



BUW **OUTPUT**

Forschungsmagazin *Research bulletin* der Bergischen Universität Wuppertal
01/2022

**Raus aus der Nische – Transformationsforschung und Nachhaltigkeit
im Reallabor Wuppertal / Out of the Niche – Transformation Research and
Sustainability in the Wuppertal Real-world Lab**

von / by Karoline Augenstein und / and Alexandra Palzkill-Vorbeck

**Women Entrepreneurs in Science – Mehr Frauen für die Start-up-Szene
Women Entrepreneurs in Science: More Women for the Start-up Scene**

von / by Christine Volkmann

**Der asiatische Monsun – ein Turbolift für ozonschädigende Substanzen in die Stratosphäre
The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances**

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**Mit Alt und Jung zu den besten Ideen – Wie kann kreative Zusammenarbeit in
altersgemischten Teams gelingen? / Finding the Best Ideas with Young and Old People
– How Can Creative Cooperation in Mixed-age Teams Succeed?**

von / by Stefan Diestel und / and Charlotte Hohnemann

**Krise als Chance – Neue Spielregeln für einen fairen Dialog über Migration
Crises as Opportunities – For a Fair Narrative on Migration**

von / by Carolin Gebauer und / and Roy Sommer



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Contents

- 04 | **Editorial** von / by Michael Scheffél
- 06 | **Raus aus der Nische – Transformationsforschung und Nachhaltigkeit im Reallabor Wuppertal** / *Out of the Niche – Transformation Research and Sustainability in the Wuppertal Real-world Lab*
von / by Karoline Augenstein und / and Alexandra Palzkill-Vorbeck
- 12 | **Women Entrepreneurs in Science – Mehr Frauen für die Start-up-Szene**
Women Entrepreneurs in Science: More Women for the Start-up Scene
von / by Christine Volkmann
- 18 | **Der asiatische Monsun – ein Turbolift für ozonschädigende Substanzen in die Stratosphäre**
The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances
von / by Michael Volk und / and Valentin Lauther
- 24 | **Mit Alt und Jung zu den besten Ideen – Wie kann kreative Zusammenarbeit in altersgemischten Teams gelingen?** / *Finding the Best Ideas with Young and Old People – How Can Creative Cooperation in Mixed-age Teams Succeed?*
von / by Stefan Diestel und / and Charlotte Hohnemann
- 30 | **Krise als Chance – Neue Spielregeln für einen fairen Dialog über Migration**
Crises as Opportunities – For a Fair Narrative on Migration
von / by Carolin Gebauer und / and Roy Sommer
- 36 | **Das Institut für Grundlagenforschung zur Philosophiegeschichte**
The Institute for Basic Research into the History of Philosophy
von / by Gerald Hartung und / and Melanie Sehgal
- 39 | **Research News**
- 49 | **Forschungseinrichtungen und -projekte** / *Research Centers and Projects*
- 55 | **Forschungsförderung** / *Research Funding Management*

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Human Beings and the Environment

by Prof. Dr. **Michael Scheffel**, Pro-Rector for Research, External Funding and Advanced Scientific Training



Photo Rüdiger Nehmzow

Among the attractions of the University of Wuppertal's anniversary year was the most important university building competition in the world: Solar Decathlon Europe (SDE). It was held in Germany for the first time – in Wuppertal, City of Transformation, thanks to a committed team in the Structural Physics department within our School of Architecture and Civil Engineering. The University and the city benefited not only from the competition of nearly twenty teams from various countries and all their activities: many of the innovative ideas turned into buildings can still be visited and studied near the old Nordbahntrasse railway line for the next few years. What was built here on the site of a creative centre with the telling name Utopiastadt – Utopia City – offers a fascinating insight into future opportunities for building, living and relating to nature.

This edition of BUW.OUTPUT also features projects that focus on the topic of “Human beings and the environment”. Urban centres are like seismographs of social change. They are also places where people try early on to meet the challenges posed by such change. The first article looks into how the city of Wuppertal can be used as a “living lab” for neighbourhood development and transformation research. Start-ups, i.e. newly established businesses with a high potential for growth, are an important driver of competitiveness and innovation in any society. Four out of five new entrepreneurs hold a degree, but few of them are women. Why is that, and how can that be changed? These are the questions tackled by a research project from the sphere of economics.

Climate change is largely caused by anthropogenic changes in the earth's atmosphere. An article from atmospheric physics shows how this works in practice, us-

ing the example of certain chlorine compounds. These are mostly produced in Asia, abruptly transported to an altitude of over fourteen kilometres by the Asian monsoon, and then dispersed globally in the lower stratosphere, where the compounds ultimately contribute to the depletion of the ozone layer. Other articles address the issues of how companies can promote and develop new performance potentials in teams with a high age diversity, and how discursive spaces for a fair dialogue on migration can be created in our societies marked by rapid refugee and immigration movements.

Along with news from the world of research, our publication also includes a portrait of the newly established “Institute for Basic Research into the History of Philosophy”. One focus of its work is to co-ordinate and edit a multi-volume standard work on the history of human ideas entitled “Grundriss der Geschichte der Philosophie” (“Outline of the History of Philosophy”); it also aims to shine a light on research into historiography and editing work in philosophy worldwide.

Enjoy your reading!

A handwritten signature in blue ink, which appears to read 'M. Scheffel'.



Out of the Niche

Transformation Research and Sustainability in the Wuppertal Real-world Lab

by Jun.-Prof. Dr. **Karoline Augenstein** and Jun.-Prof. Dr. **Alexandra Palzkill-Vorbeck**, Center for Transformation Research and Sustainability



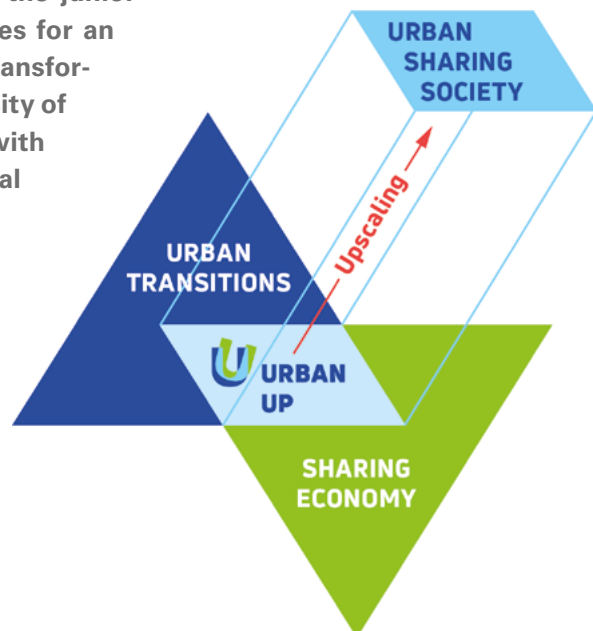
Photos Pia-Maria Michnik

Video interview: youtube.com/BergischeUniversittWuppertal

The concept of the “Urban Sharing Society” assumes that changes in behaviour within society towards a collaborative and more sustainable lifestyle can only be established when they are embedded in specific urban development contexts. At the same time, urban transformation processes can benefit from sharing approaches, as these show alternative economic perspectives and can contribute to new forms of societal wellbeing. In a five-year research project, the junior research group “UrbanUp” – Upscaling strategies for an Urban Sharing Society, based at the Center for Transformation Research and Sustainability at the University of Wuppertal (transzent), worked closely together with stakeholders from economy, civil society and local politics in the Wuppertal real-world lab to identify relevant actors and areas of action in a cooperative process, to analyse the importance of upscaling strategies for the further development of sustainable niches in urban development, and to generate context-based knowledge relevant to science and practice in equal measure.

Fig. 1: the project “UrbanUp – Upscaling Strategies for an Urban Sharing Society” examines how the basic principles “sharing and participation” can contribute to sustainable urban development.

Illustration UrbanUp



Research around societal change towards more sustainability is pulling more and more cities into focus as specific locations for transformation processes. They are investigated as locations where, on the one hand, the challenges of societal transformation are clearly seen: By 2050, it is supposed that over 70 percent of the global population will live in cities where up to 80 percent of energy is consumed today. On the other hand, urban centres are often the setting where relevant, new impulses for change leading towards sustainable development are initiated and tried out, where new forms of production and consumption, more sustainable lifestyles and new forms of political, societal and economic participation are attempted. Cities are therefore deemed sites of creativity and empowerment for implementing transformation processes towards sustainability.

And this is precisely where we see the complexity of a societal transition: no area of a city can be transformed without bringing other parts, and thus the city as a whole, into a state of change. Transformation research attempts to handle precisely this complexity. Transformation research is not a discipline per se; rather, it is based on the fact that knowledge of various disciplines together are required to solve complex sustainability issues. Above all, it is a question of finding strategies for implementing the gained knowledge together with

actors in practice, in order to shape the economy and society in a more sustainable way.

“Upscaling” as a central issue

For the development of sustainable alternatives, the creation and protection of niches in which impulses for change are developed and tried out experimentally plays a major role. Sustainable niches can then grow and become powerful if they succeed in questioning established, unsustainable structures and demonstrating alternatives to the status quo. One of the key issues in transformation research is how exactly “upscaling”, i.e. the structure-changing effect of technological and social innovations stemming from niche settings, can be promoted proactively. What is required to increase the scale of an isolated, protected niche for it to become mainstream? How should niches be shaped, and what strategies can actors develop to create impact and to contribute to shaping the entire system in a more sustainable way?

These questions are extremely demanding when you recognise that transformation processes are not linear, but coevolutionary, owing to their complexity. Through the evolutionary process of societal change, which runs its course in a reciprocal manner between different actors and trends, the proactive attempts of politics, but

Out of the Niche – Transformation Research and Sustainability in the Wuppertal Real-world Lab

also of science or civil society, often simply fall short of scaling up these niches strategically, or control their development in a straightforward fashion.

This is because, on the one hand, these protected niches are required for the emergence of alternatives – shielded from market pressures and established societal structures – on the other hand, the respective actors must work with the current structural conditions if they wish to make their activities effective beyond their niche. Niches then run the risk of losing their innovative character if they fit too well into the mainstream, which presents a dilemma.

This is also discussed as a fundamental problem of modern or reflexive societies: rational problem management strategies attempt to examine individual challenges in as isolated a manner as possible, to identify targeted solutions and to make these manageable and controllable. In a complex world, this kind of attempt at problem solving brings about new, unexpected problems however, (e.g. nuclear power as a contribution to the energy transition) which they then, in turn, attempt to solve in the same manner, in order to then produce unintended side-effects.

In transformation research, this knowledge leads to a renunciation of simple problem solving strategies. Governing transformation takes on a different meaning, and thus: a research-based approach which is open to different findings, bringing together many perspectives of a problem, approaching problems with experiments which can be adapted again and again, and initiating learning processes between the actors involved. The aim is to increase reflexivity, i.e. an awareness of the inherent complexities and interdependencies within transformation processes, and approaches which are tailored to these.

In this way, the upscaling of niches is not only about identifying and strategically promoting supposedly linear paths for scaling innovations; instead, it is about highlighting the complex relationships between niches and the non-sustainable structures surrounding them. In the context of research on urban transformation processes, experimental interventions in urban real-world

labs are used to initiate reflection processes and to discover cooperative ways of concrete problem solving.

Wuppertal real-world lab

This also applies to the Wuppertal real-world lab, which was developed in cooperation with the Center for Transformation Research and Sustainability at the University of Wuppertal (transzent), the Wuppertal Institute, the City of Wuppertal and various members of the city's society. The Wuppertal real-world lab is set up as a research infrastructure in which researchers and actors from practice have already developed a stable network and have experience in collaboration collected over several years. It covers several research projects within the transzent, and focuses on specific issues of urban wellbeing and sustainable urban development in various neighbourhoods of Wuppertal.

The City of Wuppertal is particularly well-suited as such an experimental context for three reasons: The first: Wuppertal has an excellent landscape of academic institutions: transzent, joining expertise of the Wuppertal Institute and the University of Wuppertal, links the applied transdisciplinary sustainability perspectives of the Wuppertal Institute with the various faculties of the university, and is a hub for transformation research. On the other hand, Wuppertal fulfils the characteristics of a typical “small big city” and its challenges and can therefore be considered a good example for other cities. A further advantage is the already existing and extensive civil society engagement in the form of initiatives and also networks of local businesses.

In basic terms, real-world labs are spaces and contexts in which researchers, together with actors from practice, create knowledge in a transdisciplinary research process. With the help of the relevant knowledge of the various actors from academia, politics, business and civil society, the real-world lab approach allows researchers to find out what is particularly relevant on the ground in Wuppertal. At the same time, it is possible to research how these different groups can be brought together in order to strengthen the transformation processes. There is a growing strand of research which is developing the relatively young concept of real-world labs and is based on some core features, e.g. on the fact that real-world labs aim to make a transdisciplinary, experimental and

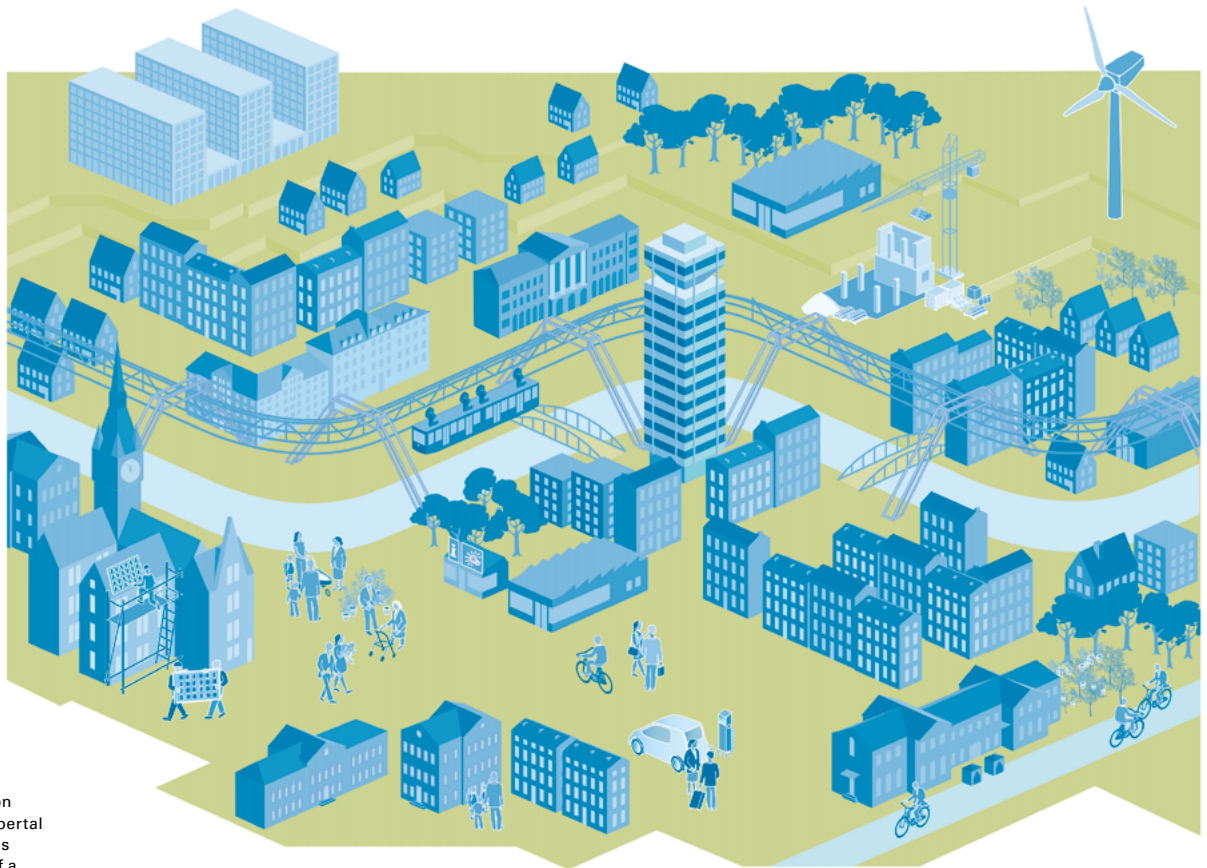


Fig. 2: Transformation research in the Wuppertal living lab: the city has the characteristics of a typical small city and its challenges, and can be considered a good example for other cities.

Illustration UrbanUp

normative contribution to sustainable development, and take their starting point for research in a real-world problem relevant to sustainability. In addition, the aim is that they achieve their transformative effect beyond the spatial and temporal boundaries of a project or specific experiment. In the best case, real-world labs are places where such reflexive learning processes are enabled beyond the context of a project.

