Global Health (HIGH), Bärnighausen works directly on solutions to these challenges and their interaction. He was recently one of the organisers of a major symposium on climate change and pandemics: climate change is not only responsible for heat, storms and torrential rainfall that pose an immediate threat to our lives; it also indirectly threatens our health by increasing the likelihood of pandemics – such as the spread of exotic mosquitoes in Europe which can transmit dangerous diseases like the West Nile virus, dengue fever or malaria.

TIGER MOSQUITOES ADORE BARCELONA

In 2005, for example, the first Asian tiger mosquito turned up in Barcelona. In the last few years, there have been outbreaks of Chikungunya fever, which it transmits. Bärnighausen, who is conducting a project there together with his team and local partners, thinks the sewer system could offer a solution. In Barcelona, it partly dates back to Roman times and is an ideal breeding ground for exotic mosquitoes that feel happy as Larry in the warm and humid darkness. "The mosquito offspring thrive in the angular canals where there is often a lot of standing water. They are now supposed to be replaced by curved canals so that the water can drain everywhere." One method the researchers use to regularly check whether the measures are having the desired effect involves setting up mosquito traps to measure population density.

Bärnighausen's institute specialises in what is known as intervention research, in which it is a world leader. He would like more institutions to do the same. "Not just in health research but also in politics, development aid and climate protection – everywhere we should constantly be conducting scientifically sound checks to see whether an intervention in a system is really having a positive impact." Medicine, in which evidence as the basis for progress is now the standard, he notes, was a pioneer in this respect.

"THE GOVERNMENT IS HESITANT TO TRY OUT NEW APPROACHES.

In this, Bärnighausen also addresses the German government. "There tends to be a lack of willingness to try out new approaches of the type I encounter in Africa, for example in trying to contain HIV." The introduction of AIDS self-testing kits, for instance, had proved amazingly effective because many people were too ashamed to consult a doctor.

AI FOR FASTER SOLUTIONS

In order to explore which approaches prove successful, huge volumes of data are required. And to manage these, Bärnighausen works together with his colleague Joacim Rocklöv, the second Humboldt Professor at his institute. The mathematician is an AI specialist and models, amongst other things, the links between climate change and infectious diseases on a computer. Thus, at HIGH, medicine, social science and computer science form something of a symbiotic relationship.

"As a medical historian by training, I know that people in history always found good solutions to the challenges of their times," says Bärnighausen. "With intervention research and our new technologies, we are now managing that considerably faster and more sustainably." ● *Text* **JAN BERNDORFF**

Photo: Humboldt Foundation/Elbmotion

EU FELLOWSHIPS

Humboldt Foundation and partners support Ukrainian researchers

Under the Europe-wide aid programme MSCA4Ukraine, the Humboldt Foundation, together with Scholars at Risk Europe and the European University Association, has selected 124 at-risk researchers from Ukraine, 111 postdocs and experienced researchers as well as 13 doctoral candidates, to continue their work at European host institutions. The European Union is providing 25 million euros to implement the programme.

MORE INFORMATION
www.humboldt-foundation.de/k115-01

HUMBOLDT RESIDENCY PROGRAMM

DIALOGUE

Handling natural resources sustainably

In the context of the Humboldt Residency Programme, the Foundation brings together researchers, creatives, activists and journalists at a six-week residency in Berlin. The aim is to share ideas on the challenges currently facing society. The motto for 2023 is "Our Precious Resources: Pathways to a Secure and Sustainable Future." Interdisciplinary dialogue is designed to generate new approaches to tackling the global resource crisis.

MORE INFORMATION
www.humboldt-foundation.de/k115-02

SCIENCE COMMUNICATION

The next big bang in research

What is science expecting to see in 2023? With new space missions, pioneering AI applications and developments in biotechnology – how can and should researchers and journalists report on the next "big bang" which is already fundamentally happening, even though it has not yet become everyday reality? How much news value should we ascribe to risky or early-stage research? In May 2023, Humboldt Foundation sponsorship-recipients and journalists in the International Journalists' Programmes are getting together for a joint workshop.

