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Cover: dpa/Kay Nietfeld

A barbed wire fence near the Greek-Macedonian border camp of Idomeni. This edition includes the first of a four-part series entitled "Migration and Refugees – Perspectives from Research".



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Peter Strohschneider

# On Trust and Boundaries

*As important as modern research is – it does have its boundaries. What happens at those boundaries is not only determined by research itself. It is also decided by societal trust, without which research cannot exist. Reflections on the awarding of this year's Leibniz Prize against the backdrop of recent events.*

In mid-March the DFG presented this year's Gottfried Wilhelm Leibniz prizes. Since its debut 31 years ago, the awarding of Germany's most important research funding prize has been a particularly festive moment, for the prizewinners and their families and friends, but just as much for the many guests from the research community, politics and society, and of course for the DFG as well.

But each year, this event also reminds us of the principles without which science and academia cannot even exist, and to which the prizewinning researchers particularly adhere.

This begins with the inquisitive willingness to let oneself be "productively irritated" by external knowledge, and to question one's own assumptions about the world. It includes a relaxed approach to the unfamiliar, the uncertain and the complex, as well as the insistence of modern research that says researching our world is not about seeking familiarity, but about continuously re-measuring and expanding our areas of knowledge. It enables thinking outside the box with regard to plans and expectations, and the revision, criticism and expansion of valid knowledge. It also includes the ability to think things as yet unthought, and sometimes even things that have been considered unthinkable; and it underlines the various ways in which modern top-level research is of importance to society.

*This article is the revised version of the DFG President's welcome speech given at the Leibniz Prize award ceremony on 15 March 2017 in Berlin.*

This year of course, in times during which resentment, populist vulgarity and an anti-scientific worldview are dangerously growing, these principles have become particularly important. And the fact that the German Minister for Education and Research and Bremen's Research Senator – the two most important research policy representatives in Germany – once again came to the award ceremony and gave welcome speeches sent a clear message: Unlike in some research nations, science and academia in our country enjoy the trust of policymakers, even in these times.

We can be certain of the importance of modern research, not just at such award ceremonies but in general. And yet, although the significance of modern sciences and humanities cannot be overstated, this significance is not without boundaries.

There are financial, legal, political and ethical restrictions on academic research, and possibly also barriers to system growth. And, in a different direction, there are also boundaries to research insights, for example as non-research knowledge: as the knowledge of the everyday, of business or politics, of law, morals and decency, of religion or art.

And these boundaries are crucial for the relationship between research and society. The negotiations, collisions and conflicts at these boundaries are decisive not only for research work and the scope of the sciences and the humanities themselves. This is also the place where decisions are made about the societal trust without which research cannot exist.



These boundaries can be described and approached in various ways, for example in the following categories: use orientation, promises, compatibility of democratic values and non-research.

Let us first consider *use orientation*. Modern research is systematically set up in order to generate knowledge that is both new and methodically reliable. This is not possible without communication guidelines and practices in which knowledge is kept free and readily available. Only in this way can knowledge claims and assertions of innovation be examined, adapted and further developed. And once they have been identified as reliable and new, they can go back and influence the order of research knowledge. Others turn out to be unforeseeably broad functional relationships beyond the scope of science and academia, and there is nothing wrong with that. On the contrary, it is a fundamental condition of research that is meaningful to society.

Yet the boundaries of a free, productive research practice are to be found at the point where commercial exploitation interests clash with research communica-

tion practices. This can currently be observed in the attack on the proposed amendment to the copyright law, an attack which is certainly also being carried out beyond the boundaries of the reasonable.

And there, too, are boundaries, where the monitoring and communication of knowledge claims become the domain of patent lawyers. How quickly this point can be reached can be demonstrated by the current legal battle about genome editing – perhaps not the only example, but certainly a very incisive one.

The *logic of promises*, too, often results in issues of trust for modern research. Societal expectations of research performance are increasing. The trust placed in the sciences and humanities is not growing at the same rate, and that has consequences. Research, at least when shared publicly, must be justifiable to society – and in battles for the distribution of funding, must be politically implementable. In this way, pressure increases to demonstrate the direct and short-term societal impact of invested funds.