Expedition: Space Station

An experimental intervention was carried out by the research project “UrbanUp” – a five-year junior research group funded within the framework of the social-ecological research of the Ministry of Education and Research – together with the civil society initiative Utopiastadt.

Utopiastadt focuses on topics such as sustainable urban development and concentrates particularly on the neighbourhood in which the initiative is located. One

of the main activities of Utopiastadt is the restoration of an old railway station building and its development into a sustainable cultural centre. In 2019, Utopiastadt acquired an abandoned area next to the old railway station and is working to develop it into a liveable urban space, as a “Utopiastadt campus”, to protect it from gentrification processes and to increase the quality of life in the city and in the neighbourhood.

This is where the intervention “Expedition: Space Station” began. In a series of workshops, a common understanding of the problem and common research questions were first developed and the specific intervention planned. This was so that the practical needs of Utopiastadt and the interests of the participating researchers were all taken into account: how can urban space be developed to offer space for ideas and concepts oriented towards the common good? How can actors and initiatives such as Utopiastadt achieve their public-interest goals and at the same time deal with economic constraints and institutional frameworks in their role

Out of the Niche – Transformation Research and Sustainability in the Wuppertal Real-world Lab



as property owners? How can groups not previously involved in Utopiastadt become involved, and what tensions or conflicts and positive learning processes are triggered by this?

To shed some light on these questions, two shipping containers were made available as a temporary experiment on the newly purchased Utopiastadt site, in addition to the ongoing activities offered in old shipping containers (e.g. bicycle rental and culinary offers), and rented out for short-term use. The intention was for various concepts to liven up the space to be tested out. An open call for participation was launched via various channels. Anyone who had a business, social, cultural, artistic or other idea for Utopiastadt was offered the opportunity to use one of the

containers for a period of up to eight weeks for the sum of one euro. The entire experiment ran from June to October 2019 and the containers were used by a variety of actors, local businesses, artists, entrepreneurs, social entrepreneurs and a local politician.

The overall aim of this intervention was to capture the different meanings and functions attributed to the specific location in Utopiastadt, and to initiate a reflexive learning process about possible paths and concepts for the future development of the purchased area.

There was very diverse feedback on the ideas that were tried out in the area. It became clear that the Space Station was perceived as a lively space as well as an attractive and valuable location, which differs clearly from the more consumption-oriented city centres, but also from purely natural or entertainment-oriented recreational spaces such as parks or playgrounds. The surveys showed that it was understood as a (semi-)public place which takes on a public or social function, as a space

Utopiastadt, an “ongoing social congress with ambitions and effect”, is a socio-cultural centre in Wuppertal. It is located in the buildings of the former Mirke railway station, directly on Nordbahntrasse street.

Photo Wolf Sondermann

“which creates potential, which somehow tries to fill a gap”, but not a typical inner city area. . However, while in some interviews with visitors it was emphasised that the quality of the location is thanks to its beautiful ambience and culinary offering, and that it is also possible to buy nice things, many others visit the location mainly because they see it as free from the compulsion to consume: “when the word ‘money’ was mentioned, one woman turned on her heel and left.” This gives rise to an area of tension which emphasises the central challenge of striking a balance between commercial and consumption-free, in order to meet the demands of all visitors, residents and, of course, the initiative itself.

In the sense of interventions in real-world labs, the purpose of Expedition: Space Station was not to find direct solutions for the financially viable and nevertheless public-interest-oriented development of the new area towards an urban free space; rather, it was to examine whether an urban area can be developed in an experimental process, what tensions might occur, and what various roles the actors involved in urban transformation processes fulfil.

Creative engagement with tensions

In this sense, real-world labs can function as structured spaces of experimentation and reflection, not just to allow problems to be solved in an isolated and rational manner and then to scale them up, but to find ways of handling emerging tensions proactively and creatively, and thus offer a reflexive contribution to urban transformations.

Many of the upscaling challenges that arise in sustainability-oriented processes cannot be “solved” in the sense of the dilemma described; they require learning and reflexivity – also via theoretical assumptions and problem definitions, as well as a reorientation of research questions and experimental approaches. The experimental approaches in real-world labs should be meaningfully collaborative and transdisciplinary, recog-

nise this dilemma and be designed in such a way that learning and reflexivity are the focus of the research approaches. Real-world labs and similar approaches can be suitable for this kind of reflexive process, especially if they are designed as research infrastructures, as in Wuppertal, in order to mobilise structures, trust and also resources for experiments and to promote the development of reflexivity throughout the entire research process (and beyond).

Thus, the goal of real-world labs is not necessarily to develop blueprints or strategies that can be scaled up and applied in other contexts, but to create space for reflexive learning.

www.urbanup.uni-wuppertal.de
www.utopiastadt.eu

Women Entrepreneurs in Science

More Women for the Start-up Scene

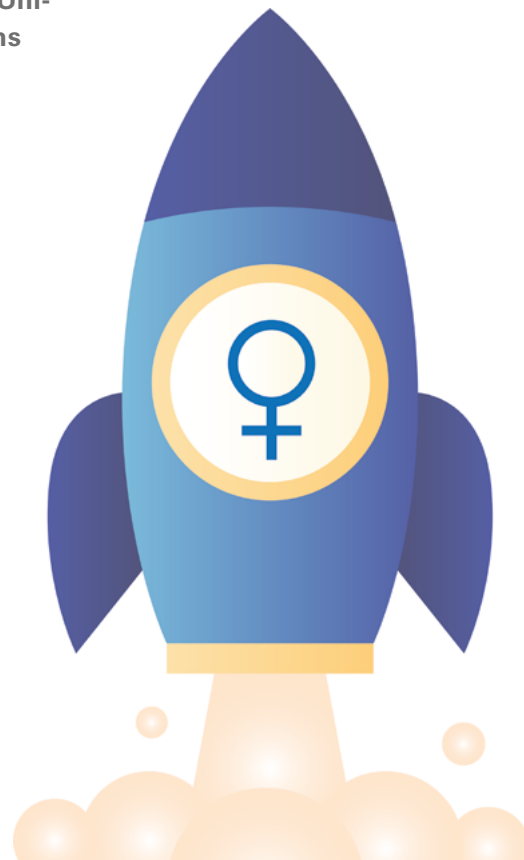
by Prof. Dr. **Christine Volkmann**, Chair of Entrepreneurship and Economic Development & UNESCO Chair of Entrepreneurship and Intercultural Management




Foto Özlem Eryigit

▶ Video interview: youtube.com/BergischeUniversitaetWuppertal

Across the country, the number of businesses founded by women is a mere 17.7 per cent, according to the 2021 Start-Up Monitor¹. Hence women in Germany are still significantly underrepresented in the start-up scene, implying that a great deal of start-up potential is not being utilised. Against this backdrop, the Women Entrepreneurs in Science project at the University of Wuppertal was initiated. The project aims to contribute in the long term to the state government's goal of increasing the proportion of spin-off companies founded by women from universities in North Rhine-Westphalia by 2025. This article highlights why significantly fewer women found a start-up than men. It also shows how the Women Entrepreneurs in Science project addresses these start-up barriers and sensitises more female students, staff members and alumni to the idea of founding a business. The lack of relatable female role models in the start-up scene and inadequate networks which enable access to investors, for instance, play a crucial role in this.





Start-ups, i.e. newly founded businesses with high growth potential, are an essential driver of competitiveness, the power of innovation, and digitisation in Germany. Due to their high degree of innovation and use of technology, for the most part, start-ups are viewed as significantly more academic than other forms of company foundations. It is therefore not surprising that four out of five start-up founders have a university degree². The nationwide share of start-ups by women is only 17.7 per cent. This figure has risen only marginally since 2015³. There are currently over 700,000 students in North Rhine-Westphalia, just under 50 per cent of whom are female. At 12.9 per cent, North Rhine-Westphalia's share of start-ups by women is below the national average (as of 2020)³. This low rate of start-ups by women reveals a high untapped potential. However, from a statistical point of view, female founders are more successful than male founders.

The project "Women Entrepreneurs in Science" (WES) at the Start-Up Center of the University of Wuppertal aims to raise this potential. To this end, Women Entrepreneurs in Science acts as a central contact point and supports the universities in NRW in establishing offers for women interested in starting a business. The goal is to create a positive and inspiring environment and a shared drive for action. Women entrepreneurship experts work to show women interested in starting a

business and female founders how to implement and advance their ideas successfully. The Ministry for Economic Affairs, Innovation, Digitalization and Energy funds the project as part of the "Exzellenz Start-up Center. NRW" initiative of the state of North Rhine-Westphalia.

Why are there fewer female entrepreneurs?

In general, male and female founders have similar requirements when it comes to starting a business. For example, networks play a central role in gaining access to investors and supporters. However, these requirements present a particular obstacle to women when starting a business. The start-up ecosystem – i.e., the environment of actors who drive and strengthen start-up growth in a specific region – is still dominated by men² and shaped by gender stereotypes and male entrepreneurial role models⁴. The vast majority of the historically shaped and societally expected traits of a successful entrepreneur are associated with males. For example, Andres et al. discuss a total of 13 traits that are generally attributed to an entrepreneur. Nine out of these 13 traits are assigned to stereotypical men. Among other things, they include competence, far-sightedness, flexibility and the willingness to subordinate family and friends to the company's success. In contrast, only four traits are attributed to

Women Entrepreneurs in Science – More Women for the Start-up Scene

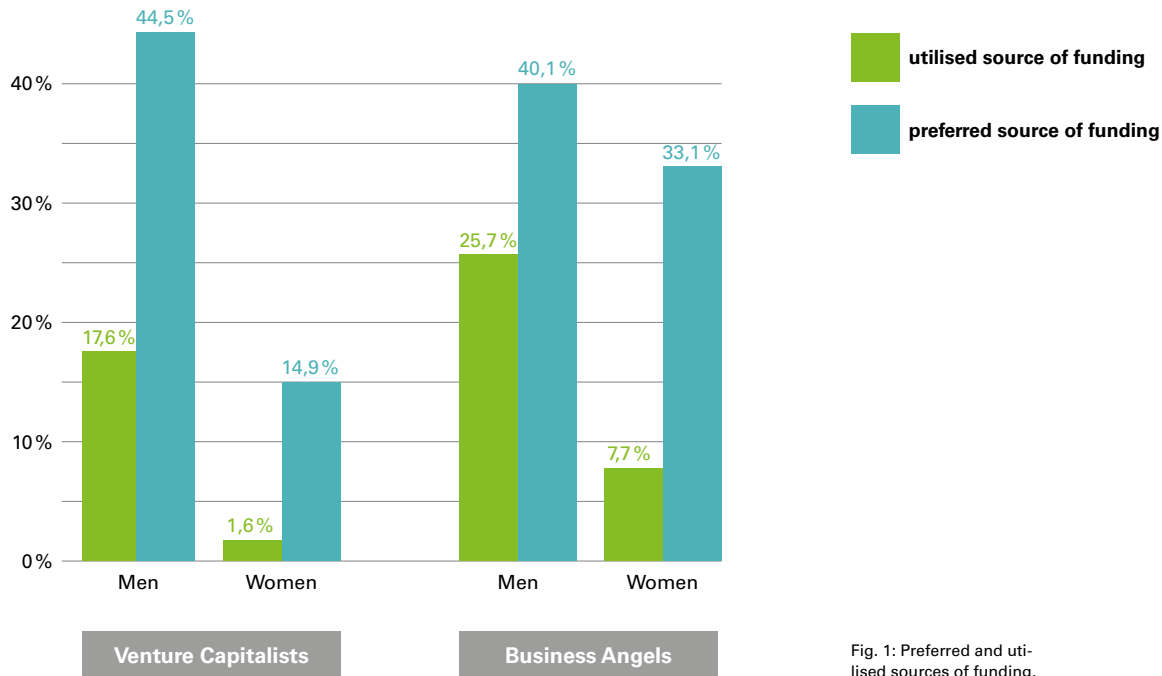


Fig. 1: Preferred and utilised sources of funding.

women. These include creativity, organisational skills and a good rapport with employees. In turn, it leads to a discrepancy: prejudices against female managers emerge, as the stereotypes associated with the female gender contradict those of a manager⁵. Consequently, there are partly conscious and unconscious stigmas that the start-up ecosystem and environment project onto the female founders.

In this context, studies show homosociality, i.e. a preference for social relationships with people of the same gender⁶. As a result, gaining visibility in a male-dominated start-up and investor network is often difficult for women entrepreneurs. Furthermore, studies in the context of start-up financing show the "same-gender effect", which describes the prioritisation of founders by investors⁸. This effect cannot be compensated for due to a lack of existing female investors. A gender bias is also evident in pitches by female founders: After a pitch, male founders are asked about their vision for the company, whereas women have to provide concrete financial forecasts and information about their customer base⁷.

Difficult access to funding sources

Consequently, female founders rate the start-up ecosystem significantly worse than male founders². However, a positive environment and network are relevant for potential business relationships and exchange among each other. The lack of networks also makes it more difficult for women to access sources of financing². Although female founders resort to their own financial resources as often as male founders, a significant difference can be observed within the scope of venture capital and business angel financing. Female founders achieve a rate of about 8 per cent in business angel funding². In contrast, male founders have a rate of about 26 per cent (cf. figure 1). In venture capital funding, a similar ratio can be seen².

These differences cannot be explained by various motives and sectors alone. In this respect, networks play a key role in enabling access to investors and finding supporters. Based on this very male-dominated start-up ecosystem, female role models are fundamental. While

there are many male role models, there is a lack of visible and relatable female role models for potential female founders. The findings from the project reflect this perception: Eugenia Gagin, a graduate of the Westfälische Wilhelms-Universität Münster (University of Münster) and co-founder of Dentalheld, a comparison portal for dental supplies, emphasises: "I was often mistaken for my co-founder's assistant or wife at the beginning of our start-up journey". Dr. Alice Martin, a graduate of the Heine-Universität Düsseldorf (Heinrich Heine University Düsseldorf) and winner of the NRW 2021 founder prize, founded dermanostic, a dermatology app. In an interview, she criticises the "strongly male-dominated environment" and the problem that female founders are taken less seriously when presenting to investors. This

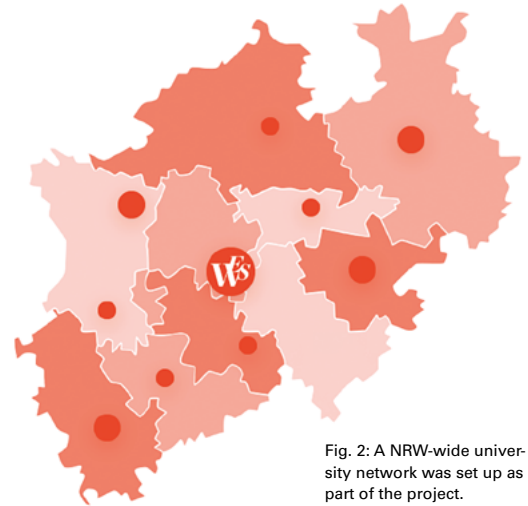


Fig. 2: A NRW-wide university network was set up as part of the project.

Illustration WES

circumstance also results from the image of a successful entrepreneur, who is described with male-associated attributes⁵. Thus, female entrepreneurs and founders are crucial in sensitising women to start a business and increasing the intention to start a business⁴.

A more female ecosystem and university network

Within the Women Entrepreneurs in Science project, an NRW-wide network was initiated and continually expanded to represent all stakeholders relevant to start-ups. It includes female founders, mentors, investors, and other start-up initiatives. The intention is to reduce the barrier "access to networks" for start-ups in the long run. Female investors and mentors share their knowledge as speakers in workshops and events and are available to offer female founders expert advice. Numerous universities, such as the RWTH Aachen University, Technische Universität Dortmund (TU Dortmund University), Ruhr-Universität Bochum (Ruhr University Bochum), Westfälische Wilhelms-Universität Münster (University of Münster) and Universität Paderborn (Paderborn University), are members of this network.

Women Entrepreneurs in Science works closely with partner universities' start-up centres and transfer offices to raise awareness among female students, employees



Women Entrepreneurs in Science – More Women for the Start-up Scene

and alumnae. The universities, in turn, provide individual counselling and support for those interested in founding a company.

For example, Women Entrepreneurs in Science was able to connect founder Sigrid Dispert with her start-up idea for "Memogic" with various partners in the start-up ecosystem. Sigrid, who grew up in Wuppertal, is also active in the WES network and serves as a role model to inspire women interested in starting a business. With the experience she has gained, she has become a network partner herself, but on the other hand, she also benefits from the WES network when challenges arise: "If we have a question, the Women Entrepreneurs in Science team is happy to refer us to people who have already mastered this challenge well".