MORE INFORMATION
www.humboldt-foundation.de/k115-03

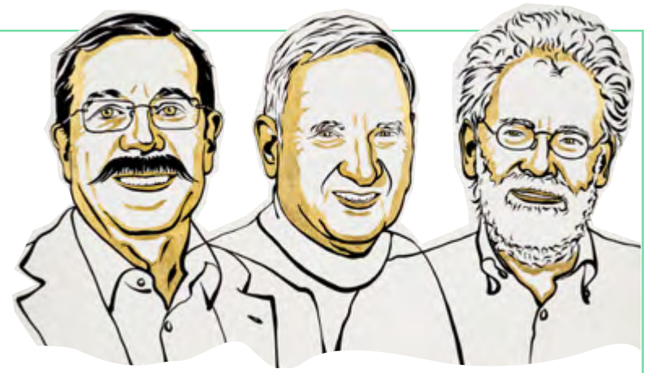
All current topics at www.humboldt-foundation.de/en/newsroom

DIVERSITY

Investigating strategies

Representatives of the political arena, science and diversity management as well as research funding organisations got together on 2 March at the Berlin-Brandenburg Academy of Sciences and Humanities to discuss the interaction between excellence and diversity. Reviewing current measures and activities being undertaken in the international science system, the aim was to gain strategic ideas for the work of research and funding organisations.

MORE INFORMATION
www.humboldt-foundation.de/k115-04



NOBEL PRIZES

Physics Nobel Prize for Humboldtians

The Humboldtians Alain Aspect (l.) and Anton Zeilinger (r.) were jointly awarded the 2022 Nobel Prize in Physics together with John F. Clauser. The three scientists were honoured for their pioneering experiments in quantum research. This now takes the total number of sponsorship recipients in the Humboldt Foundation's worldwide network who have received a Nobel Prize to 59.

MORE INFORMATION
www.humboldt-foundation.de/k115-05

Alexander von HUMBOLDT STIFTUNG

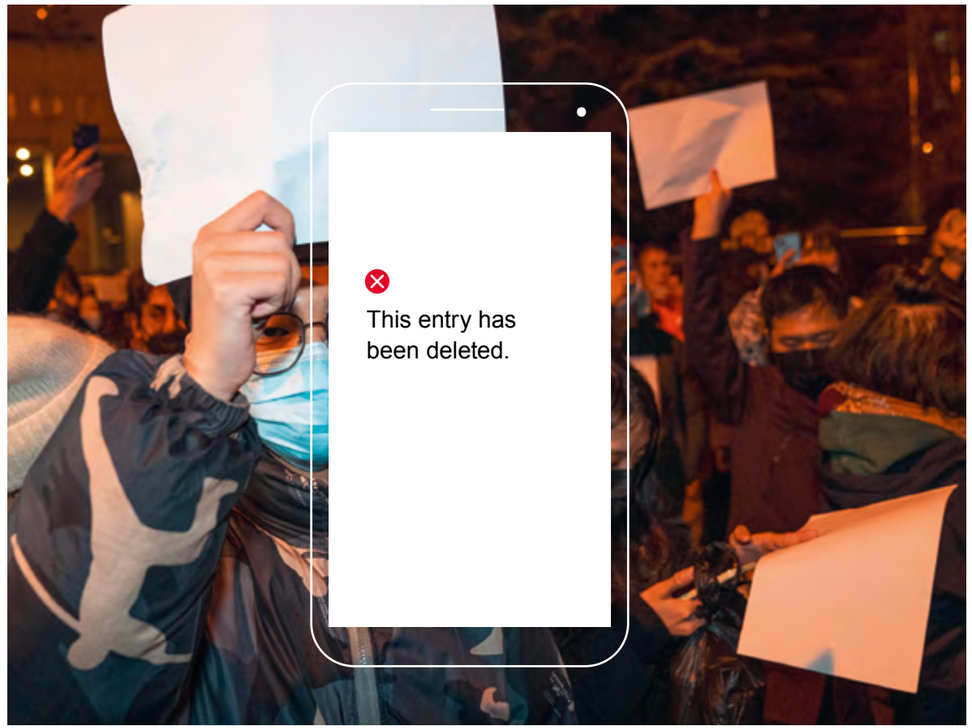
CORPORATE DESIGN

The Humboldt Foundation's new look

In the Foundation's anniversary year, we are asking "What's next?" – visually, too. In mid-March, the Humboldt Foundation launched a new corporate design which evokes a spirit of new departures and hope. The modernised image mark reflects the diversity of our international network and, at the same time, demonstrates qualities that characterised our namegiver, Alexander von Humboldt: flexibility of thought and action.

MORE INFORMATION
www.humboldt-foundation.de/k115-06

Photos: Getty Images; Niklas Elmehed/Nobel Prize Outreach



SHE MONITORS THE MONITORING

Margaret E. Roberts' research field could not be more pertinent. With the help of artificial intelligence and machine learning, the political scientist and data researcher investigates the Internet censorship practices of authoritarian states. Furnished with a Max Planck-Humboldt Research Award, she is now examining the role of social media platforms.