It is natural that science and academia react to this with promises of immediate practical benefits – from





the creation of jobs to the eradication of widespread disease to saving the world. But this leads to a spiral of one-upmanship around impact requirements and impact promises that, instead of strengthening societal trust in research, rather threatens to ruin it. And the unfulfilled promise of a solution, the promise that cannot, in the foreseeable future, be fulfilled, is one of the boundaries beyond which things can become serious for academic freedom. This boundary is (too) often crossed.

When talking about the boundaries of research, the third aspect to reflect on is the *compatibility of democratic values* (Klaus Töpfer) with research and technology. Without modern technology, it would be hard to imagine societal trust in the sciences and humanities. However, ethical boundaries are to be found where research findings enable such a great accumulation of private power that it can be controlled only partially – if at all – by democratic policy. And findings are often just as ambivalent in a structural sense as technical innovations, which is precisely the problematic nature of dual use. So the following applies here, too: do not ignore risks, do not simply demand more confidence of the alleged German aversion to technology, but join in with reflecting on boundaries.

Finally, the barriers that research comes up against when it meets other forms of knowledge, in other words *non-research*. Non-research knowledge, too, can certainly be knowledge in its own right. In terms of tradition, individual experience, collective systems of regulation or religious beliefs, it may have a different validity from that provided by methodical research, and also different functions.

In part, such knowledge stands side by side with research findings or their technical manifestation; if you've ever tried to book a seat in row 13 on a Lufthansa flight, you'll know what that means. In part, non-research or pseudo forms of knowledge compete with scientific forms of knowledge – creationist intelligent-design concepts, for example, challenge the theory of evolution. In part they also complement each other, for example in the case of existing values and norms.

Although being able to call on research findings as a final instance when making decisions is the mark of a highly "scienticised" civilisation, at the same time it is necessary to acknowledge the fact that research

knowledge is uncertain knowledge. In the sciences and humanities, too, various knowledge claims compete with each other. And the methodological unavailability of a final certainty also draws a boundary: researcher expertise is always particular and selective. And that must always be communicated, not only in the communication of research knowledge to society. It also has the consequence that research must not call on society or politics as instances that are to perform a purely administrative execution of apparently unambiguous research stipulations.

So modern research always finds itself in a dialectic of freedom and self-limitation. For all who work in it, this results in a specific tension:

The intellectual and practical challenges of their actions demand a deep conviction of the significance of those actions. At the same time, the complex implications and contexts demand that researchers must constantly be able to reflect on the boundaries of their own actions, as well as of those in research in general. Academic freedom is a means of responsibly handling these boundaries.

Only research that is able to act with reflection in such situations of tension can justify its intellectual boundary-crossing. One could conclude and postulate much from this: the fundamental openness and publicness of research communication for example; in addition, the serious and conservative nature of performance expectations, also when research requires societal justification; and finally the critical reflection of consequences in terms of the individual ethics and social morality of research knowledge and ability.

And it means recognising that there are things other than the sciences and humanities.

In the specific working context of research, however, an awareness of the boundaries of research must be combined with that passion for an intellectual daring to cross boundaries without which modern research cannot exist – a combination mastered by the DFG's Leibniz prizewinners again and again.

Prof. Dr. Peter Strohschneider  
is the President of the DFG.

## Series: Migration and Refugees / Part 1



Europe is dealing with an unprecedented number of migrants, refugees and asylum seekers. In the shadow of globalisation and many "crisis experiences", German society also seems to be drifting apart both politically and economically. In a time when simple, quick-fire opinions are in vogue, we need intelligent questions, considered answers and knowledge-based per-

spectives. Our new series is designed to contribute to this by presenting "Perspectives from Research".

The first author plunges in with a very topical question: **why has political populism become so popular?** A sociological examination and analysis. We also present a brief overview of selected DFG projects in this area.





## Making Things Simple

Xenophobic, anti-elitist, anti-science: the programmes of political populism break with civilisation – the immune system of democracy and society faces existential challenges

Today's ceremony, however, has very special meaning. Because today we are not merely transferring power from one administration to another, or from one party to another – but we are transferring power from Washington, D.C., and giving it back to you, the American People."

These are the seventh and eighth sentences from Donald Trump's inauguration speech, delivered on 20 January this year. They are the first sentences after the obligatory greetings to the office-bearers present – and they em-

body in a nutshell what is known as populism. Political populism clearly incorporates a tendency to simplify the solutions to complex problems, as well as the denial of well-established knowledge and a flexible relationship with facts. But all this can also be found in political forms which are not regarded as populist. The most important characteristic of populism is the assumption that those addressed form a homogeneous group, whose homogeneity consists of an actual, real, authentic will – "authentic" being the most important word here.