Start-up sensitisation and offers

Besides the network activities, WES also has low-threshold offers in the form of various workshops to sensitise female students and alumnae to the idea of starting a business. The workshops are held in cooperation with the NRW universities and serve as the first point of contact between those interested in starting a business and the university's start-up advisors. A monthly cir-



Fig. 3: Sigrid Dispert, founder of Memogic.

Photo Sebastian Zarzutski

cle serves to network women interested in creating their own business with female entrepreneurs and contributes to increasing the visibility of female founders from the region.

In addition, the Ministry for Economic Affairs, Innovation, Digitalization and Energy of the State of North Rhine-Westphalia initiated the WES female mentor programme as part of the project. It offers prospective female founders the opportunity to be accompanied by experienced female founders who can support them in developing their full potential. Besides mentoring, the (future) female founders can participate in accompanying workshops and networking events to exchange experiences. Topics such as lean start-up, legal issues, mar-



Fig. 4: Carla Schäfers (li.) and Jessica Thelen, employees of Women Entrepreneurs in Science.

Photo Josephine Behr

Women Entrepreneurs in Science – More Women for the Start-up Scene

keting and press are addressed. The mentors also have the opportunity to exchange ideas with experienced female founders at "Virtual Experience Exchanges".

In mastermind groups organised by WES, female founders can also exchange ideas with other like-minded people. Over a period of six months, the female found-

ers meet up, set targets for their start-ups, discuss challenges and evaluate solutions for them. Once a year, WES invites female founders and mixed teams from NRW universities to the "Women Entrepreneurs in Science Summit" in Wuppertal to pitch their ideas to an expert audience of successful female investors and founders. Thereby WES provides access to investors and increases the visibility of female founders in NRW. The "Women Entrepreneurs in Science Award" distinguishes the best female or mixed start-up team of the NRW universities. In 2021, the summit focused on the topic of financing.

In this strong network of NRW universities and the actors relevant to start-ups, women interested in becoming entrepreneurs and female founders are supported in their journey before, during and after starting their business.

www.wes.uni-wuppertal.de

Fig. 5 (from left to right): Sebastian Hanny-Busch (NRW.Bank) with the winners of the 'Women Entrepreneurs in Science Summit '2021': Alexander Pöhler and Xiaojun Yang, founders of Assemblean GmbH.

Photo Josephine Behr

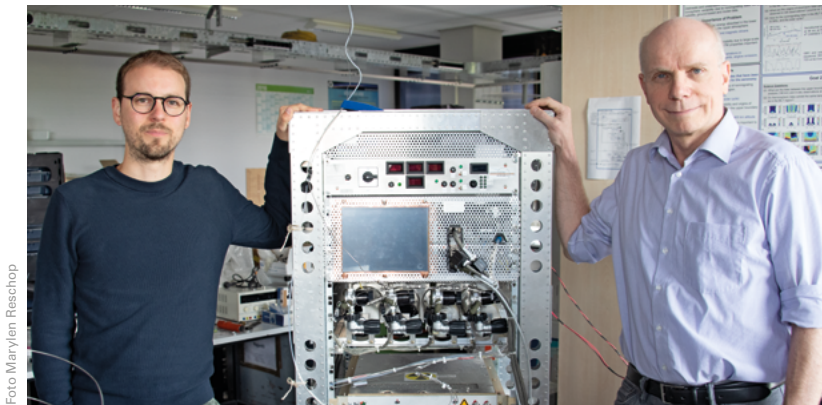


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The Asian Monsoon

– A Turbo Lift into the Stratosphere for Ozone-depleting Substances



by Prof. Dr. **Michael Volk** (r) and
Dr. **Valentin Lauther**, Institute for
Atmospheric and Environmental
Research

▶ Video interview: youtube.com/BergischeUniversitaetWuppertal

Working together with scientists from the Forschungszentrum Jülich research centre and the University of Mainz, atmospheric physicists from the University of Wuppertal have observed greatly increased concentrations of ozone-depleting substances in the lower stratosphere above the North Atlantic during a measurement campaign with the HALO research aircraft, and analysed the transport routes of these air masses to establish their regions of origin near the ground. The findings of the study¹ show for the first time by direct observation that short-lived organic chlorine compounds, which are mainly produced and released into the atmosphere in Asia, are catapulted to over 14 kilometres altitude by the Asian monsoon during summer, and then distributed globally in the lower stratosphere where they contribute to the destruction of the ozone layer. The findings and their significance for humans and the environment are presented and discussed in this article.

The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances

In order to counteract the progressive damage to the stratospheric ozone layer, the production of ozone-depleting substances has been regulated by international agreements under the Montreal Protocol since the late 1980s. As a result, the production of the very long-lived and harmful chlorofluorocarbons (CFCs) in particular was almost completely stopped. However, the production of very short-lived chlorinated hydrocarbons, including dichloromethane (CH_2Cl_2) and chloroform (CHCl_3), has not been regulated so far. Given these substances are already degraded within a few months in the troposphere, i.e. at altitudes less than about ten (or in the tropics up to 18) kilometres, it has long been assumed that only very small amounts of them reach the stratosphere above.

Recovery may be delayed

However, the production of these two substances in Asia, especially in China, has increased massively in the last 20 years, such that recent model simulations of the Earth's atmosphere predict a sharp increase of these substances, even in the lower stratosphere. If this development continues, a model study suggests that the ozone layer's recovery, which is actually expected by the middle of the century, could be set back significantly in the next few decades.²

Of course, such model forecasts are associated with a great deal of uncertainty. As for the question of what

proportion of the released dichloromethane or chloroform really ends up in the stratosphere, it is crucial how long it takes for the corresponding air masses to reach the stratosphere. This will often happen so slowly that these substances already break down in the troposphere such that the chlorine contained is rapidly washed out of the atmosphere by rain.

In the case of particularly rapid transport of the polluted air masses into the stratosphere, on the other hand, the degradation only happens up there – above all weather activity – and the chlorine released as a degradation product can remain in the stratosphere for months or even years, attacking the ozone layer. Sufficiently rapid transport into the stratosphere, however, occurs almost exclusively in intense thunderstorms, where moist and warm ground-level air is subjected to strong convective uplift through almost the whole depth of the troposphere, sometimes even into the stratosphere. Such high-level convection is predominantly found in the tropics and subtropics, and especially in regional monsoons, with the Asian summer monsoon being the largest and strongest by far.

However, individual storm cells are generally too small to be spatially resolved in global atmospheric models, meaning that the rapid convective transport is not simulated in detail at all; only its effect can be roughly approximated. Global simulations of short-lived chlorinated substances in the stratosphere thus rest on fairly shaky ground.

The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances

New measurements in the stratosphere

In order to not merely rely on simulations, these ozone-depleting substances must be measured in the stratosphere, which is difficult because of the extremely low concentrations of a few “parts per trillion” (ppt). Unlike some other trace gases, short-lived chlorinated hydrocarbons such as dichloromethane and chloroform cannot currently be measured by remote sensing methods from satellites. This means that you have to fly into the stratosphere and either gather air samples there, or better yet: have a highly sensitive measuring device flying in the stratosphere, which can continuously and quickly analyse the air directly on board an aircraft while precisely determining even the smallest concentrations of the two substances. The latter is the core business of the working group led by Prof. Dr. Michael Volk at the University of Wuppertal.

With their self-developed instrument HAGAR (“High Altitude Gas Analyzer”) measuring not only the most important greenhouse gases but also the CFCs F11 and F12, the working group has regularly carried out flights on the Russian high-altitude aircraft “M55 Geophysica” for almost 20 years (Fig. 1). It is one of only three research aircraft in the world that can reach the ozone layer at any location in the world (including in the tropics) with a peak altitude of over 20 kilometres. As part of the EU-funded international mission “Stra-

toClim”, in July and August 2017 the Geophysica from Kathmandu (Nepal) was the first ever to carry out measurement flights into the stratosphere in the region of the Asian monsoon.³

Air samples collected during the flights by colleagues from Utrecht University and later analysed in the lab at the University of East Anglia showed astonishingly high concentrations of short-lived chlorinated substances above 15 kilometres in altitude⁴, indicating rapid transport of contaminated ground-level air by means of high-reaching storm cells. Measurements of CO₂ and N₂O (laughing gas) with HAGAR also show that these South Asian air masses rise slowly (i.e. a few kilometres in a few months) higher and higher into the stratosphere after rapid convective transport in the region of the monsoon (Fig. 2), whereby they increasingly mix with air masses originating from other regions.

In order to significantly expand the measurement scope of HAGAR, including the possibility of carrying out direct measurements of short-lived chlorinated substances, a new instrument, “HAGAR-V”, with an additional mass spectrometer as detector was developed at the University of Wuppertal in recent years. Deployed on the German research aircraft HALO (Fig. 3) since 2015, this instrument has allowed direct and spatially highly resolved measurements of a whole range of climate-active and ozone-depleting trace gases up to 15 kilometres in altitude.

Fig. 1: The single-seated research aircraft M55 Geophysica can fly at altitudes exceeding 20 kilometres. Here it is prepared at the airfield in Kathmandu in July 2017 to conduct the first measurement flights to the stratosphere in the Asian monsoon region. On board: the instrument HAGAR (“High Altitude Gas Analyzer”) operated by the University of Wuppertal team to analyse the air for CO₂, N₂O, CFCs and other long-lived trace gases.

Photo Markus Rex

The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances

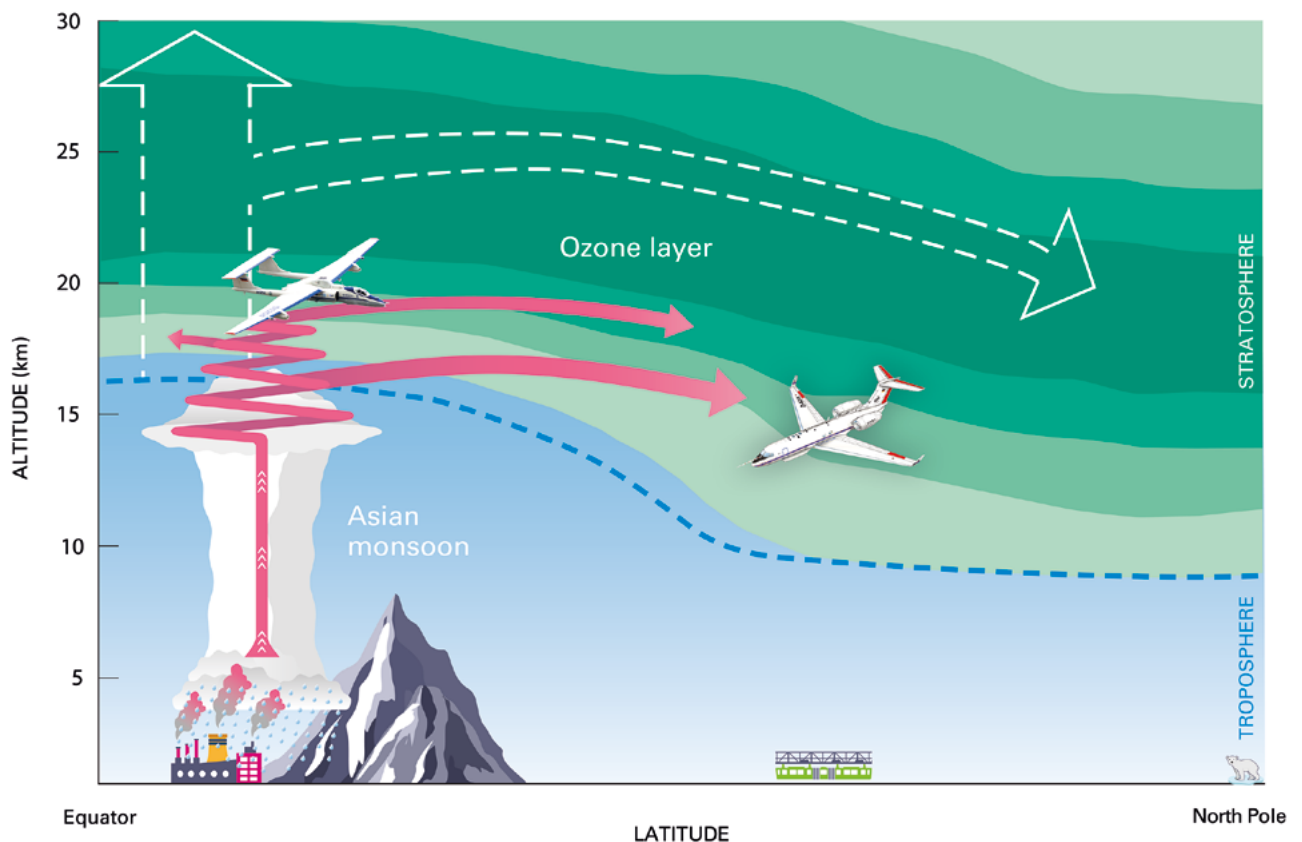
As part of the HALO mission WISE (Wave-driven Isentropic Exchange) coordinated by the Forschungszentrum Jülich and the University of Mainz, concentrations of dichloromethane and chloroform were measured from Shannon in Ireland over the North Atlantic in September and October 2017. On several of the 15 measurement flights, concentrations in the lower stratosphere were increased by up to 150 percent compared to typical background levels. With the help of calculations on air movement and model simulations at the Forschungszentrum Jülich it was eventually possible to show that these air masses, containing high concentrations of dichloromethane and chloroform, originate largely from layers near the ground in the South and East Asian region: the strong winds associated with the huge thunderstorms sucked up the ground-level air masses enriched with greenhouse gases and pollutants, and catapulted them to over 14 kilometres altitude. Thereafter they rose another few kilometres further into

the stratosphere at a slower pace (Fig. 2) while circling the high-pressure region over South Asia, the main area of the monsoon, in a giant clockwise spiral movement. Eventually, the ascended air masses broke out of the spiral to the north-east, were then transported across the Pacific and North America, and after a total of six to eleven weeks of transport they were observed with HALO over the North Atlantic (Figures 2 and 4).

Impacts far beyond Asia

The findings of the study show for the first time by direct observation that short-lived organic chlorine compounds, which are mainly produced and released to the ground-level air strata in Asia, are transported from the monsoon region directly into the lower stratosphere in summer by the powerful storms and the air circulation of the Asian monsoon – a bit like a “turbo lift”. Once there, they can contribute to the degradation of

Fig. 2: Sketch of air mass transport during the Asian summer monsoon in a height-latitude cross section (ozone layer shaded green): emissions of industrial pollutants near the ground, then rapid transport in high-reaching thunderstorms up to over 14 kilometres, followed by slow spiraling ascent around the monsoon's high-pressure area, from where air masses are transported to more northern latitudes at different heights (pink arrows). Part of the air also enters the tropics in the south, where it is captured by the global stratospheric circulation (white dashed arrows) and thus over the course of a few years spread throughout the whole stratosphere (above blue-dashed line).



The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances

the ozone layer. The measurements and analyses show how strongly the composition of the air in the lower stratosphere is determined by the Asian monsoon and how the global spread of air masses introduced by the monsoon works in detail.

Because this transport is so fast, there is not enough time even for short-lived pollutants such as dichloromethane and chloroform to degrade chemically in the troposphere, which means that they enter the stratosphere almost undiminished. Once there, they move further and further into the ozone layer, partly through further gradual ascent in the monsoon region and partly through global horizontal distribution towards more northerly latitudes. Some of these air masses also reach the tropical ascent region of the global stratospheric circulation further south, which overturns the entire stratosphere in the course of a few years, so that part of the chlorine from dichloromethane and chloroform is finally distributed over the entire stratosphere (Fig. 2).

The future of the ozone layer

The working group identified another rapid transport route into the stratosphere over Central America, here in connection with the North American monsoon or in isolated events by hurricanes. On several flights air masses were observed which a few weeks earlier were tossed to over 14 kilometres by Hurricane Maria in the Caribbean, just before Maria devastated Puerto

Rico. Then, the air masses crossed northeast into the stratosphere over the North Atlantic. Here, however, the “turbo lift” into the stratosphere is not located in a region with strong sources of emission; the air entering the stratosphere from the Central American region is comparatively clean.

In the case of the Asian summer monsoon, however, several key factors coincide in the same region: 1) the main industrial source regions of dichloromethane and chloroform and correspondingly increased concentrations near the ground, 2) an efficient coupling of the ground-level layers with the lower stratosphere by the rapid upward transport in the monsoon, and 3) continued strong population and economic growth with emissions which may be steadily increasing. It is therefore important to note: the Asian monsoon forms the basis of life for the entire densely populated South Asian region through heavy rainfall between June and September. Conversely, the monsoon increases the influence of the approximately two billion people living there on the Earth's atmosphere: if the industrial production of short-lived ozone-depleting substances in Asia continues to increase in the coming decades, this “turbo lift” into the stratosphere could have negative consequences for the sensitive ozone layer and significantly influence its future.