Text **MARLENE HALSER**

The fact that Margaret E. Roberts is currently researching into censorship and the influence of social media platforms on people's decision-making is due to a coincidence. Or rather, a discovery the American made quite by chance.

When Roberts, known as Molly, began working on her doctorate at Harvard in 2009, she actually intended to focus on international trade relations. She had previously studied international relations and economics at Stanford and received a Master's in statistics there. She had, moreover, taken Chinese language classes and repeatedly spent time in China. "I was very interested in the rapid growth of the Chinese economy at that time and wanted to use data analysis to discover how it came about," says Roberts. But everything turned out differently.

Molly Roberts' supervisor at Harvard was Gary King, a world-leading specialist in quantitative methods. "Gary wrote to tell me and another graduate student at Harvard, Jennifer Pan, that he had found all these Chinese blogs and there were far too many of them to read them all," Roberts explains in a video chat from her apartment in California, where she lives with her husband and children. "He wanted to know whether I would be interested in finding out how you could use artificial intelligence to discover a way of structuring this mass of data."

CRITICISM DISAPPEARS FROM THE WEB

The blog posts King had downloaded from the Chinese Internet were all about workers' protests. Roberts was supposed to ascertain whether the texts were positive or negative. To do so, she initially had to train the artificial intelligence. "The first thing we did was to assign numbers to frequently used terms," Roberts explains. "Then we read the texts, evaluated them and labelled them: here someone is writing something positive about the protest, there it's being portrayed negatively." On the basis of these examples, the computer learned to interpret words and word contexts according to the instructions. "The fascinating thing about AI is that it can recognise patterns on a deeper level that we humans often can't access." In this respect, according to Roberts, the machine is ahead of the human brain.

Six months into her work, Roberts and her collaborators noticed something. Because the evaluation of one of the blog posts was not completely clear, she typed in the URL to search for additional information on the original page. But the post wasn't there anymore. "Sorry, this entry is no longer available" appeared on her screen. The researcher started checking other URLs and discovered that especially the posts that had been positive about the protests had disappeared. It soon became clear that the Chinese Propaganda Ministry must have censored the posts. Roberts realised what she had hit on: "Without searching for it, we had found a mechanism for measuring Internet censorship," she says, still sounding really excited when she talks about it.

Roberts wrote a programme that regularly pinged the pages to see whether they were still online. No easy task. If the computer pings too often, at some stage the sender, i.e., the computer, will be blocked. "I first had to learn quite a lot about programming," says Roberts, laughing. And she managed that, too. But it also meant that she had to decide what she wanted to work on in the future: international trade relations or censorship?

> "AI RECOGNISES PATTERNS IN TEXTS THAT HUMANS OFTEN DON'T DISCOVER.

LOCAL PROTESTS ARE THE MOST PROVOCATIVE

"I woke up in the morning and the first thing I thought about was censorship," says Roberts. That's when she knew she had to change her plans." In 2013, together with Gary King and Jennifer Pan, she published a paper in the American Political Science Review, describing how the Chinese government, whilst allowing criticism, nonetheless severely restricted the population's collective expression. She completed her doctorate on the subject a year later.

"It's reports about local protests that are subject to most censorship in China," says Roberts, summarising her main findings at the time: when people go onto the streets to protest about expropriation, for example, or police brutality. Roberts was able to follow live how posts on such topics disappeared from blogs and forums. "We often think censorship functions via punishment, when people are imprisoned, for instance, because of something that they have written," she says. That is certainly true, she states, not just in China but in other authoritarian states like Russia and Iran, too. But in all these countries you can also observe what a major role access to information plays.

In Russia, the government purposely spreads misinformation to cover up what is really happening in the ›

Photo: picture alliance/AP Images

> INFORMATION BECOMES HARDER TO ACCESS WITHOUT PEOPLE NOTICING.

war in Ukraine. In Iran, the regime throttles the Internet in the hope of preventing protesters from connecting and preventing information from getting out. But censorship, according to Roberts, is more than that. Particularly in peacetime, censorship is often far more subtle.

"Certain kinds of information become harder to access without people necessarily noticing," she explains. "They have to make much more of an effort to get at the information, but many people don't make the effort because it's often just not practical in everyday life." Take local protests in China, for example: "Let's assume a person has heard about a protest but can't find anything about it online because all the posts on the topic have been tacitly removed," Roberts explains. "This person will ask themselves: Are there any protests happening at all? Or perhaps they will think: It can't be that important, after all."