What makes this figure so perfidious is the fact that, at first glance, it looks like radical democracy. Trump's inauguration address – delivered with the representatives of the most important constitutional bodies of the United States of America behind him – chose the American people as its addressee and insinuated that power had long moved away from the sovereign to representatives who cared only about their own interests and not the authentic will of the people. Populism, as we currently see it in mainly right-wing-oriented political programmes in many western

*Left: Victory pose? Combative gestures? The new US President Donald Trump after his inauguration speech on 20 January 2017 in Washington, D.C. Below: Also in January 2017 – demonstration in the shadow of Cologne Cathedral.*

and eastern European countries, as well as in the USA, is anti-democratic but disguised in radical democratic semantics. After all, what could be more democratic than transferring power to the people, setting the old anti-elitist attitude of the sovereignty of the people against the republican monarchy of the office-bearers?

Modern democratic political systems are characterised by the fact that they only represent the sovereign, and express its internal plurality and non-uniformity within a mechanism of institutionalised parliamentary opposition. The sovereign is not a subject. The differentiation of political systems has always responded to the fact that, in increasingly complex societies, although sovereignty is based on the will of the people, this will is more the construct of a democratic process than an eternally valid authentic will. Populism in the literal

sense, then, would be the political aim of setting this will of the people against the political system and its division of power.

Populism of this nature is nothing new; it has always existed alongside the formation of democratic political systems. It is at once a modern and an anti-modern motif that affected to suffer under the diversity of modernity, its *Entzweiung* (dissociation), as Hegel puts it, and lacked mobile forms of collective sovereignty. The promise of sovereignty for the people sought to take advantage of a subjectivity that aimed to consistently assert an authentic will. Those seeking to understand the current situation are reminded of the classic anti-liberalist criticism of Carl Schmitt. Back in the 1930s, Schmitt criticised liberalism first and foremost as an ideology of weakness. Parliamentary debate, the division of power, the priority of law over power and, not least, the battle of interests, led in his view to the depoliticisation and neutralisation of state action, hampering the kind of politics that can gain followers

The author:



**Armin Nassehi**, born in 1960 in Tübingen, raised in Munich, Landshut, Tehran and Gelsenkirchen, was appointed Professor of Sociology at LMU

Munich in 1998. Nassehi studied educational science, philosophy and sociology in Münster and Hagen and in 1992 completed his doctorate ("Die Zeit der Gesellschaft") in Münster, where he also completed his habilitation in 1994. His main interests are cultural sociology, political sociology, sociology of religion, and sociology of knowledge and science. As well as the ongoing development of sociological theory of systems and practices, Nassehi works in the field of empirical ethics research, including DFG-funded projects. He has been a member of the DFG review board on Sociological Theory since 2016. In addition to his academic work he is a public figure and involved in publishing, for example as the editor of *KURSBUCH* in 2012, as well being in demand as an interviewee and panellist.





and rendering it virtually impossible. He postulated that only the schema of friend and enemy could politicise society; only the decisionism of action could guard against the relativising power of debate and argument.

Populism is decisionism. Decisions are authentic acts because they are always associated with an element of non-knowledge, an element of uncertainty, a quantum of freedom. If I know what I have to do, then I don't have to decide – and if a decision only counts as such when subject to a complicated process based on compromise and the division of power, the decision is effectively decoupled from a desired will. Only the decisionist can represent this will, by asserting it in the face of resistance. And his legitimisation consists in the fact that he can do it. Consequently, the populist does not need good reasons, only good opportunities. He operates using the kairos of the situation rather than the chronos of a considered strategy.

Populists are often accused of a tendency to lie – and not without good reason. But for populists, lying is not relevant for the sake of its truth content. It is lying, the unguarded claim, the obvious distortion of fact, that demonstrates decisionist power. When the AfD talks about the Islamisation of Germany, Brexit campaigners claim that the UK is a victim of European colonisation, or Donald Trump says climate change is an invention or vac-

**“The lie only works because it can be asserted with relatively little fear of consequences.”**

cines are harmful, it's not about the fact that these claims are obviously untrue. Simply to argue against the substance of these statements is to underestimate the political lie. The lie only works because it can be asserted with relatively little fear of consequences – exactly

as we would expect to find with decisionism.