In fact, recent studies show that despite CFC concentrations falling for about 20 years, the ozone layer in the lower stratosphere has in part continued to thin,



Fig. 3: The research aircraft HALO was used to carry out measurements from Shannon in Ireland over the North Atlantic at up to 15 kilometres altitude. During several flights the HAGAR-V instrument, developed at the University of Wuppertal, observed strongly enhanced concentrations of dichloromethane and chloroform in lower stratospheric air masses that originated from layers near the ground in South and East Asia.

Photo Valentin Lauther

The Asian Monsoon: A Turbo Lift into the Stratosphere for Ozone-depleting Substances

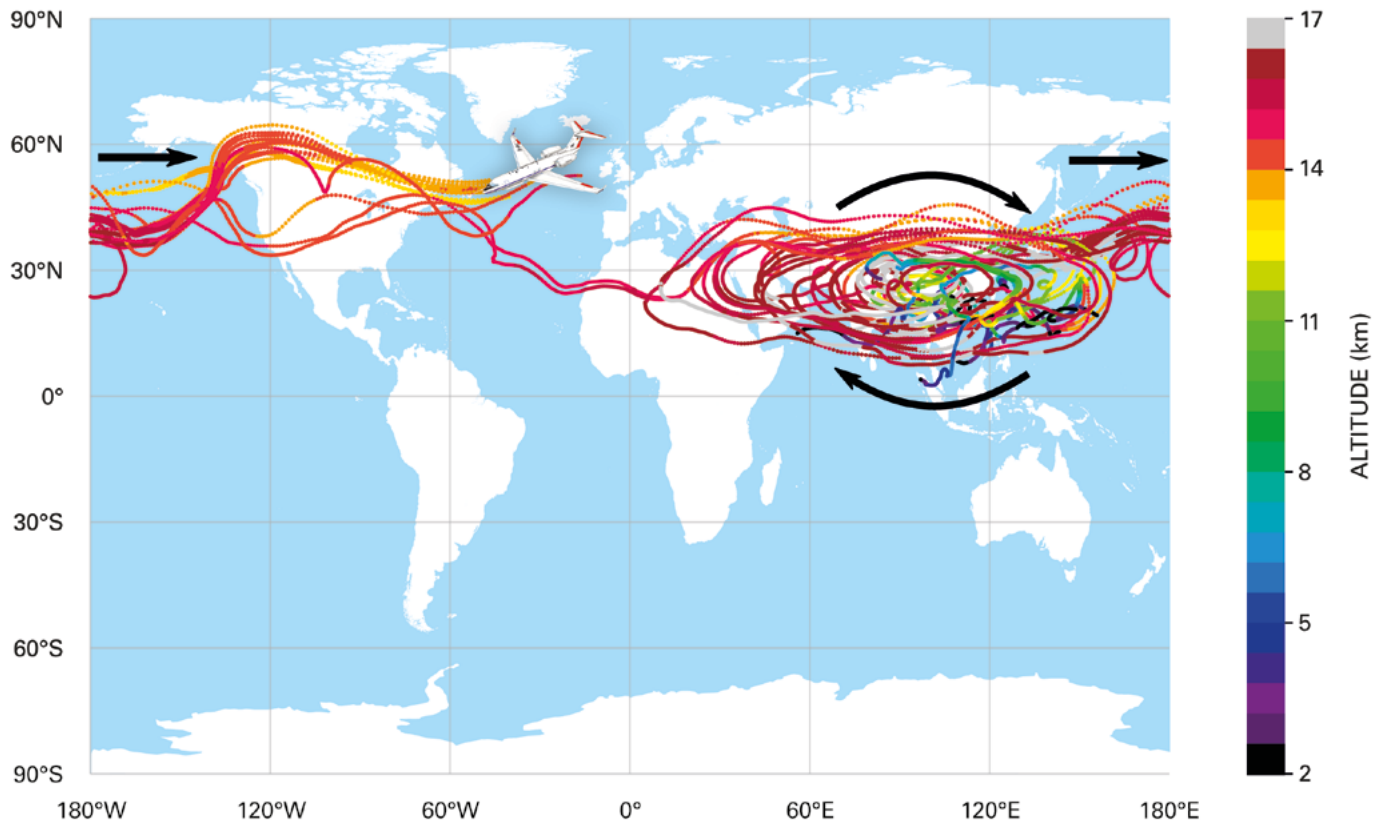


Fig. 4: Calculated trajectories (transport paths) of the air masses with strongly enhanced dichloromethane concentrations observed over the North Atlantic with HAGAR-V on board of HALO (trajectory altitude indicated by colours and direction by black arrows). After rapid uplift to over 14 kilometres in the Himalayan region the air spirals clockwise around the monsoon high-pressure centre while slowly ascending to 16 and 17 kilometres altitude, and finally crosses the Pacific and North America to the North Atlantic (observation site).

albeit at a much slower rate than before⁵. Up to now, the expected recovery could only be ascertained above approx. 30 kilometres altitude and above the polar regions. The continued ozone depletion in parts of the lower stratosphere may also have other reasons apart from the increasing chlorine or bromine from short-lived substances such as dichloromethane and chloroform. In particular, changes in the slow stratospheric air circulation are suspected, which transports ozone continuously from its tropical source region to mid- and high latitudes. However, such circulation changes can in turn be attributed to the increase in greenhouse gases. These developments demonstrate the continued sensitivity of the ozone layer to human activities, and how important it is that we continue to monitor it. This topic will remain one of the central research topics of the Atmospheric Physics group. The next measurement campaign in Alaska is already scheduled for August and September 2023, from where HALO flights over the North Pacific will be used to examine the export of polluted air masses into the lower stratosphere closer to the Asian source region.

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Finding the Best Ideas with Young and Old People

How Can Creative Cooperation in Mixed-age Teams Succeed?

by Prof. Dr. **Stefan Diestel** and **Charlotte Hohnemann**,
Chair of Work, Organisation and Business Psychology



Photo (1) Monhof, (2) Hohnemann

▶ Video interview: youtube.com/BergischeUniversittWuppertal

Since October 2019, in the project "Diversity Innovation Support Scheme" (DINNOS) from the Chair of Work, Organisation and Business Psychology, specific measures for the development of managers and a cognitive training for employees in small and medium-sized businesses have been implemented to promote and develop innovative performance potentials in teams with a high age diversity. The project, which was developed jointly by Trinity College in Dublin, the University of Wuppertal, the ASTON University, the Greater Birmingham Chambers of Commerce and the Kienbaum Institut & ISM for Leadership and Transformation, is supported by the European Union with a total funding volume of almost 700,000 euros over three years.



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Finding the Best Ideas with Young and Old People – How Can Creative Cooperation in Mixed-age Teams Succeed?

In many companies, employees of all age groups work together closely on a daily basis. The increasing age differences in working groups are due to different organisational developments, and overarching developments in Europe. On the one hand, more and more complex projects are being implemented, where results must be achieved efficiently using agile methods. On the other hand, young people are starting their working lives earlier, while middle-aged workers are increasingly changing their professional roles and older people are working for longer. Both trends lead to high age differences within teams which have to work on very complex topics and, in doing so, have to cope with unusual and new requirements, particularly in connection with digital transformation processes. In addition, flat hierarchies, which are becoming increasingly widespread, favour a type of communication which has changed in comparison with earlier times, and which must be as target-oriented and task-oriented as possible, regardless of unexpressed expectations and generation-specific role models. It is therefore often the case that significantly younger team members instruct older colleagues on issues of modern digital technologies, thereby influencing the general occurrences in the team more than before.

For these and similar reasons, cooperation between older and younger people is interesting and promising, yet also a risky challenge for teams, managers, company

directors and also human resource management. The particular potentials of teams with large age differences – including age diversity – lie primarily in the possibility of a creative exchange of ideas, experience and knowledge which have very different perspectives and accents in different generations and ages. While younger people bring in many solutions and technologies in IT, the skills of middle-aged and older people are characterised by in-depth expertise in communication, networking and integrative problem solving. Working together in a team that is oriented towards discovering innovative concepts efficiently should therefore benefit to a large extent from an intelligent combination of these diverse skills, abilities and knowledge with a high age diversity. However, when people of different ages work together on complex topics, completely different views on processes, tasks and solutions may lead to conflicts that severely affect communication, motivation, performance and, not least, health within the team. This is especially the case when large, obvious age differences cause team members to form smaller groups with people of the same age within the overall team. Likewise, prejudices against specific age groups play a role that should not be underestimated, as these prejudices can harden psychological fronts between smaller groups and exacerbate clear and underlying conflicts.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824217.

Finding the Best Ideas with Young and Old People – How Can Creative Cooperation in Mixed-age Teams Succeed?

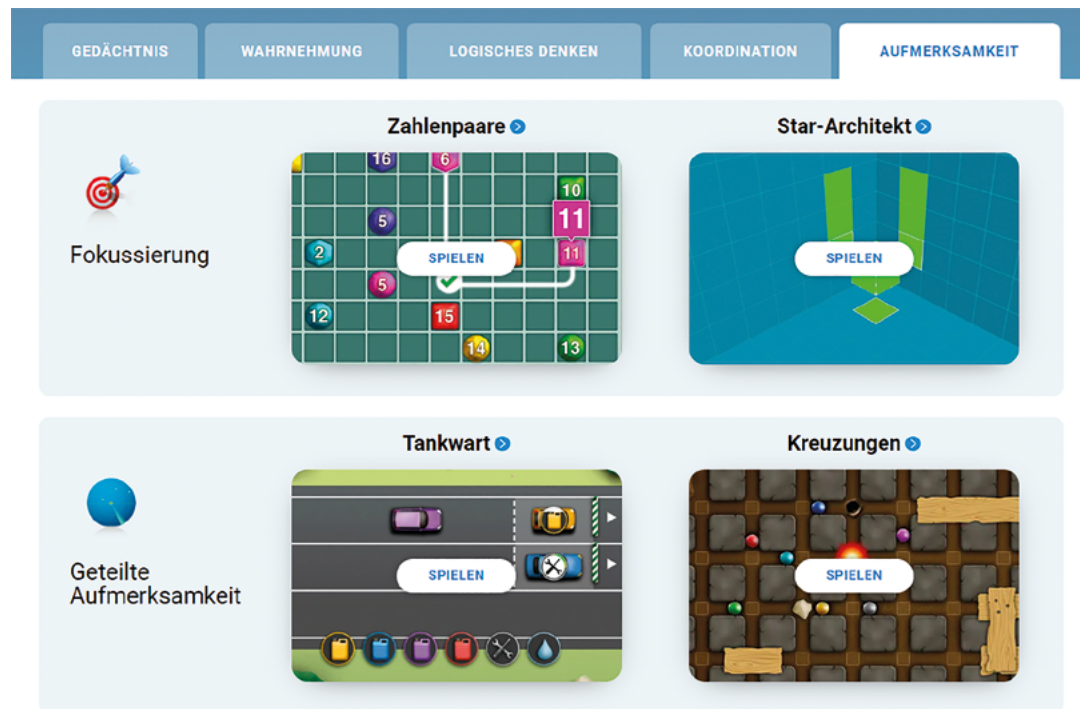


Fig. 1–4: Examples for cognitive training.

Innovation-oriented interventions

For the practice of leading and developing teams with large age differences, the key question relates to the influencing factors that favour creative exchange and prevent problematic conflicts within these teams. There is now a broad range of findings from human resources and organisation psychology which allow differentiated insights into the active mechanisms of interpersonal communication and the coordination of performance and innovation processes in mixed-age teams. On the basis of these findings, the DINNOS (Diversity Innovation Support Scheme) project, funded by the European Union, addresses the key question of the conditions conducive to performance and innovation in mixed-age teams. The project, which was developed together by Trinity College Dublin, the University of Wuppertal (Chair of Labour, Organisation and Business Psychology: Charlotte Hohnemann and Stefan Diestel), the ASTON University, the Greater Birmingham Chambers of Commerce and the Kienbaum Institute & ISM for Leadership and Transformation, is supported with a total funding volume of almost 700,000 over a period of

three years. The primary objectives of this project are to carry out extensive research and innovation-oriented interventions in over 300 small and medium-sized businesses from almost all sectors in the UK and Germany.

The concept (Diversity Innovation Support Scheme) intended to support these objectives integrates two interventions for innovation and performance processes within businesses:

1. Systematic development of individual skills

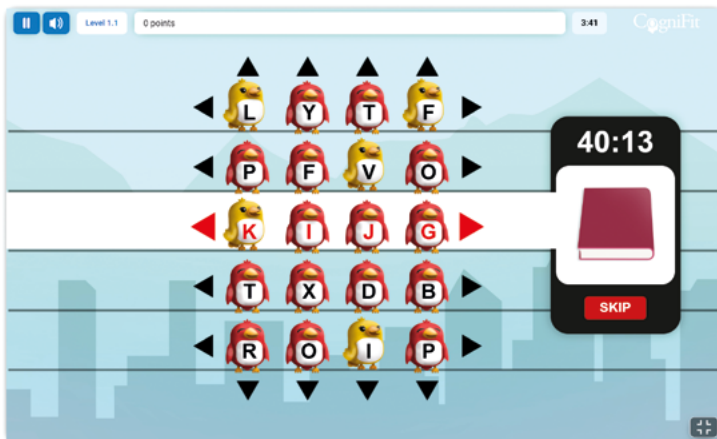
The first training involves the promotion of cognitive performance processes among employees who are exposed to increasing dynamic and technologically complex requirements. These cognitive performance processes relate to general mental abilities, including logical thinking, problem solving, planning, abstract thinking, understanding complex ideas and learning experiences. These are key skills that are required to face challenges in education, in a professional context and in everyday life. A growing number of empirical studies document that, in particular, these mental abilities can

Finding the Best Ideas with Young and Old People – How Can Creative Cooperation in Mixed-age Teams Succeed?

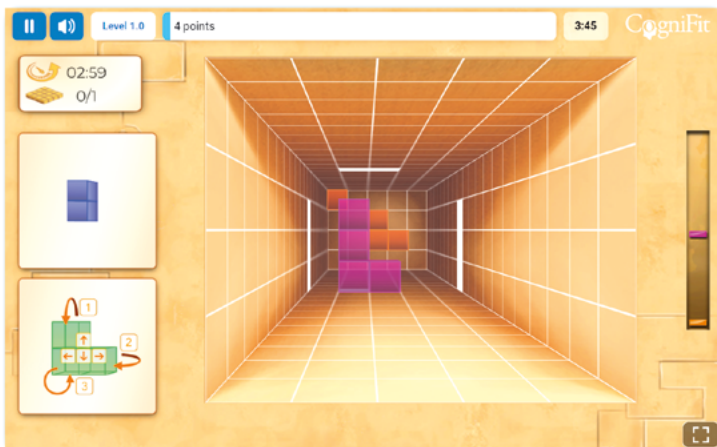


be developed sustainably through targeted training, and can exert strong positive influences on the search for original and unconventional solutions in complex tasks. Based on these findings, the DINNOS project focuses on memory processes, executive functions (e.g. attention), processing capacity, logical-conclusive thinking and creative solution processes which are to be expanded extensively via an online training platform developed by CogniFit¹ which has gamification elements included. This training is mainly completed by employees from the participating companies in order to help them to find and implement innovative solutions for structures and processes, but also for products and services.

2. Targeted development of managers



Owing to their decision-making powers, responsibility and role as communicators and coordinators, managers have a critical influence over performance and innovation processes in mixed-age teams. In many recent studies, “Servant Leadership” has proven to be a very motivational and performance-promoting style of leadership in almost all professional contexts. This style of leadership describes the extent to which managers see their role as serving their employees. Here, ethical integrity, the prioritisation of the development and needs of their own employees and meaningful contributions to society are characteristic features of the leadership. On the one hand, Servant Leadership favours a strong intrinsic motivation of the team members of the fulfilment of basic mental needs (autonomy, competence and social relationships). On the other hand, this kind of behaviour should also create a climate of mutual support, innovation orientation and mutual respect and trust. Both psychological conditions can allow the innovative performance potential in teams with a high age diversity to flourish. In an eight-week training concept, managers are familiarised with different techniques and strategies of the Servant Leadership model in a way that is geared to their professional role and thus promote concrete processes for innovation and performance-promoting team management.



Finding the Best Ideas with Young and Old People – How Can Creative Cooperation in Mixed-age Teams Succeed?