PROTESTS REMAIN HIDDEN

In this situation, people need to have observed the protests themselves or heard about them from others if they are to find out about them in the first place. And in order to access blocked foreign media and their reporting, you need technical solutions like virtual private network (VPN) connections to bypass the censor. But that costs money and involves a good deal of effort, so not everyone will go the extra mile. Consequently, says Roberts, networking directed against the government and the narrative it pursues is forestalled or at least made more difficult.

Roberts is now a professor at the University of California in San Diego where she teaches and conducts research. In 2022, she received the Max Planck-Humboldt Research Award, which is granted jointly by the Humboldt Foundation and the Max Planck Society. The selection committee was convinced by Roberts' unusual career and innovative research profile. She wants to use the award amount of 1.5 million euros to extend her research on censorship and launch a project on the role of social media platforms together with the Technical University of Munich and the University of Konstanz.

Asked about her career path, Molly Roberts says she was very lucky – simply because she had the opportunity to freely pursue her ideas and interests. "It was just on a whim that I signed up for Chinese language classes when I was a student." She had never even been to Asia when she started university. "I was just curious and wanted to try something new." Again, it was a mentor who nudged her in the right direction. "She recommended me to take an extra course in sociology that dealt with China under Mao." After the course, Roberts was so fascinated that, in 2005, she spontaneously applied to a programme enabling her to spend the summer in China. It would be the first of many visits there and she spent one semester studying in Beijing. "One of the things that has always fascinated me about China is the speed of economic development," says Roberts. "Every time you go there, everything looks completely different because so much has happened."

Roberts got involved in artificial intelligence through statistics. For her final project on a machine learning course at Harvard, she developed a digital tool for topic analysis that she still uses to this day. "The analysis examines the words in the various documents and then calculates which topics are the most probable," Roberts explains. In this way huge datasets can be evaluated with the help of a computer. Together with a fellow student, Brandon Stewart, Roberts wrote a programme which also allows you to trace how topics change in the course of time. For evaluating social media platforms, this is now worth its weight in gold because you can follow online debates using the programme without having to read every single post.

According to Roberts, the fascinating thing about it is that the machine more or less does it unsupervised. This means that now, unlike in her earlier research on Chinese blog posts, neither the topics nor the valuations are determined in advance. "The tool does the filtering on its own using word probability distribution," says Roberts. "I only interpret which topic the terms belong to afterwards." The programme is now also used by other researchers as well as journalists for evaluating social media posts.

THE CENSOR AS MODERATOR

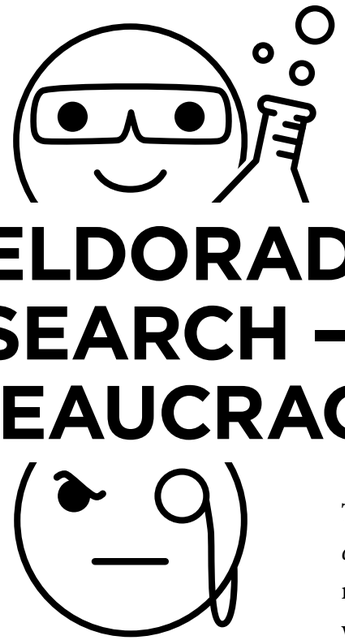
Thanks to receiving the Max Planck-Humboldt Research Award, Roberts now wants to channel these diverse findings into a completely new project: she intends to investigate how users are influenced on social media platforms and analyse their content moderation methods, which are anything but transparent. Molly Roberts will cooperate, amongst others, with the Konstanz political scientist Nils B. Weidmann, who conducts research on protest movements and civil wars as well as digital communication and political mobilisation. Weidmann originally came to Konstanz sponsored by the Humboldt Foundation: in 2012, he relocated there from Norway on the strength of a Sofja Kovalevskaja Award and used the funding for outstanding junior researchers to build up his own research project and working groups.

"The emergence of social media platforms has produced a raft of new, interesting phenomena," says Roberts and lists just some of them: disinformation, online harassment, hate speech, the influence of foreign governments on elections. She now wants to explore the tools that are necessary to guarantee freedom of information as well as the influence that internal moderation methods on social media platforms have on democracies. Her project is scheduled to take five years, and Roberts intends to commute between California and Germany.