This brings us to another characteristic of populism: the precedence of oral over written statements. Strong assertions of truth – political, scientific, cultural, even religious – are a correlate of the culture of writing and books. It is writing and book-printing that enable a temporal and social division of the production and reception of meaning. Only when a sentence exists in written form does it assert its claim to truth – because it can be verified. Populism tends to rely on the spoken word, the act of speaking, the present-based form of oral communication which vanishes again as soon as it has been uttered. Here, the lie is significant not in terms of its truth content

but in terms of its performative function. This function works like this: I can say it, and there's nothing you do about it, because the public believes me!

Viewed in terms of their concrete political content, the political programmes of populism attempt to break with civilisation – only consider their xenophobic, anti-elitist, anti-science attitudes, their criticism of the press, art and culture. Even more crucial, however, is the performative, practical dimension of populism, which seeks to elude every mechanism that is characteristic of modern societies: division of power, diversity, differences of perspective, pluralism, and not least the provisional nature of solutions.

*Fake news has become a point of political contention. The underlying phenomenon is not new, but populists seem to have adopted the distortion of facts as a strategy.*



Illustration: fotolia/Marco2811



Revealing expressions (from left): Geert Wilders, Partij voor de Vrijheid, Frauke Petry, Alternative für Deutschland, and Marine Le Pen, Front National, at a press conference for the congress “Europe of Nations and Freedom” in Koblenz.

Let's not fool ourselves: political rhetoric depends on bringing things to a crisis point, on making things appear simpler than they are. An element of populism is more or less inherent within it – but the line is crossed as soon as it begins to assert the authenticity of the people's will against the routines of the structure of political institutions. Until recently we were struggling with how difficult, how almost impossible it is to change our society, to have an impact on it, even though we know what needs to be done – be it in relation to social inequality, healthy lifestyles, climate change or appropriate education programmes. It is a fundamental experience of scientists and academics that society is resistant to knowledge, to insight, to the implementation of soundly justified programmes, as if there were a kind of societal immune system against change.

Startlingly, this situation has been reversed. What we were la-

menting not so long ago is now what we are hoping for. If there is anything that can counter populist political programmes, it is the immune system which hinders direct access to the complete political system and indeed to society. Part of the principle of modernity is the fact that no one can hold absolute power and that discontinuity is built into society – for example, in the sense that political decisions do not impact directly on people's everyday lives. Whom we love, how and whether we believe in a god or gods, what gives our lives purpose, is not politically decided. Nor is the question of how we invest, what is scientifically true or what decisions are made by a court. All these things are to some extent mutually dependent, but there is no direct access from one to the other. This is what makes modern society so complex and uncontrollable, and gives it so much obstinacy that it some-

times makes you despair. But it is also the most effective protection against those who claim to speak for an entire group that does not exist in the alleged form.

If there is a positive side to the political populism that can be observed in so many different places just now, it is perhaps the fact that we are once again becoming more aware just how valuable are the institutions, discontinuities, challenges and even frustrations of modern society. It would certainly be a remarkable trick of historical reason if Trump and his ilk were to at least help us to see more clearly – which is of course the primary objective of scholarship.

**Prof. Dr. Armin Nassehi**

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Die letzte Stunde der Wahrheit, Hamburg: Murmann Verlag 2015; 2017 edition, €20





## Rural Extremism?

Case study examines radicalisation processes in Hessen

It is generally assumed that populist movements are linked to radicalisation processes in society. But what relevant data does empirical social research provide? One study, funded by the DFG since 2014, aims to make a contribution. The case study, entitled “Right-wing extremism and gender: political socialisation and radicalisation processes in the rural space”, is being conducted by Marburg-based political scientist Prof. Dr. Ursula Birsl and her team in the district of Lahn-Dill in Hessen.

The study is based on the observation that rural areas serve as havens for right-wing groups. According to the research team, data from right-wing extremism research reveals an urban to rural incline in the development of a democratic political culture and a rural to urban incline in the development

of extreme right-wing views. Although there has been gender research with girls and women in right-wing extremism and their socialisation processes and experiences, as yet the associated insights “have not been systematically incorporated into right-wing extremism research”.