The interventions carried out in the participating companies in both areas are accompanied by a comprehensive evaluation programme. As well as the change in cognitive performance and leadership, the evaluation also covers economic parameters of the participating companies. This process involves an experimental method of investigation, with which interfering factors in the evaluation of new interventions are largely reduced. The implementation of a randomised-controlled study containing an experimental and a waiting control group is intended to provide answers to the question of whether the implementation of the innovation support programme can improve innovation abilities at an organisational and individual level compared to the control group.

Initial results suggest that managers who develop their teams according to the Servant Leadership principle will promote a trusting team climate and prevent task-related and interpersonal conflicts. The leadership training demonstrated a great effect on those who are very self-effective (i.e. who have confidence in their own performance). Finally, a confident team climate positively influenced by Servant Leadership reinforced the effect of intrinsic motivation on creative solution processes.

The close cooperation with CogniFit means that further experimental studies to support the influences of cognitive training are coming into being. The findings of the DINNOS project are intended to open up new perspectives in team management and the development of individual competences in order to be able to offer managers and businesses effective solutions for utilising the innovation and performance potential of teams with a high age diversity in the face of the dynamic challenges of digital transformation.

www.aow.uni-wuppertal.de

Footnote

¹<https://www.cognifit.com>



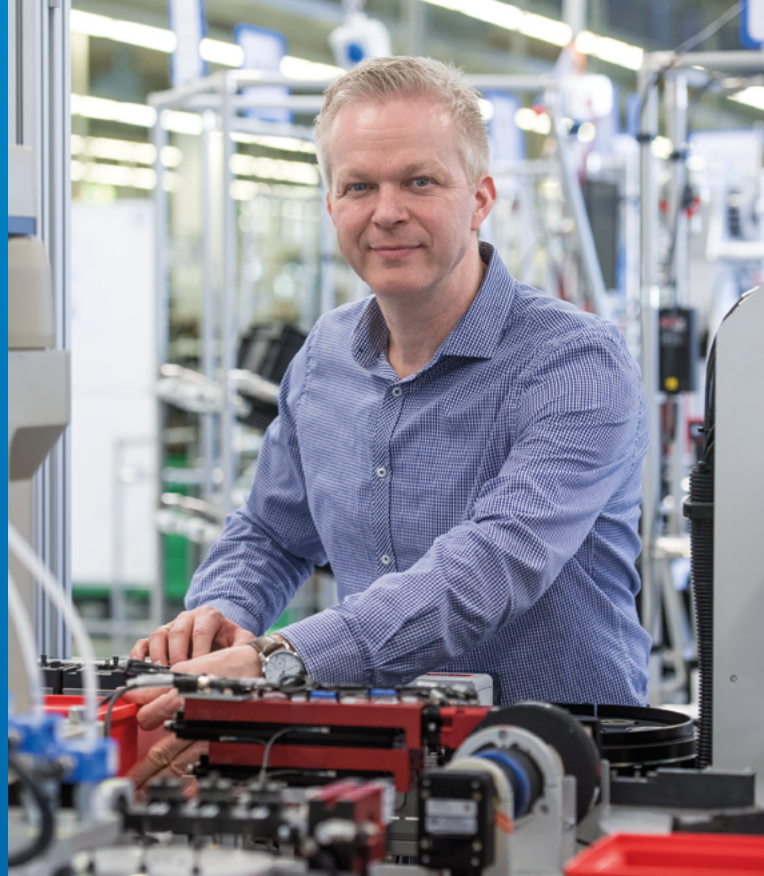
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Crises as Opportunities

For a Fair Narrative on Migration

by Dr. **Carolin Gebauer** and Prof. Dr. **Roy Sommer**,
Center for Narrative Research



Photos Gebauer/Sommer

Video interview: youtube.com/BergischeUniversittWuppertal

At the Center for Narrative Research at the University of Wuppertal, humanities scholars conduct research on the topics of narrative and migration as part of the Horizon 2020 project “Crises as OPPORTUNITIES: Towards a Level Telling Field of Migration and a New Narrative of Successful Integration”, funded by the European Union. Under the scientific coordination of Prof. Dr. Roy Sommer, an international team of four academic staff members investigates media representations of forced displacement and migration in order to model the dynamics of European migration debates by combining approaches from narrative theory and discourse analysis. In fostering a joint exchange between scientists, non-governmental organisations, and migrants, OPPORTUNITIES seeks to develop and test new discourse rules for a fair dialogue on migration and integration. The international and interdisciplinary consortium of the project includes universities, research institutions, and non-governmental organisations from eleven European and African countries, as well as a leading theatre company. The Koninklijke Vlaamse Schouwburg (KVS) theatre in Brussels will translate the findings of the project into a stage production which will also be performed in Wuppertal.



At a press conference on 31 August 2015, Chancellor Angela Merkel famously proclaimed “Wir schaffen das” (“We can do this”), thus sounding a clarion call to politicians, municipalities, and civil society to join efforts to overcome the new challenges arising from the so-called refugee crisis. A wave of willingness to help was the visible expression of approval among large parts of the population, with the result that “Willkommenskultur” (welcome culture) became the guiding concept of a humanitarian migration policy.

Instrumentalisation of migration

However, the AfD, Germany’s right-wing party, exploited the exceptional situation to fuel fears about immigration and, at the same time, to promote Euroscepticism. Similar developments could be observed in other EU countries. In the UK, as the consequence of a largely xenophobic Brexit campaign, a thin majority voted on 23 June 2016 to leave the EU. In 2015, the EU agreed on a quota system to relieve Greece and Italy: up to 160,000 refugees were to be distributed among other member states. Although they had been assigned only symbolic quotas, Hungary (approx. 1,000) and Poland (approx. 6,000) refused to accept even one single person; the Czech Republic (approx. 2,000) allowed only twelve persons to enter the country. The idea of a common mi-

gration policy had temporarily failed, putting the European Union to a crucial test. The European Commission consequently brought these three countries before the European Court of Justice, which determined in April 2020 that the three countries had violated EU law.

The events of 2015/16 will keep historians busy for a long time to come. Yet it is already clear today that they show how migration policy within the EU has been used to assert national interests as well as ideas about foreign and security policy at the expense of solidarity. The past few years have shown that Merkel’s confidence was justified – indeed, the challenges of the last decade have been overcome: Europe has taken in over a million refugees, mainly from Syria and Iraq. And the AfD’s fear that immigration would increase crime has also proven to be objectively unfounded and ideologically motivated.

An unusual project

How can one, even in scenarios of crisis, envisage a migration policy that is based on human rights and the Geneva Refugee Convention, protect the right of asylum irrespective of origin and



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way, OPPORTUNITIES establishes new forms of transfer between academia and civil society, with transfer being an integral part of research activities, which not only serve as “one-way traffic” (from research to practice), but are rather conceptualized as a dialogue: the NGOs use the concepts developed by the academic partners to generate, together with migrants, new migration narratives. These narratives, then, are analysed by the university partners and thus integrated in processes of theory building.

religion, stop illegal pushbacks, create inclusive forms of integration, and prevent the misuse of humanitarian disasters as a means to foster anti-European sentiments? The collaborative project “Crises as OPPORTUNITIES: Towards a Level Telling Field on Migration and a New Narrative of Successful Integration” (Horizon 2020), funded by the European Union since 2021, seeks to contribute to finding answers to these questions:

1. We develop new analytical categories for the description of the narrative dynamics of migration.
2. We study migration discourses and attitudes with the help of quantitative and qualitative methods: the project investigates public opinion in four member states, with variously rather liberal or restrictive asylum policies (Germany, Austria, Italy, Hungary), as well as in two African states (Senegal and Ghana).
3. We propose and develop the innovative concept of a “Level Telling Field” (LTF), based on the economic metaphor of the “Level Playing Field,” which is designed to overcome toxic debates on migration.
4. We implement and evaluate LTF principles in projects with migrants in Romania, Italy, Austria, Belgium, France, and Portugal as well as Mauritania, Ghana, and Senegal, using an innovative Cross-Talk methodology.

Seeing crises as opportunities also involves new forms of collaboration between European and African partners and the systematic integration of non-governmental organisations (NGOs) in research conducted by participating universities and research centers. In this



Fig. 1: The team members of OPPORTUNITIES (1st row from left to right): Prof. Dr. Roy Sommer, Dr. Carolin Gebauer, Dr. Mariam Muwanga, (2nd row from left to right): Ida Pálma Fábíán, Dr. Moustapha M. Diallo and Monika Kieslich.

Objectives of the project

At the Center for Narrative Research (CNR) at the University of Wuppertal, a team led by the scientific coordinator of the overall project, Prof. Dr. Roy Sommer, is developing the theoretical foundations. These include devising a theory of narrative dynamics which uses narratological categories to model both the origins and progressions of discourse shifts: How do narratives and counter-narratives interact with each other? What forms of symbiotic narration can be distinguished? How does narrative aggregation work, and which centrifugal or centripetal effects of narratives can be observed?

The research of Dr. Carolin Gebauer focuses on the typological distinction between narratives on migration (media reports, scientific analyses, political position papers) and narratives of migration, i.e. representations of the lived experience of forced dis-

placement and migration in conversations, eyewitness accounts, autobiographical texts, literary works, and artistic productions. Both types of narratives on and of migration must be balanced in migration debates, if a constructive dialogue on equal terms, a “Level Telling Field,” is to be achieved.

The concept of the “Level Telling Field” (LTF) is derived from the sports metaphor of the “Level Playing Field.” In economic contexts, this term refers to the removal of barriers to competition, thereby also standing for the principle of fair competition in the EU single market: the “spatial conditions” should not favour one team over the other. The members of the OPPORTUNITIES project at the CNR discuss important starting points with their partners in Rotterdam (with a view to the economic dimension of asymmetric relationships in markets) and Leuven (with a view to the legal and humanitarian facets of integration and inclusion).

When transferred to migration discourses, the notion of “fair play” implies, for example, that those voices must also be heard which are normally marginalized in public debates. The work of Dr. Mariam Muwanga and Dr. Moustapha Diallo deals with the untapped potential of the African diaspora in Germany, whose expert knowledge of the backgrounds of migration to

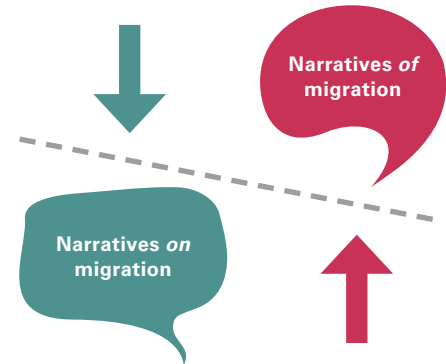


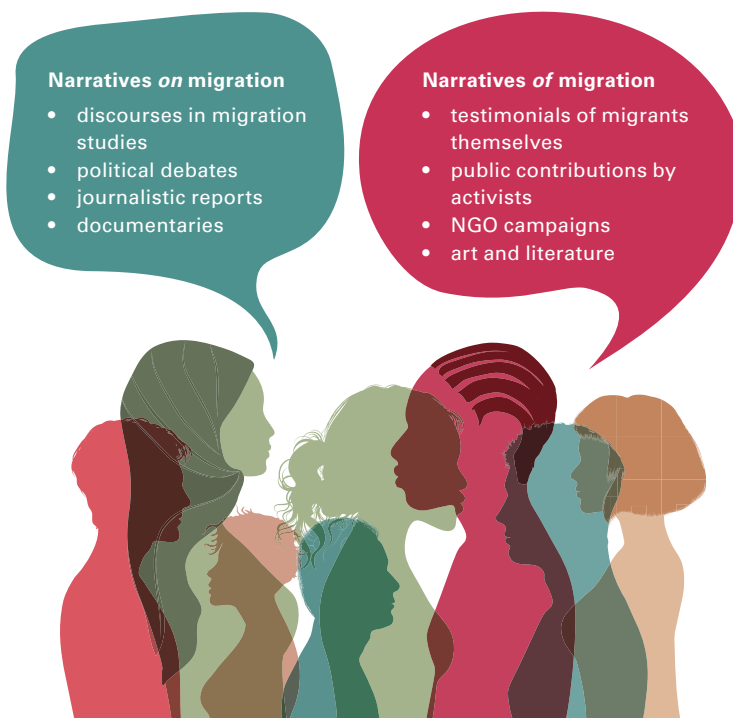
Fig. 2 and 3: For a fair debate on migration – a “Level Telling Field” seeks to ensure that also the voices of underrepresented groups are heard and listened to.

Europe has not played a role so far. The two researchers examine African perspectives on mobility and migration, drafting proposals for a strategic incorporation of the diaspora to utilise development assistance more efficiently. Together with the project partners in Ghana and Senegal, they will, moreover, work to establish new perspectives on migration: What do migration and mobility mean from an African point of view?

The project further explores the conditions under which debates can be considered fair and constructive. Key aspects are an inclusive representation of all participants in the LTF, an ethics of listening and mutual recognition, the abandonment of forms of toxic communication (hate speech, false claims, discrimination, etc.), and the condemnation of racist and xenophobic attitudes and actions.

A focus on current developments

Ida Fábíán’s work at Wuppertal’s CNR builds a bridge to qualitative research being conducted by project partners in Austria (ifz Salzburg) and at the University of Ghent in Belgium. This team undertakes comparative discourse analyses, with a focus on media representations of refugees and migrants in Hungary, Austria, Italy, and Germany. How have public opinions on and attitudes toward forced migration and displace-



Crises as Opportunities – For a Fair Narrative on Migration

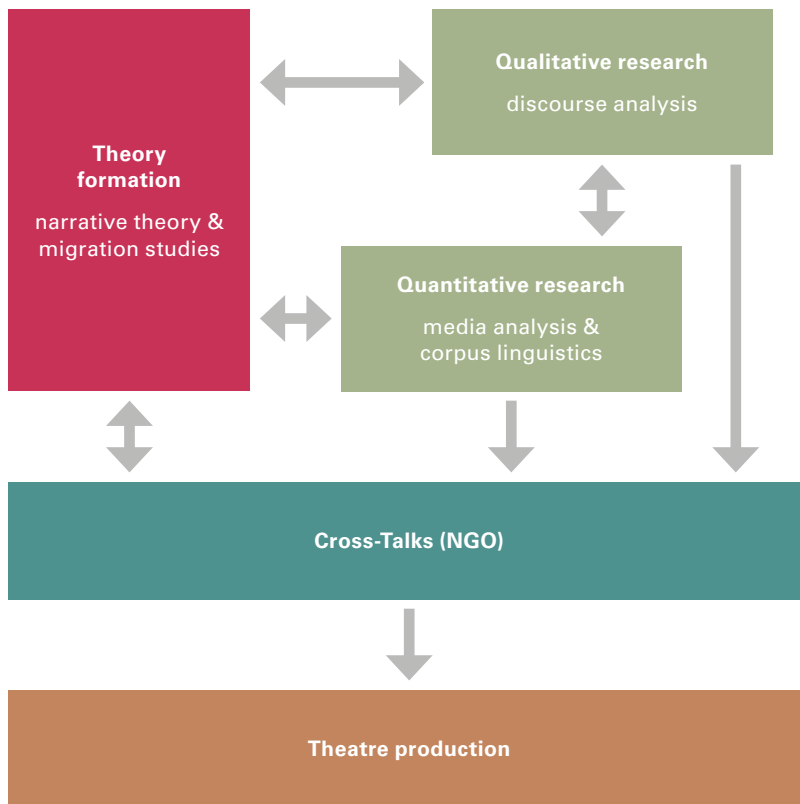


Fig. 4: the interplay of theory and practice in the OPPORTUNITIES project.

ment changed since 2015/16? The project proceeds from the assumption that the war against Ukraine, which is widely perceived as a threat to Europe itself, poses a new set of challenges to European migration policies as well.

It reveals that forced displacement is not a “crisis” but a humanitarian disaster. This was not different in Syria, of course, but back then the war took place far beyond the walls of “Fortress Europe.” In Poland (which has approx. 40 million inhabitants, around 25,000 of whom are Muslim), Muslim refugees were not welcome, and Islamophobia also increased in the Czech Republic (approx. 10.5 million inhabitants, including around 10,000 Muslims). Anti-humanitarian rhetoric dominated Italian foreign policy, with Matteo Salvini accusing sea rescue organisations such as Sea Watch of human trafficking. He accordingly refused to permit Sea Watch 3 entry to the port of Lampedusa –

illegally, as Italian courts later ruled.