Most of the work is done at the computer anyway, she notes. And the tools that she developed in the past will stand her in good stead here as well. "We're talking huge volumes of data," says Roberts. "They can only be tackled with the help of artificial intelligence and machine learning."

PROFESSOR DR MARGARET E. ROBERTS teaches and conducts research at the Department of Political Science and the Halıcıoğlu Data Science Institute at the University of California, San Diego, United States. There, she is also co-director of the China Data Lab at the 21st Century China Center. Her book "Censored: Distraction and Diversion Inside China's Great Firewall" (Princeton University Press, 2018) received multiple awards. In 2022, she was granted the Max Planck-Humboldt Research Award, a joint award by the Humboldt Foundation and the Max Planck Society valued at 1.5 million euros.

Photos: picture alliance/AP Images (l.), Humboldt Foundation/David Aussenhofer (r.)



AN ELDORADO FOR RESEARCH — AND BUREAUCRACY

The study, *Germany from the outside,* reveals how visiting researchers from abroad rate working and living here.

Text **GEORG SCHOLL**

How open and tolerant are Germans in their dealings with visiting researchers from abroad? How progressive are we, how bureaucratic, how hospitable? How well equipped are the labs or libraries? What about working hours, childcare and career opportunities for junior researchers?

The Humboldt Foundation has evaluated feedback from more than 1,800 fellows from 119 countries who were hosted by German universities and research institutions between August 2018 and May 2022. The survey reveals how Germany compares with the fellows' own countries.

TOP MARKS FOR RESEARCH AND FINANCING

Without exception, Germany scores very well as a science location in comparison with the other countries. On a scale from zero to ten, there are top scores for infrastructure, quality of research, project financing opportunities, internationality and childcare. The results vary, however, according to the fellows' regions of origin. Sponsorship recipients from Asia, for example, rate the quality of research higher than those from North America. Nevertheless, the evaluation does show that in these fields Germany performs well irrespective of the country it is compared with.

Also positive, although not so high, are scores for dual career options, promotion of junior researchers and professional prospects.

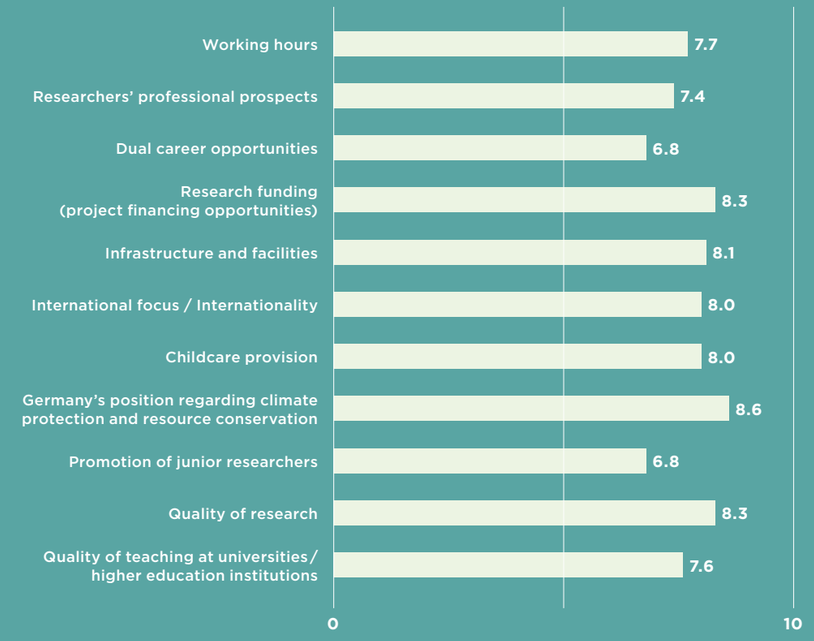
Asked what they associated with Germany on a scale from minus five to plus five, Germany emerged as very science friendly, democratic, gender equal, hospitable and tolerant. When it came to sense of humour and openness, the responses were not so positive.

The only negative result was for bureaucracy, whereby the fellows from Asia were the only ones to rate Germany as rather unbureaucratic. The worst score in this category came from sponsorship recipients from North America. In comparison with the last survey covering the period 2012 to mid-2018, this score dropped by a further 0.6 points.