The researchers are therefore posing questions relating to the environment and conditions of introduction and radicalisation processes with respect to a rurally structured region in the area of Gießen in Hessen. The team is using a combination of participative observation, group discussions and expert interviews. Through a nationwide “event data survey” using media reporting, they are also investigating how the urban/rural divide is reflected in right-wing and hate-based criminal offences and acts of violence and how



“forms of participation of women and men” should be assessed. In this way, the researchers aim to integrate the case study data into “the bigger picture”.



The project in the DFG GEPRIS database:  
gepris.dfg.de/gepris/  
projekt/260066309?language=en

## Identity, Respect and Power

Kiel social psychologist aims to develop effective theory for intergroup conflicts

Populist views appear to be associated with a strong friend/enemy mindset. Images of the self and others affect questions of identity at both individual and societal level. In a Reinhart Koselleck project, Kiel-based social psychologist Prof. Dr. Bernd Simon is seeking to develop a new interpretation of conflicts between groups and verify his theory on intergroup conflicts with empirical data. The project has been funded by the DFG since 2012.

One premise of the research is the understanding of conflicts of interest as the fight for and with collective identity. Collective identity, recognition/respect and power are the coordinates for the research programme.

“The focus is on the conflicts that arise in modern, culturally heterogeneous societies between groups with a traditional orientation and those with a progressive orientation, with reference to higher-level (national, suprana-

tional and global) collective identities as conflict frameworks.”

Simon explains that he is using a variety of approaches and methods, including lab experiments, qualitative interviews and panel studies. Over and above the project, he aims to contribute “to a multidisciplinary informed, universalising analysis of intergroup conflicts”.



The project in the DFG GEPRIS database:  
gepris.dfg.de/gepris/  
projekt/212189329?language=en

## Islam and Muslim Life

Research into local authority practice

Does populism depend on the nature and extent of cultural integration in everyday life? Muslims and Muslim life are particularly visible at a local level. Many local authorities face the challenge of resolving conflicts and tensions between Muslims and non-Muslims. Since 2016, human geography researchers Prof. Dr. Georg Glasze, University of Erlangen-Nuremberg, and Prof. Dr. Andreas Pott, University of Osnabrück, have been examining “Configurations of Islam and Muslims at local level in Germany” as part of a DFG-funded project. They intend to place the results of their case studies in a nationwide context.



The project in the DFG GEPRIS database:  
gepris.dfg.de/gepris/  
projekt/317779617?language=en

## Media and Populism

Book and DFG project examine how social media alters political opinion-forming

From fake news and lying press to post-truth debates – newspapers, TV and radio were faced with adversity even before the election of Donald Trump. The editorial media in general and journalists in particular have had to accept a loss of prestige and trust. Conversely, a growing number of users are looking for political information using the news offered by search engines

general public – because “the altered landscape of news, information and discourse on the Internet contributes to a situation where many people feel more informed, but are in fact misinformed or disinformed” (p. 183). Although the dictum of the “pseudo-informed” public is easily observed, there is a noticeable lack of in-depth studies

on the subject. In a DFG-funded project, Schweiger is currently investigating “Trust in journalism amid structural change in the media”. His aim is to measure trust and mistrust empirically and using guided interviews, an online representative survey of Internet users and a media content analysis. Evidence-based arguments are needed, even if ultimately the new attraction of pop-

ulism can only be explained by the interplay of various factors in society, politics and media.

Rembert Unterstell



Wolfgang Schweiger: *Der (des)informierte Bürger im Netz*. ISBN 978-3-658-16057-9, Springer Fachmedien, Wiesbaden 2017, 214 pp., €19.99

What role does social media play in the foreground and background of the rise of populism? In his short, highly readable book *Der (des-)informierte Bürger im Netz* (“The (dis)informed citizen on the web”), communication researcher Prof. Dr. Wolfgang Schweiger, University of Hohenheim, looks for answers. The book

concisely presents the current state of communication research, linking it with practical examples and theorems of media use research.

His core thesis is that social media weakens political culture and opinion-forming among the



The project in the DFG GEPRIS database:  
gepris.dfg.de/gepris/projekt/  
31867477?language=en

Read part 2 of the series in the next issue:

**Homo migrans: What research can tell us about migrations of the past – a CRC exhibition**



# Communicator Award to Stefan Kröpelin

Cologne geologist recognised for long-term, high-impact commitment

Geologist and climate researcher Dr. Stefan Kröpelin is the winner of this year's Communicator Award, conferred by the DFG and the Donors' Association. The researcher from the University of Cologne will be presented with the €50,000 prize for his long-standing commitment to sharing his research on the Sahara.