The attack against Ukraine, which violates international law, has a direct impact on Europe. The geographical and cultural proximity creates a new welcome culture – this time not “only” for reasons of humanitarian solidarity, but also due to the fear that Putin’s war will not stop at the borders of Russian-controlled Transnistria in Moldova. Abstract threat scenarios now suddenly appear more concrete. How do these political developments influence public opinion? Which attitudes dominate, and which arguments find most approval? The project addresses these and other questions in comparative discourse analyses as well as in quantitative media research: a team of media scientists at the University of Leuven examines changes in attitudes by analysing discourse shifts in political communication with the help of methods from statistics and corpus linguistics.

Theory and practice

But how can one establish discursive spaces which foster a fair debate among different stakeholders on topics of migration and inclusive forms of integration? Not only does the OPPORTUNITIES project reflect upon these questions from a theoretical perspective and through case studies, but it also involves NGOs in Romania, Italy, Austria, Belgium, France, Portugal, Mauretania, Senegal, and Ghana. All these organizations are involved in refugee aid and have longstanding experience in working with migrants.

The NGOs source examples of migrant experiences by conducting interviews and organizing Cross-Talks in the countries mentioned above. Cross-Talks are community events with representatives from civil society, during which locals and refugees put the LTF approach into practice. Toward the end of the project, the Koninklijke Vlaamse Schouwburg KVS theatre in Brussels will translate our findings into a traveling stage production. The ensemble will tour through several European countries, including Germany, and will, of course, also visit Wuppertal.

www.opportunitiesproject.eu



The Institute for Basic Research into the History of Philosophy

by Prof. Dr. **Gerald Hartung** and Dr. **Melanie Sehgal**

The Institute for Basic Research into the History of Philosophy (IGP) researches the institutional, material and practical dimensions of philosophising, primarily since the 19th century, and works on historiographic and methodical questions in particular. At the heart of the Institute's work is the standard reference work "Grundriss der Geschichte der Philosophie" (Outline of the History of Philosophy), to which academics from all around the world contribute. The Institute was founded in 2019 by Prof. Dr. Gerald Hartung to raise the profile of research in the field of historiography and editing in philosophy and to connect researchers in these areas. It works closely with the Chair of Cultural Philosophy and is part of the Department of Philosophy. The IGP at the University of Wuppertal also collaborates with the Interdisciplinary Centre for Science and Technology Studies (IZWT) and the Interdisciplinary Centre for Editing and Documentology (IZED) and is involved in the research training group "Dokument – Text – Edition". Dr. Melanie Sehgal has been Director of Research at the IGP since April 2021.

The "Grundriss der Geschichte der Philosophie" (Outline of the History of Philosophy), edited by Gerald Hartung and Laurent Cesalli, is at the centre of the Institute's work. The Grundriss is a global history of philosophy mapped out over more than fifty volumes and involving teams from all around the world. A board of trustees at the Swiss Academy of Humanities and Social Sciences (SAGW) is there to assist the general editor and the publisher. The "Grundriss der Geschichte der Philosophie" was launched in 1862 by Friedrich Ueberweg. This bibliographic reference work, with its contributions on the biographies of scholars, abstracts of even obscure

texts and historical and systematic outlines of philosophical doctrines and their reception, is the standard reference work for the history of philosophy in Germany and beyond.

At the same time, the work is evidence of the constrictions of 19th-century philosophical historiography, which we now need to reconsider: is philosophy really European? In the globalised world of the 21st century, can we still explain philosophy on the basis of patterns and structures rooted in the nation state? What classification criteria could replace religion and nationality – languages, cultures or even internal criteria (ideas, concepts, knowledge formations and practices)? Such questions are the focus of the work on the Grundriss, and the answers are directly reflected in the structure and content of the various volumes. "Philosophie in der Islamischen Welt, 8.–10. Jahrhundert" (Philosophy in the Islamic world, 8th–10th century) and "Die Philosophie des 19. Jahrhunderts. Deutschsprachiger Raum, 1800–1830" (Philosophy in the 19th century in the German-speaking world, 1800–1830) are the most recent publications.

In addition to the work on the Grundriss, the IGP has two other key and interrelated research focuses. The first is the study of forms of practice of philosophy. By forms of practice, we mean the institutional frameworks, the local and global networks and the practices – editing, publishing, teaching, research, etc. – of philosophy as well as its spaces and formats: a material history of philosophy, so to speak. What do philosophers actually do? Does their work have to be connected to a university? When did philosophy become an academic discipline, and what was it before? Are there other forms

of philosophy than those practised at university such as seminars and lecture theatres? The history of university philosophy is at the centre of our work in this area. We conduct research and editing projects on the history of university philosophy in Germany, with funding from the German Research Foundation (DFG). To date, projects have looked at the philosophers Wilhelm Windelband and Hans Vaihinger and covered the years 1871 to 1918.

The 2022 summer semester saw the launch of the lecture series “Praxisformen der Philosophie” (“Practices of Philosophy”), which extends this focus and will be continued in the future. In June the philosopher Michael Hampe (Zurich) outlined the history of a type of philosophy in the mid-20th century whose aim is less to argue or prove its points but rather attempts to show what it is concerned with, through microhistories and autobiographical references for instance. The historian Martin Mulsow (Erfurt) will continue the series in the winter semester. He will speak about the practice of the history of ideas, examining what scholars actually did concretely when they were engaged in the history of ideas or intellectual history. Questions which he asks as part of his research include: how did you find a topic, how did you approach it, what kind of sources did you use, how

did you work with them? What kinds of expertise from colleagues near and far could you draw on, and how did you cross the boundaries of your own discipline?

The second focus of the Institute’s work is on historiographic and methodical explorations of philosophical historiography. This feeds indirectly into work on the “Grundriss der Geschichte der Philosophie”, in particular the series on the European history of philosophy of the 20th century and its global interrelations, and that on non-European philosophy. Within both areas of focus – practices of philosophy and philosophical historiography – we address questions of canon formation, the necessity of a decolonisation of philosophical historiography and the discussion about implicit racism in canonical representations of philosophical history: are there centres and peripheries of philosophical traditions? Can we speak of progress in the history of philosophy? How can events, episodes, trajectories and intersections of philosophical thought be distinguished from each other? What role do processes of institutionalisation play? How is it, that certain philosophies become canonical in the history of philosophy, while others, which were quite prominent in their time, are forgotten?

www.igp.uni-wuppertal.de

At the official opening ceremony of the institute (from left to right): Chairman Prof. Dr. Gerald Hartung, Prorector Prof. Dr. Michael Scheffel, Director of Research Dr. Melanie Sehgal, Dean Prof. Dr. Ursula Kocher, Prof. Dr. Carsten Dutt (University of Heidelberg, scientific advisory board of the IGP) and UW’s chancellor Dr. Roland Kischkel.

Photo Sebastian Jarych



NACHHALTIGKEIT Unter dem Label Humboldtⁿ haben sich NRW-Universitäten zusammengeschlossen, um ein landesweites Nachhaltigkeitskonzept zu entwickeln. Sie kooperieren mit dem Wuppertal Institut für Klima, Umwelt und Energie als außeruniversitärem Partner und renommierter Forschungseinrichtung für die Themen Nachhaltigkeit und Transformationsforschung sowie mit der Nordrhein-Westfälischen Akademie der Wissenschaften und der Künste im Bereich Nachwuchsförderung. Humboldtⁿ will Generationenverantwortung für Nachhaltigkeit und nachhaltiges Handeln in Forschung, Lehre, Administration und Infrastrukturen verankern.

NACHWUCHSFÖRDERUNG In der Automobil- oder Handyindustrie, aber auch in Haushaltsgeräten sorgen elektronische Bauteile auf Basis von Halbleitern für wichtige Funktionen. Wie die Fertigung dieser Bauteile optimiert werden kann, untersuchen Wissenschaftler*innen des Interdisziplinären Zentrums für reine und angewandte Massenspektrometrie (ipaMS) an der Bergischen Universität. Für die Finanzierung von Abschlussarbeiten in der Grundlagenforschung erhält das ipaMS zusammen mit der Physikalischen und Theoretischen Chemie der Hochschule rund 1,25 Millionen Euro Förderung von einem großen deutschen HiTech-Unternehmen.

MEHR EFFIZIENZ Effiziente Distributionszentren sind eine wichtige Grundvoraussetzung der großen Onlinehändler, um am Markt bestehen zu können. In einem neuen Forschungsprojekt am Lehrstuhl für Wirtschaftsinformatik und Operations Research der Bergischen Universität unter Leitung von Prof. Dr. Stefan Bock geht es darum, geeignete Verfahren zu entwickeln, die zu möglichst kostenminimalen Touren in den Zentren führen. Das Forschungsvorhaben wird von der Deutschen Forschungsgemeinschaft mit über 420.000 Euro gefördert; die Hälfte davon geht nach Wuppertal.

VERLÄNGERUNG Die NRW-Landesregierung fördert das von der Bergischen Universität Wuppertal geführte Competence Center 5G.NRW für weitere drei Jahre mit rund 2,9 Millionen Euro. Prof. Dr. Andreas Pinkwart, Minister für Wirtschaft, Innovation, Digitalisierung und Energie des Landes Nordrhein-Westfalen, überreichte die Förderbescheide Anfang Mai in der 5G-Demonstrationsfabrik an der RWTH Aachen. Als Brücke zwischen Wissenschaft und wirtschaftlicher Anwendung begleitet das CC5G.NRW die Entwicklung des Mobilfunkstandards mit dem Ziel, Nordrhein-Westfalen zum Leitmarkt für 5G-Anwendungen zu entwickeln.

SUSTAINABILITY Under the Humboldt labelⁿ, universities in NRW have joined forces to develop a state-wide sustainability concept. They are collaborating with the Wuppertal Institute for Climate, Environment and Energy as a non-university partner and acclaimed research institute on the issues of sustainability and transformation research, and with the North Rhine-Westphalian Academy of Arts and Sciences in the field of research training and the support of junior academics. Humboldtⁿ aims to anchor generational responsibility for sustainability and sustainable action in the fields of research, teaching, administration and infrastructures.

RESEARCH TRAINING AND SUPPORT OF JUNIOR ACADEMICS Electronic components that are based on semiconductors carry out important functions in the automotive and mobile phone industry, not to mention household appliances. Scientists at the Interdisciplinary Centre for Pure and Applied Mass Spectrometry (ipaMS) at the University of Wuppertal are carrying out research into how the production of these components can be optimised. ipaMS, together with the Department of Physical and Theoretical Chemistry at the university, has received approximately 1.25 million euros in funding from a leading German hi-tech company to fund theses in the field of fundamental research.

MORE EFFICIENCY Efficient distribution centres are a key requirement for large online retailers if they are to hold their own on the market. In a new research project at the Chair of Business Computing and Operations Research at the University of Wuppertal headed by Prof. Dr. Stefan Bock, the objective is to develop processes to minimise the cost of routes in the distribution centres. The research project has received funding of more than 420,000 euros from the German Research Foundation; half of this sum is going to Wuppertal.

EXTENSION The state government of NRW is supporting the 5G.NRW Competence Centre, which is managed by the University of Wuppertal, with approx. 2.9 million euros for a further three years. Prof. Dr. Andreas Pinkwart, Minister for Economic Affairs, Innovation, Digitisation and Energy of the State of North-Rhine Westphalia, presented the official funding notice at the 5G Demonstration Factory at RWTH Aachen University in early May. As a bridge between the world of science and commercial applications, CC5G.NRW is supporting development of the mobile communications standard with the goal of turning North Rhine-Westphalia into a lead market for 5G applications.



„Netzwerke 2021“: Förderung für die Bergische Uni

“Networks 2021”: funding for the University of Wuppertal

Die Landesregierung unterstützt fünf Netzwerke in zukunftsweisenden Forschungsfeldern mit insgesamt rund 81,2 Millionen Euro. An zwei dieser Forschungsnetzwerke sind auch Wissenschaftler*innen der Bergischen Universität beteiligt. Ihr Anteil an der Förderung liegt zusammen bei rund 4,3 Millionen Euro.

Das Netzwerk „NRW-FAIR“ vereint Teilchenphysiker*innen der Universitäten Bochum, Bonn, Münster und Wuppertal sowie des Forschungszentrums Jülich. Die Forschenden wollen die Arbeit an der „Facility for Antiproton and Ion Research in Darmstadt“ (FAIR) – ein voraussichtlich 2026 an den Start gehendes Teilchenbeschleunigerzentrum zur physikalischen Grundlagenforschung und eine der größten Forschungseinrichtungen, die je in Europa erbaut wurden – maßgeblich mitgestalten.

Um Forschung und Anwendung im Bereich der Terahertz-Technologie geht es im Netzwerk „terahertz.NRW“, an dem neben Forscher*innen aus Wuppertal auch Wissenschaftler*innen des Fraunhofer-Instituts für Hochfrequenzphysik und Radartechnik in Wachtberg, der Universitäten Duisburg-Essen und Bochum sowie des Fraunhofer-Instituts für Mikroelektronische Schaltungen und Systeme in Duisburg beteiligt sind. Das Netzwerk hat das Ziel, die Lücke zwischen grundlagenorientierter Forschung und einer innovationsgetriebenen wirtschaftlichen Entwicklung langfristig zu schließen.

The state government is supporting five networks in pioneering areas of research with a total of approximately 81.2 million euros. Researchers from the University of Wuppertal are involved in two of those networks. Their share of the funding amounts to roughly 4.3 million euros.

The “NRW-FAIR” network brings together particle physicists from the Universities of Bochum, Bonn, Münster and Wuppertal as well as Jülich Research Centre. The researchers want to play a major role in shaping work at the Facility for Antiproton and Ion Research in Darmstadt (FAIR) – a particle accelerator centre for fundamental physics research which is expected to launch in 2026, and which is set to be one of the largest research facilities ever built in Europe.

Research and applications in the field of terahertz technology are the focus of the “terahertz.NRW” network. Participating in the network are researchers from Wuppertal, as well as scientists from the Fraunhofer Institute for High Frequency Physics and Radar Techniques in Wachtberg, the Universities of Duisburg-Essen and Bochum and the Fraunhofer Institute for Micro-electronic Circuits and Systems in Duisburg. Over the long term, the network has the goal of closing the gap between fundamental research and innovation-driven economic development.

Weltrekord in der Solarzellenforschung

A world record in solar cell research

Solarzellen noch besser machen, damit sie einen entscheidenden Beitrag im Rahmen der Energiewende leisten – dieses Ziel verfolgen Forscher der Bergischen Universität Wuppertal am Lehrstuhl für Elektronische Bauelemente. Nun gelang ihnen ein Durchbruch mit Weltrekord.

Herkömmliche Solarzellentechnologien basieren überwiegend auf dem Halbleiter Silizium und gelten inzwischen als so gut wie „ausoptimiert“: Signifikante Verbesserungen ihres Wirkungsgrades sind kaum noch zu erwarten. Vor diesem Hintergrund ist die Entwicklung neuer Solartechnologien mit höherem Leistungspotenzial dringend erforderlich.

Anstelle von Silizium nutzten die Wissenschaftler sowohl organische Materialien als auch neuartige Perowskit-Halbleiter. Beide Technologien haben in den letzten Jahren eine rasante Entwicklung erfahren und ihre Wirkungsgrade können inzwischen schon mit Silizium mithalten. Zu Projektbeginn hatten die besten Perowskit/Organik-Tandemzellen weltweit einen Wirkungsgrad von 20 Prozent. Gemeinsam mit ihren Partner*innen von den Universitäten Köln, Potsdam und Tübingen sowie des Helmholtz-Zentrums Berlin und des Max-Planck-Instituts für Eisenforschung in Düsseldorf schafften es die Wuppertaler Wissenschaftler nun auf einen Wirkungsgrad von 24 Prozent – Weltrekord! Besonders hervorzuheben ist hierbei die enge Zusammenarbeit und die Förderung im Rahmen des Schwerpunktprogramms der Deutschen Forschungsgemeinschaft zu Perowskit-Halbleitern (SPP2196).

Making solar cells even better so that they can make a decisive contribution to the energy transition: this is the goal of researchers at the Chair of Electronic Devices at the University of Wuppertal. And they have recently achieved a breakthrough in the shape of a world record.

Conventional solar cell technologies are largely based on the semiconductor silicon, and are now considered to be “optimised to the max”: no further significant improvements in their efficiency are to be expected. Against this backdrop, there is an urgent need for the development of new solar technologies with greater performance potential.

Instead of silicon, the researchers have been using both organic materials and innovative perovskite semiconductors. Both technologies have undergone rapid development in recent years and their efficiency is now comparable with silicon. At the start of the project, the best perovskite/organic tandem cells worldwide had an efficiency of 20 percent. Together with their partners from the Universities of Cologne, Potsdam and Tübingen, as well as the Helmholtz Centre Berlin and the Max Planck Institute for Iron Research in Düsseldorf, the researchers at Wuppertal have now achieved an efficiency of 24 percent – a world record! The close collaboration between the partners and the funding under the Priority Programme on Perovskite Semiconductors (SPP2196) from the German Research Foundation deserve a particular mention here.