In the comments, too, bureaucracy is frequently criticised (27 percent), followed by the language barrier (26 percent). Individual references to discrimination and racism account for six percent of the entire number of comments with sponsorship recipients from Sub-Saharan Africa reporting particularly frequently on this (10 percent of respondents from this region) and European sponsorship recipients least frequently (4 percent). ●

For all the results of *Germany from the outside* visit:
www.humboldt-foundation.de/en/explore/germany-from-the-outside/2023

How do you rate Germany as a research location in comparison with your own country?
(0 = very negative, 10 = very positive)



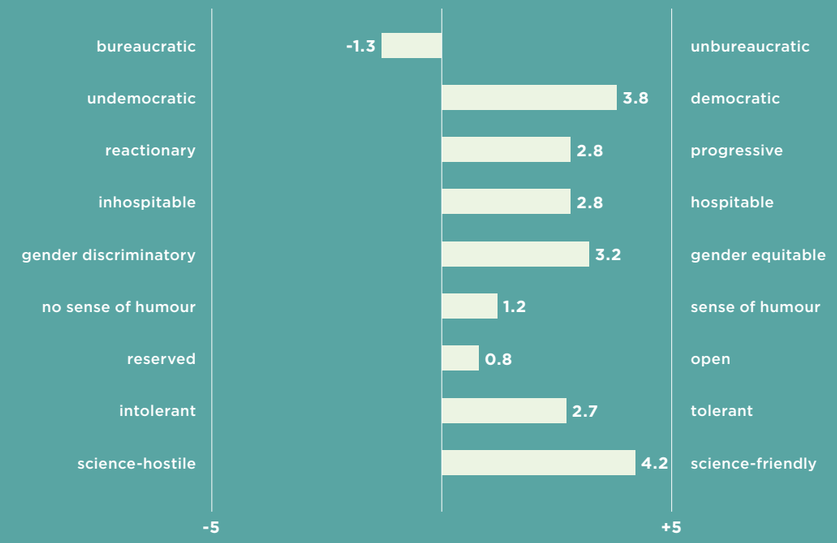
The main bottlenecks during the stay in Germany were associated with adjusting to the culture, language and procedures. But these small issues were sorted near to the end of the fellowship owing to the language fellowship support from the Foundation. After a few months of stay, it was also easy to acclimatise to the culture and procedural systems.

India, m

Coming from USA, the level of bureaucracy was unexpectedly high. While Humboldt Foundation staff made things easy, other interactions (including international office, local city registration requirements and VISA for my family) were often very stressful.

USA, m

Which of these concepts do you associate with Germany?
(-5 = negative, +5 = positive)



BACKGROUND

In an online survey at the end of their research stay, which on average lasts 18 months, the Foundation's sponsorship recipients evaluate various aspects according to predefined scales and are also free to add comments. All responses are anonymised prior to evaluation; qualitative content analysis is used to evaluate the comments. More than 94 percent of sponsorship recipients participated in the survey. The outcomes thus reflect the Humboldt fellows' comprehensive, representative image of Germany.

GREAT AT CHANGING DIRECTION

Who actually does what at Humboldt headquarters? Who are the people behind the scenes making sure that everything runs smoothly? This page is devoted to the colleagues at the Humboldt Foundation, their lives at work and beyond.

TODAY: DANIELA NIES.

When I joined the Foundation 13 years ago, I could already look back on several stages in my working life. I trained as a carpenter in my father's firm, but it wasn't the right thing for me. So, I did a complete reverse turn and finally worked as a multilingual secretary for various science organisations. Alongside this, I taught yoga and started my own yoga school. And with my yoga trainer, an Irishman, I set up the folksong duo "Laurence and Dani". Recently, I have started doing rock music again and sing with a band. When I hear about somebody having a "krummen Lebenslauf", which is the German equivalent of an "unusual CV" – someone who has tried out lots of things and changed direction – I really have to laugh. I like changing direction – after all I ride a motorbike.

I enjoy dealing with people in my work. And that suits me very well at the Foundation. I started in the press department in 2010 and am now the assistant to the Deputy Secretary General. I am quality coordinator and internal auditor. A lot has changed over the years: when I started, the Foundation had a staff of roughly 170, today it's 270. And the topics are quite different, too. There was nothing like the amount of mobile working then that there is now. With all these innovations, it's really important to me to represent the interests and rights of staff so that, hopefully, everyone feels at home in the workplace. That's why I've been on the Foundation's works council for the last seven years.

And just to be sure I don't get bored when I finally stop work, I've already made plans: my husband and I recently bought two vintage motorcycles, which we are now restoring. When we reach retirement age, they will ensure we never stop changing direction. ● *Recorded by* **TERESA HAVLICEK**

Photo: Humboldt Foundation/Michael Jordan

PROMOTE THE HUMBOLDTIANS OF THE FUTURE

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