With over 60 expeditions to the Sahara, Kröpelin is considered a recognised expert on this region. As part of the DFG-funded Collaborative Research Centre "Our route to Europe", he is currently researching the route that Homo sapiens took from sub-Saharan Africa to Europe over 100,000 years ago, and the climatic conditions that had to be faced.

Since the beginning of his scientific work, Kröpelin has made it accessible to a large audience. He has contributed research findings, exhibits and films to numerous exhibitions on climate protection and nature conservation topics, both in Germany and abroad. Readers of



popular magazines such as GEO know him for his reports on expeditions to the desert. He has become especially well known to the public through a variety of television documentaries. For example, he developed and led the expedition for the first documentary in regions of the Sahara where film crews had never set foot before. Kröpelin can also be found on the radio, online and on children's television, as well

as at numerous events in the public sphere.

Through their choice, the Communicator Award jury of science journalists and communication and PR experts, chaired by DFG Vice-President Prof. Dr. Frank Allgöwer, recognised Kröpelin's unflagging and continuing commitment to science communication and especially praised his international impact. They described how Kröpelin, as a "science diplomat", has always advocated for the regions in which he works. It is largely thanks to his initiative that a number of areas have been recognised as UNESCO World Heritage Sites.

The 2017 Communicator Award will be presented during the DFG's annual meeting on 3 July in Halle/Saale by DFG President Prof. Dr. Peter Strohschneider and President of the Donors' Association Prof. Dr. Andreas Barner.

[www.dfg.de/en/funded\\_projects/prizewinners/communicator\\_award/2017/index.html](http://www.dfg.de/en/funded_projects/prizewinners/communicator_award/2017/index.html)



Illustration: Adam Polczyk U Köln

# International Research Marketing

Presentation of awards for ideas competition: Three institutions each receive €100,000 to implement their strategic ideas / Special "start-up" prize awarded for the first time

Today more than ever, international research marketing is an important priority for universities because the competition to attract the best researchers is getting tougher all over the world," said DFG Vice President Prof. Dr. Roland A. Fischer at the award ceremony for the International Research Marketing ideas competition in Potsdam. In mid-February he presented the awards together with Frithjof A. Maennel, head of the International Cooperation section at the Federal Ministry of Education and Research (BMBF), at the annual meeting of the network [www.forschungsreferenten.de](http://www.forschungsreferenten.de). The main awards of €100,000 each went to submissions from the Humboldt University of Berlin, Goethe University Frankfurt and the GFZ German Research Centre for Geosciences, Potsdam. The special start-up prize of €75,000,



Illustration: Michael Lüder

awarded for the first time, went to TU Kaiserslautern. The event was enhanced by a light show created by artist Till Pöhlmann (above).

The International Research Marketing ideas competition is part of the BMBF-funded initiative "Research in Germany", jointly imple-

mented by the DFG, the Alexander von Humboldt Foundation, the German Academic Exchange Service and the Fraunhofer Society. A call for proposals for 2017 has now been issued.