Am Projekt beteiligte Mitglieder des Lehrstuhls für Elektronische Bauelemente (v.l.n.r.): Timo Maschwitz, Christian Tückmantel, Kai Oliver Brinkmann, Lehrstuhlinhaber Prof. Dr. Thomas Riedl, Florian Zimmermann, Cedric Kreusel und Manuel Theisen.

Members of the Chair of Electronic Devices who participated in the project (l to r): Timo Maschwitz, Christian Tückmantel, Kai Oliver Brinkmann, the current Chair, Prof. Dr. Thomas Riedl, Florian Zimmermann, Cedric Kreusel and Manuel Theisen.

Foto Timo Maschwitz



Neue Werkstoffe für den 3D-Druck

New materials for 3D printing

25 Forschungsgruppen aus ganz Deutschland – unter ihnen auch Vertreter*innen der Bergischen Universität – verfolgen gemeinsam das Ziel, neue Metall- und Polymerpulverwerkstoffe für den 3D-Druck zu entwickeln und damit die Weiterentwicklung dieses Fertigungsverfahrens, auch bekannt unter den Bezeichnungen additive Fertigung, voranzutreiben.

Mit vereintem Wissen und modernster Technik sowie finanzieller Unterstützung von insgesamt ca. sieben Millionen Euro für drei weitere Jahre durch die Deutsche Forschungsgemeinschaft (DFG) geht das Schwerpunktprogramm „Neue Materialien für die laserbasierte additive Fertigung“ (SPP2122) in die zweite Phase. Initiiert wurde diese vom stellvertretenden Programmsprecher Prof. Dr. Bilal Gökce von der Bergischen Universität gemeinsam mit Prof. Dr.-Ing. Stephan Barcikowski von der Universität Duisburg-Essen.

Der Lehrstuhl Werkstoffe für die Additive Fertigung um Prof. Gökce ist seit Anfang des Jahres Mitglied im Schwerpunktprogramm und vertritt mit dem Teilprojekt „Nanopartikel-Additivierung von Pulvern für die laserbasierte additive Fertigung von ODS Stählen“ die Materialforschung an der Bergischen Universität. Das gemeinsam mit der TU Darmstadt (Prof. Dr. Bai-Xiang Xu) und dem Max-Planck-Institut für Eisenforschung (Dr. Baptiste Gault) durchgeführte Forschungsvorhaben wird mit ca. 400.000 Euro gefördert. Ziel ist die Entwicklung eines neuen Stahlpulvers auf Eisen-Chrom-Basis für den 3D-Druck.

Some 25 research groups from all over Germany – including the University of Wuppertal – are jointly working on developing new metal and polymer powders for 3D printing and thereby driving development of this manufacturing process, which is also known as additive manufacturing.

With their combined expertise and state-of-the-art technology, as well as financial support totalling approximately seven million euros for three more years from the German Research Foundation (DFG), the Priority Programme “New Materials for Laser-based Additive Manufacturing” (SPP2122) is now entering its second phase. This phase was initiated by the deputy programme spokesperson, Prof. Dr. habil. Bilal Gökce from the University of Wuppertal, together with Prof. habil. Stephan Barcikowski from the University of Duisburg-Essen.

The Chair of Materials Science and Additive Manufacturing headed by Prof. Gökce has been a member of the Priority Programme since the start of the year, and represents materials research at the University of Wuppertal with the project “Nanoparticle additive processing of powders for the laser-based additive manufacturing of ODS steels”. The research project, which is being conducted jointly with TU Darmstadt (Prof. Dr. Bai-Xiang Xu) and the Max Planck Institute for Iron Research (Dr. Baptiste Gault), has received approximately 400,000 euros in funding. The goal is to develop a new iron-chromium-based steel powder for 3D printing.

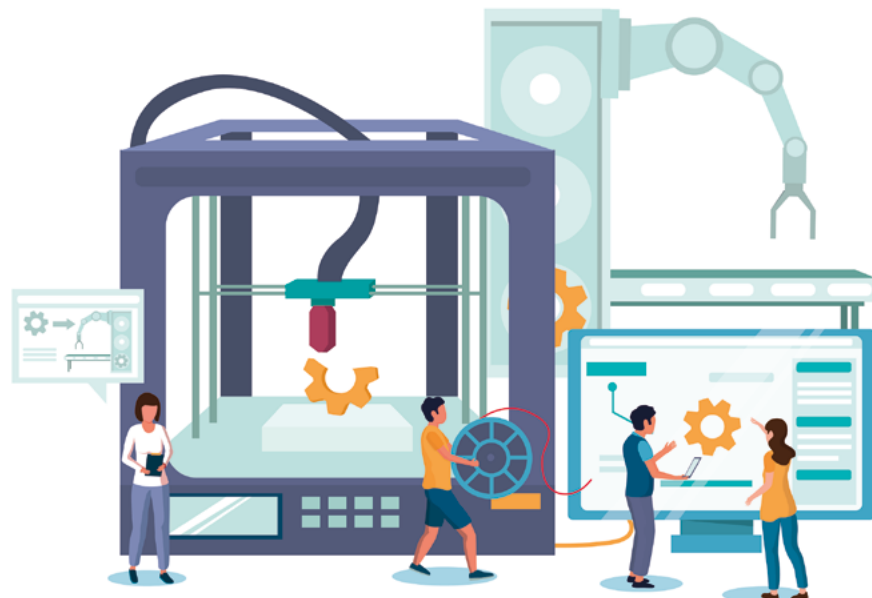




Illustration: Lorena Adotto

Drei erfolgreiche Jahre „bergisch.smart_mobility“

Three successful years of “bergisch.smart_mobility”

Die Bergische Region fit für die Zukunft machen – dieses Ziel stand im Mittelpunkt des Projekts „bergisch.smart_mobility: KI als Enabler der Mobilität von Morgen“. Nach drei Jahren Laufzeit fand im März 2022 die Abschlusskonferenz im Beisein von NRW-Wirtschaftsminister Prof. Dr. Andreas Pinkwart statt. Im Rahmen des Vorhabens erhielt die Bergische Universität rund fünf Millionen Euro Fördergelder.

Seit Juli 2019 haben die Projektpartner in vier Bereichen daran geforscht, wie Mobilität in der Smart City gestaltet werden kann und welche technologischen Voraussetzungen dafür geschaffen werden müssen. So wurden u.a. für eine effiziente und umweltfreundlichere Verkehrssteuerung neue Sensortechnologien und neue Methoden der Datenauswertung durch Künstliche Intelligenz entwickelt. Mit einem KI-gesteuerten On-Demand-Service wurde zudem ein innovatives Angebot im Öffentlichen Personennahverkehr etabliert, das bereits 50.000 Kund*innen nutzen.

Die Bergische Universität war verantwortlich für die Umsetzung der Teilvorhaben „KI-basiertes Traffic Management“ und „Rethinking Mobility“ – mehr als 25 Wissenschaftler*innen des Interdisziplinären Zentrums für Machine Learning und Data Analytics (IZMD) erarbeiteten dabei Lösungen für eine vernetzte Region.

Making the Bergisch Land region fit for the future: this goal has been the focus of the project “bergisch.smart_mobility: AI as an enabler of the mobility of tomorrow”. After three years, the concluding conference took place in March 2022 with the NRW Minister for Economic Affairs, Prof. Dr. Andreas Pinkwart, in attendance. The University of Wuppertal was awarded five million euros in funding as part of the project.

Since July 2019, the project partners have been conducting research in four fields into how mobility can be designed in the smart city and what technological framework is needed. They have, for example, developed new sensor technologies and new methods of data evaluation using artificial intelligence for efficient and more environmentally friendly traffic management. An AI-controlled on-demand service now also provides an innovative public transport service already being used by 50,000 customers.

The University of Wuppertal was responsible for implementation of the sub-projects “AI-based Traffic Management” and “Rethinking Mobility” – more than 25 researchers from the Interdisciplinary Centre for Machine Learning and Data Analytics (IZMD) developed solutions for a networked region.



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Notfallkonzepte für flächendeckende Stromausfälle

Emergency concepts for large-scale power outages

Die Bergische Universität Wuppertal hat im Dezember 2021 mit SISKIN (Großflächiger Stromausfall – Möglichkeiten zur Teilversorgung von kritischen Infrastrukturen) ein neues Forschungsprojekt begonnen. Es untersucht Blackouts und entwickelt vor dem Hintergrund der steigenden Anzahl dezentraler Erzeugungsanlagen und zusätzlicher Automatisierungstechnik neuartige Notfallkonzepte, die auch auf andere Netze übertragbar sind. Netzbetreiber sollen damit in Zukunft in der Lage sein, drohende Blackouts besser zu beherrschen. Das Land NRW fördert das am Lehrstuhl für Elektrische Energieversorgungstechnik angesiedelte Projekt mit ca. zwei Millionen Euro.

In drei Jahren Projektlaufzeit wird ein Konzept entwickelt, wie während eines andauernden Stromausfalles kritische Infrastruktur, wie Krankenhäuser und Wasserwerke, wiederversorgt werden kann. Dafür sollen neben größeren Anlagen, zum Beispiel Gasturbinen, die die Grundlage heutiger Wiederversorgungskonzepte sind, auch kleine Anlagen aus privaten Haushalten, wie Photovoltaikanlagen und Hausspeicher, verwendet werden. Das Konzept soll in einem ersten Schritt in einer geeigneten Simulationsumgebung, in einem zweiten Schritt in einem Labortest und in einem dritten Schritt im Feldtest getestet werden.

Projektpartner sind die Energieversorgung Leverkusen GmbH & Co. KG, die RheinEnergie AG, die WSW Netz GmbH, der Wupperverband und die AWG Wuppertal.

In December 2021, the University of Wuppertal launched a new research project called SISKIN (Large-scale power outages – options for the partial supply of critical infrastructures). The project is investigating blackouts, and in the light of the increasing number of decentralised power plants and additional automation technology, is developing innovative emergency concepts that can also be applied to other grids. The aim is to enable grid operators to better manage impending blackouts in the future. The state of NRW is supporting the project, which is based at the Chair of Electrical Power Supply Technology, with approximately two million euros.

Over the course of three years, the project is set to develop a concept for resupplying critical infrastructure such as hospitals and waterworks in the event of a prolonged power outage. Small systems in private households such as photovoltaic systems and home storage units are to be used to this end in addition to larger facilities such as gas turbines, which are the basis for current resupply concepts. The first step will be to test the concept in a suitable simulation environment, before advancing to a laboratory test and finally field testing.

The project partners are Energieversorgung Leverkusen GmbH & Co. KG, RheinEnergie AG, WSW Netz GmbH, Wupperverband and AWG Wuppertal.

Prozesse in Galaxien besser verstehen

Better understanding processes in galaxies

Das Universum ist ein dynamisches System, das in einem Urknall entstanden ist und sich seither immer weiter ausdehnt. Dieser Nachweis gelang Anfang des 20. Jahrhunderts. Welche Prozesse genau dabei ablaufen und wie sie die Entwicklung von Galaxien prägen, das will zukünftig ein neuer Sonderforschungsbereich (SFB) unter Beteiligung der Bergischen Universität erforschen. Die Deutsche Forschungsgemeinschaft fördert den auf zwölf Jahre angelegten SFB in den ersten vier Jahren mit insgesamt zehn Millionen Euro.

Im SFB 1491 kommen 16 auf ihrem Gebiet führende Forschende der Universitäten Bochum, Dortmund und Wuppertal zusammen. Sie wollen verstehen, wie kleine Galaxien – z. B. die Milchstraße – funktionieren, aber auch große Galaxien, in deren Kern sich ein aktives, supermassereiches schwarzes Loch befindet. Ein Blick in die Galaxien zeigt: Sterne in ihnen entstehen und vergehen in mächtigen Supernovaexplosionen und beeinflussen so maßgeblich die dort ablaufenden Prozesse. Durch die Explosionen entstehen Wolken mit Teilchen oder aus Plasma, die mit kosmischen Magnetfeldern wechselwirken. Dieses Wechselspiel untersucht der SFB zukünftig genauer. Die Bergische Universität ist unter Leitung von Prof. Dr. Karl-Heinz Kampert mit zwei Forschungsprojekten zur kosmischen Strahlung am SFB beteiligt.

The universe is a dynamic system that was created in a big bang and which has been expanding ever since. This was discovered at the beginning of the 20th century. A new Collaborative Research Centre (SFB) with the participation of the University of Wuppertal is carrying out research into exactly what processes take place and how these shape the development of galaxies. The German Research Foundation is funding the twelve-year SFB with a total of ten million euros in the first four years.

SFB 1491 brings together 16 leading researchers in their field from the Universities of Bochum, Dortmund and Wuppertal. The scientists want to find out not just how small galaxies – such as the Milky Way – work, but also about large galaxies that have an active, supermassive black hole at their core. The study of galaxies has shown that the stars in them form and decay in powerful supernova explosions and therefore have a significant influence on the processes that take place there. The explosions create clouds of particles or plasma that interact with cosmic magnetic fields. The SFB is seeking to investigate this interplay in more detail. Under the direction of Prof. Dr. Karl-Heinz Kampert, the University of Wuppertal is participating in the SFB with two research projects on cosmic radiation.

Das Wechselspiel der kosmischen Materie: Untersuchungen zu den fundamentalen Eigenschaften der Materie (Plasma- und Teilchenphysik sowie Dunkle Materie, dargestellt in grün, blau und rot) dienen als Input für das wissenschaftliche Verständnis der gemessenen Signaturen von Galaxien (Kugel in der Mitte).

Das Wechselspiel der kosmischen Materie: Untersuchungen zu den fundamentalen Eigenschaften der Materie (Plasma- und Teilchenphysik, sowie Dunkle Materie, dargestellt in grün, blau und rot) dienen als Input für das wissenschaftliche Verständnis der gemessenen Signaturen von Galaxien (Kugel in der Mitte).

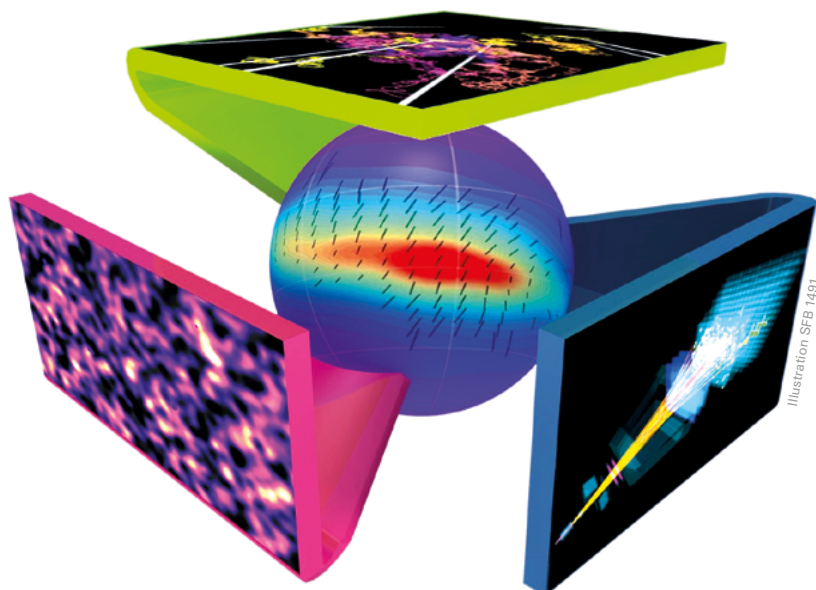


Illustration SFB 1491

Autonome Shuttlebusse kontaktfrei laden

Contactless charging of autonomous shuttle buses

Wie können autonome, also selbstfahrende, Shuttlebusse, die den Personentransport in einer mittelgroßen Stadt übernehmen sollen, über einen längeren Zeitraum ohne Unterbrechungen, etwa durch Ladevorgänge, und mit einer hohen Wirtschaftlichkeit betrieben werden? Mit dieser Frage befasst sich das neue Forschungsprojekt „Modulare intelligente induktive Ladesysteme für autonome Shuttles“ (MILAS) der Lehrstühle für Elektromobilität und Energiespeichersysteme (Prof. Dr.-Ing. Benedikt Schmülling) und Theoretische Elektrotechnik (Prof. Dr. Markus Clemens) an der Bergischen Universität.