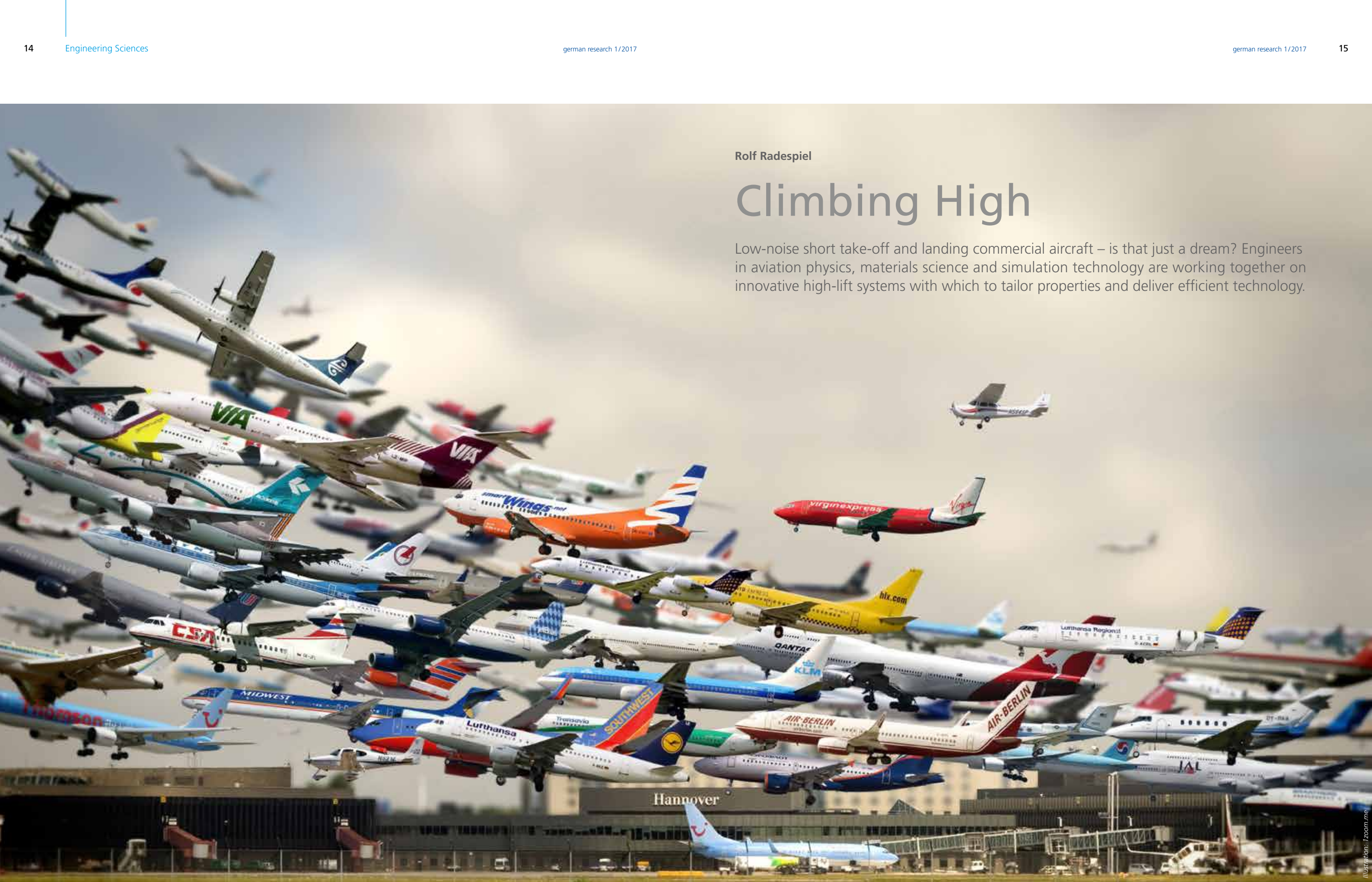
[www.dfg.de/ideenwettbewerb-forschungs-marketing](http://www.dfg.de/ideenwettbewerb-forschungs-marketing)



Illustration: DFG

DFG Secretary General Dorothee Dzwonnek held discussions with partner organisations and universities in Japan at the beginning of March. The linking topic was potential for further cooperation between researchers and between research funding agencies in the two countries, for example as part of a lead agency process. In Awaji, Dzwonnek took part in a workshop organised by the German-Japanese Research Training Group "Selectivity in Chemo- and Biocatalysis". She was also a guest at the German embassy in Tokyo (photo left) and at a think tank of the Japanese ministry of education, where she spoke about the impacts of the Excellence Initiative on German research.



A large number of commercial aircraft, including airlines like Lufthansa, Air Berlin, and others, are shown flying in formation over a city, illustrating the concept of climbing high.

Rolf Radespiel

# Climbing High

Low-noise short take-off and landing commercial aircraft – is that just a dream? Engineers in aviation physics, materials science and simulation technology are working together on innovative high-lift systems with which to tailor properties and deliver efficient technology.