Das Forschungsteam entwickelt im Rahmen von MILAS ein modulares intelligentes induktives Ladesystem für das stationäre sowie dynamische Laden von autonomen Shuttles im kleinstädtischen Straßenverkehr durch die Integration in den ÖPNV. Dafür wird magnetisierter Beton eingesetzt. Diese Entwicklung wird in einem zweistufigen Feldtest erprobt. Im Anschluss werden die Tests ergänzt um eine systemische Bewertung sowie um Wirtschaftlichkeits- und Übertragbarkeitsstudien.

Das Vorhaben wird vom Bundesministerium für Wirtschaft und Klimaschutz (BMWK) mit insgesamt 4,4 Millionen Euro gefördert, 640.000 Euro gehen nach Wuppertal. Beteiligt sind auch die TU München sowie die Unternehmen Valeo, IBC Solar und Magment. Testkommune wird die fränkische Stadt Bad Staffelstein sein.

How can autonomous i.e. self-driving shuttle buses that are to provide passenger transport for a medium-sized city be operated over an extended period of time efficiently and without interruptions – for example for charging? This is the question addressed by the new “Modular Intelligent Inductive Charging Systems for Autonomous Shuttles” (MILAS) research project at the Chair of Electric Mobility and Energy Storage Systems (Prof. Dr.-Ing. Benedikt Schmülling) and the Chair of Electromagnetic Theory (Prof. Dr. Markus Clemens) at the University of Wuppertal.

Within the framework of MILAS, the research team is developing an intelligent modular inductive charging system for both the stationary and dynamic charging of autonomous shuttles in traffic in a small town *through integration into the public transport network. Magnetised concrete is being used. The development is to be tested in a two-stage field trial. The tests will then be supplemented by a systemic evaluation and economic feasibility and transferability studies.*

The project is being funded by the Federal Ministry for Economic Affairs and Climate Action (BMWK) with a total of 4.4 million euros, with 640,000 euros going to Wuppertal. TU Munich and the companies Valeo, IBC Solar and Magment are also participating in the project. The test municipality will be the Franconian town of Bad Staffelstein.



Auf Kloster Banz in Bad Staffelstein fand das Kick-off-Meeting mit allen Beteiligten statt. Von der Bergischen Universität war Prof. Dr.-Ing. Benedikt Schmülling (5. v. l.) vor Ort.

The kick-off meeting with all participants took place at Kloster Banz in Bad Staffelstein. Benedikt Schmülling (5th from left) was representing the University of Wuppertal.

Foto Michael Böhm

EU-Klimaschutzpolitik erklären

Explaining EU climate protection policy

Durch die Fridays for Future-Bewegung sind wichtige Sorgen der jüngeren Generation sichtbar geworden, aber auch Wissenslücken, die es zu schließen gilt. In einem neuen Projekt an der Bergischen Universität geht es darum, die Zusammenhänge und Aspekte der EU-Klimaschutzpolitik sowie der EU-Integrations- und Digitaldynamik zu vermitteln. Zielgruppe sind Lehrer*innen sowie deren Schüler*innenschaft in der Oberstufe des Gymnasialbereiches und an Europa-Schulen.

Projektleiter Paul Welfens, Professor für Makroökonomische Theorie und Politik, wird dabei einen Fokus auf die Rolle des Handels mit CO₂-Zertifikaten in der EU, nämlich in den Bereichen Energie und Industrie, legen. Im Projekt werden zudem wichtige internationale Kooperationsfragen bei der Klimaschutzpolitik und international vergleichende Politikperspektiven herausgearbeitet. Wichtige Zusammenhänge sollen schüler*innengerecht über digitale Animationen und Videos vermittelt werden. Workshops sollen das Forschungsteam und die Lehrer*innen der Region zusammenbringen.

Das Projekt „Future Learning: EU Integration and Digital Modernization in the Age of Climate Change Policy“ (FUTLEARNEU) wird von der Europäischen Kommission im Rahmen des EU-Programms Erasmus+ für Bildung, Jugend und Sport für drei Jahre mit knapp 300.000 Euro gefördert.

Thanks to the Fridays for Future movement, the worries of the younger generation have become clear, but gaps in knowledge that need filling have also been revealed. A new project at the University of Wuppertal is aiming to communicate the context and different aspects of EU climate protection policy as well as EU integration and digital dynamics. The target group is teachers and senior students at academic secondary schools in Germany and at Europa-Schule schools.

The project manager, Paul Welfens, Professor of Macroeconomic Theory and Policy, is to focus on the role of carbon trading in the EU, specifically in the areas of energy and industry. The project is also to identify important issues surrounding international cooperation on climate protection policy and how policy perspectives compare internationally. The key contexts are to be conveyed in a student-friendly way via digital animations and videos. Workshops will bring together the research team and teachers in the region.

The “Future Learning: EU Integration and Digital Modernization in the Age of Climate Change Policy” (FUTLEARNEU) project has received funding from the European Commission under the Erasmus+ programme for education, youth and sport of the EU for three years to the value of approximately 300,000 euros.



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Wenn's um Geld geht



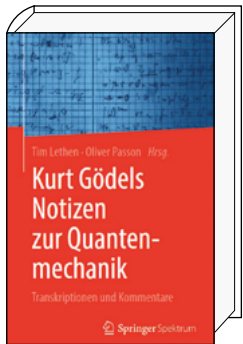
**Sparkasse
Wuppertal**



Volker Ronge / Werner Bruns: Die Irritation der Gesellschaft durch den Lockdown

Die wirtschaftlichen, sozialisatorischen und kulturellen Effekte der Pandemiepolitik stehen im Mittelpunkt eines neuen Buches von Prof. Dr. Dr. h.c.mult. Volker Ronge, von 1999 bis 2008 Rektor der Bergischen Universität, das er gemeinsam mit Prof. Dr. Werner Bruns, Leiter des Europa-Instituts für Erfahrung und Management an der Rheinischen Fachhochschule Köln und Wuppertaler Alumni, herausgegeben hat.

Bruns, Werner / Ronge, Volker: Die Irritation der Gesellschaft durch den Lockdown, Beltz Juventa 2021, 224 Seiten, 24,95 €.



Oliver Passon / Tim Lethen Auf den Spuren eines mathematischen Genies

Kurt Gödel, österreichischer Mathematiker und Philosoph, gilt als eines der größten mathematischen Genies des 20. Jahrhunderts. Dr. Oliver Passon, Akademischer Rat im Arbeitsgebiet Physik und ihre Didaktik an der Bergischen Universität, hat zusammen mit Tim Lethen von der Universität Helsinki bisher unveröffentlichte Quellen aus Gödels umfangreichem Nachlass herausgegeben und kommentiert.

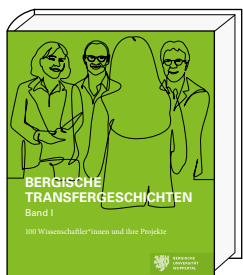
Lethen, Tim / Passon, Oliver: Kurt Gödels Notizen zur Quantenmechanik, Springer Spektrum 2021, 156 Seiten, 49,99 €.



Gerrit Walther / Joachim Studberg: Festschrift zum Jubiläum: Zeitzeug*innen berichten

Wie sie die Anfangszeiten der Bergischen Universität erlebt haben, darüber berichten 56 Wegbegleiter*innen in der Festschrift „50 Jahre Bergische Universität Wuppertal – Erinnerungen an die Gründungsphase“. Herausgeber und Autoren des Buches sind Dr. Joachim Studberg, über 30 Jahre lang Uni-Archivar und seit Herbst 2021 im Ruhestand, sowie der Wuppertaler Historiker Prof. Dr. Gerrit Walther.

Studberg, Joachim / Walther, Gerrit: 50 Jahre Bergische Universität Wuppertal – Erinnerungen an die Gründungsphase. Aschendorff Verlag 2022; 271 Seiten, 28 €.



100 Transfergeschichten in einem Buch

Seit 2016 führt der UniService Transfer der Bergischen Universität Wuppertal regelmäßig Gespräche mit Wissenschaftler*innen der Uni über deren Forschungsprojekte. Mehr als 100 Transfergeschichten sind seitdem daraus entstanden. 100 von ihnen sind nun in einem Sammelband erschienen.

UniService Transfer: Bergische Transfergeschichten, Teil I; 440 Seiten.

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www.iz2.uni-wuppertal.de

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www.cmats.uni-wuppertal.de

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/ Center for Narrative Research

www.zef.uni-wuppertal.de

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www.sprachforschung.uni-wuppertal.de

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/ Center for Research into Childhood and Society

www.izkg.uni-wuppertal.de

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www.ipams.uni-wuppertal.de

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/ Research Center for the Early Modern Period

www.fruehneuzeit-forschung.de

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www.wib.uni-wuppertal.de

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www.hydro.uni-wuppertal.de

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www.ikib.uni-wuppertal.de

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www.ipi.uni-wuppertal.de

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www.ist-site.uni-wuppertal.de

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www.sicherungssysteme.net

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DFG-GRK 2696: Transformationen von Wissenschaft und Technik seit 1800: Inhalte, Prozesse, Institutionen / *"Transformations of science and technology since 1800: topics, processes, institutions"*, Sprecher: Prof. Dr. Volker Remmert

DFG-GRK 2196: Dokument – Text – Edition / *Document – Text – Editing*, Sprecher: Prof. Dr. Jochen Johrendt

DFG-GRK 2240: Algebro-geometrische Methoden in Algebra, Arithmetik und Topologie / *Algebro-Geometric Methods in Algebra, Arithmetic and Topology*, Projektbeteiligte: Prof. Dr. Jens Hornbostel, Prof. Dr. Sascha Orlik, Prof. Dr. Britta Späth, Prof. Dr. Matthias Wendt

STIMULATE (SimulaTion in MULTiscale physicAl and biological sysTEms) – MSCA Innovative Training Networks – European Joint Doctorate (ITN-EJD), Projektbeteiligte: Prof. Dr. Andreas Frommer

ROMSOC (Reduced Order Modelling, Simulation and Optimization of Coupled systems) – MSCA Innovative Training Networks – European Industrial Doctorate (ITN-EID), Projektbeteiligte: Prof. Dr. Michael Günther

ConFlex (Control of flexible structures and fluid-structure interactions) – MSCA Innovative Training Networks – European Training Network (ITN-ETN), Projektbeteiligte: Prof. Dr. Birgit Jacob

TACK (Communities of Tacit Knowledge: Architecture and its Ways of Knowing) – MSCA Innovative Training Networks – European Training Network (ITN-ETN), Projektbeteiligte: Prof. Dr. Christoph Grafe

Graduiertenkolleg NERD – North Rhine-Westphalian Experts on Research in Digitalization, Projektbeteiligte: Prof. Dr.-Ing. Tibor Jager

Forschungsverbünde und -gruppen / *Research Networks and Groups*

ATLAS-Experiment am Large Hadron Collider (LHC) am CERN / *ATLAS Experiment at the Large Hadron Collider (LHC), at CERN*

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FOR 2316 DFG-Forschungsgruppe „Korrelationen in integrierbaren quantenmechanischen Vielteilchensystemen“ / *FOR 2316 DFG Research Unit "Correlations in Integrable Quantum Many-Body Systems"*, Sprecher: Prof. Dr. Andreas Klümper

FOR 2063 DFG-Forschungsgruppe „Epistemologie des LHC“ / *FOR 2063 DFG Research Unit "The Epistemology of the LHC"*, Sprecher: Prof. Dr. Gregor Schieman

FOR 2733 DFG-Forschungsgruppe „Sakralraumtransformation. Funktion und Nutzung religiöser Orte in Deutschland“ / *FOR 2733 DFG Research Unit "Transforming places of worship – function and use of religious buildings in Germany"*, Projektbeteiligte: Prof. Ulrich Königs

FOR 2558 DFG-Forschungsgruppe „Interaktionen von essenziellen Spurenelementen in gesunden und erkrankten älteren Menschen (TraceAge)“ / *FOR 2558 DFG Research Unit "Interactions of Essential Trace Elements in Healthy and Diseased Elderly"*, Projektbeteiligte: Prof. Dr. Julia Bornhorst

FOR 5269 DFG-Forschungsgruppe Zukünftige Methoden für Studien von eingeschlossenen Gluonen in QCD / *FOR 5269 DFG Research Unit "Future methods for studying confined gluons in QCD"*, Sprecher: Prof. Dr. Francesco Knechtli

Sonderforschungsbereiche / Collaborative Research Centers

SFB 986 Tailor-Made Multi-Scale Materials Systems M³,

Projektbeteiligte: Prof. Dr. Swantje Bargmann

SFB Transregio 196 MARIE, Projektbeteiligter: Prof. Dr. Ullrich Pfeiffer

SFB 1187 Medien der Kooperation, Projektbeteiligter: Prof. Dr. Patrick Sahle

SFB 1252 Prominenz in Sprache, Projektbeteiligter: PD Dr. Stefan Hinterwimmer

SFB Transregio 270 Hysteresis design of magnetic materials for efficient energy conversion,
Projektbeteiligter: Prof. Dr. Bilal Gökce

SFB 1491 Wechselspiel der kosmischen Materie, Projektbeteiligter: Prof. Dr. Karl-Heinz Kampert

SFB 837 Interaction Modeling in Mechanized Tunneling, Projektbeteiligter: Prof. Dr. Arne Röttger

SFB 901 On-The-Fly Computing – Individualisierte IT-Dienstleistungen in dynamischen Märkten,
Projektbeteiligter: Prof. Dr. Tibor Jäger

SFB 1143 Korrelierter Magnetismus: Von Frustration zu Topologie,
Projektbeteiligter: Prof. Dr. Christian Hemker-Heß

ERC-Grantees Horizon 2020

ERC Advanced Grant DIRECTS (Direct Temporal Synthesis of Terahertz Light Fields Enabling Novel Computational Imaging), Prof. Dr. Ullrich Pfeiffer

ERC Starting Grant REWOCRYPT (Theoretically-Sound Real-World Cryptography),
Prof. Dr.-Ing. Tibor Jäger

ERC Starting Grant HyMoCo (Hybrid Nodes for Highly Efficient Light Concentrators),
Prof. Dr.-Ing. Patrick Görrn

ERC Proof of Concept Grant ConPhoNo (Next Generation of Concentrated Photovoltaics Using Node Concentrators), Prof. Dr.-Ing. Patrick Görrn



Schwerpunktprogramme / *Priority Programmes*

SPP 2314 Integrierte Terahertz-Systeme mit neuartiger Funktionalität (INTEREST), Koordinator: Prof. Dr. Ullrich Pfeiffer

SPP 1294 Bereich Infrastruktur – Atmospheric and Earth system research with the "High Altitude and Long Range Research Aircraft" (HALO), Projektbeteiligter: Prof. Dr. C. Michael Volk

SPP 1786 Homotopietheorie und algebraische Geometrie, Projektbeteiligter: Prof. Dr. Jens Hornbostel

SPP 1796 High Frequency Flexible Bendable Electronics for Wireless Communication Systems (FFLexCom), Projektbeteiligte: Prof. Dr. Ullrich Pfeiffer, Prof. Dr. Ullrich Scherf, Prof. Dr. Thomas Riedl

SPP 1857 Elektromagnetische Sensoren für Life Sciences (ESSENCE), Projektbeteiligter: Prof. Dr. Ullrich Pfeiffer

SPP 1894 Volunteered Geographic Information: Interpretation, Visualisierung und Social Computing, Projektbeteiligter: Prof. Dr. Frank Fiedrich

SPP 2020 Zyklische Schädigungsprozesse in Hochleistungsbetonen im Experimental-Virtual-Lab, Projektbeteiligter: Prof. Dr. Steffen Anders

SPP 2196 Perowskit-Halbleiter: Von fundamentalen Eigenschaften zur Anwendung, Projektbeteiligter: Prof. Dr. Thomas Riedl

SPP 2255 Kulturerbe Konstruktion – Grundlagen einer ingenieurwissenschaftlich fundierten und vernetzten Denkmalpflege für das bauliche Erbe der Hochmoderne, Projektbeteiligter: Prof. Dr. Helmut Maier

SPP 1984 Hybride und multimodale Energiesysteme: Systemtheoretische Methoden für die Transformation und den Betrieb komplexer Netze, Projektbeteiligter: Prof. Dr. Matthias Bolten

SPP 2289 Gestaltung von Synergien in maßgeschneiderten Mischungen heterogener Pulver: Hetero-Aggregationen partikulärer Systeme und deren Eigenschaften, Projektbeteiligter: Prof. Dr. Eberhard Schmidt

SPP 2122 Neue Materialien für die laserbasierte additive Fertigung, Projektbeteiligter: Prof. Dr. Bilal Gökce

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