Hannover



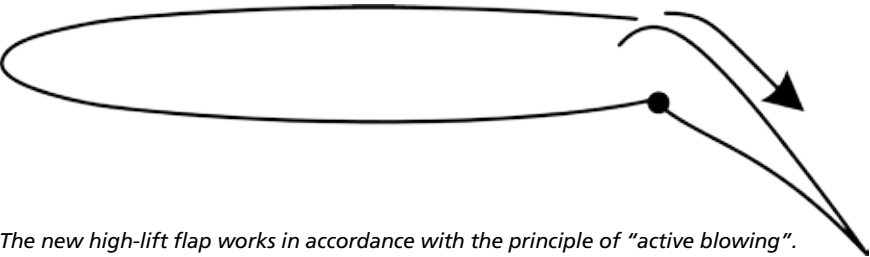
The hallmarks of modern mobility, airliners are used for long-distance travel to destinations which are difficult or impossible to reach by car or rail. Long-haul travel and many of the economic processes in this globalised world are unthinkable without reliable and regular air travel. However, its consumption of raw materials and pollution of the environment with emissions and noise attract criticism. The call for better air connections cannot be ignored nor can the clearly voiced

objections to noise, pollutants and the exploitation of nature. It is a fundamental and pernicious conflict in our society. In light of this, representatives of the European aviation industry have been developing and presenting their vision of air travel in 2050. They are proposing significantly shorter door-to-door travel times and lower fuel consumption, greenhouse gas emissions and aircraft noise. However, the technological hurdles are high; from a sci-

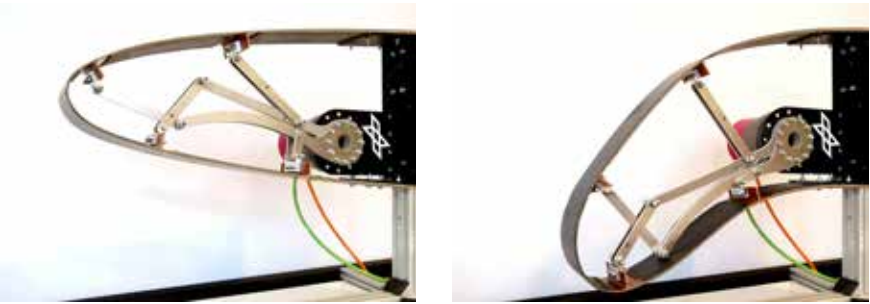
entific point of view, they cannot be surmounted by an evolutionary development of today's aeroplanes. The high-lift systems used in airliners are one example: the airliner's fuselage and its wing must both be the perfect size to make take-off, cruising and landing economical. Design calculations show that efficient airliners have a high mass relative to the surface of the wing and fly most efficiently when cruising fast at 800 or 900 kilometres per hour.

At any time throughout the flight, however, the fundamental rule applies that the aerodynamic lift of the aircraft must be equal to its weight. Otherwise, it would fail to fly steadily forwards and instead descend steeply. As the lift increases by a power of 2 with the flying speed, while it is only linearly dependent on the angle of attack, aeroplanes must travel with a much higher angle of attack when flying slowly than when they are cruising fast. However, it is not enough to adjust the flight speed to the angle of attack to allow airliners to take off or land on existing runways. Very large angles of attack mean that the flow separates from the aerofoil. It is this that limits the minimum flying speed.

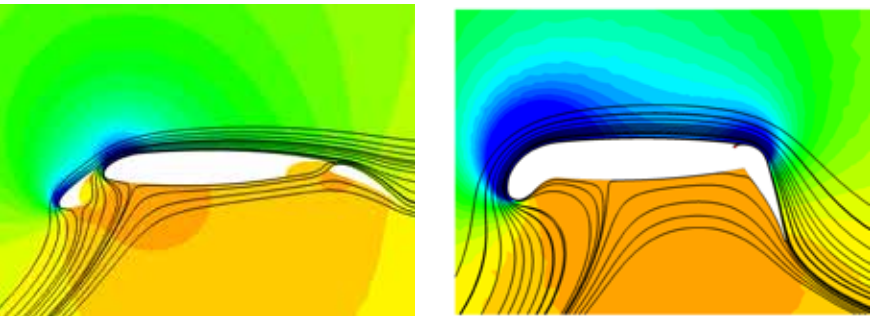
Airliners therefore have auxiliary mechanisms with which the lift can be increased for take-off and landing. These are extendible high-lift flaps on the trailing edge of the aerofoil and slats on the leading edge. The airflow around the wings, the engines, the landing gear, and within the engine is the main source of noise from an aeroplane. Powerful high-lift systems with customised acoustic properties are therefore key to less noise in and around airports.



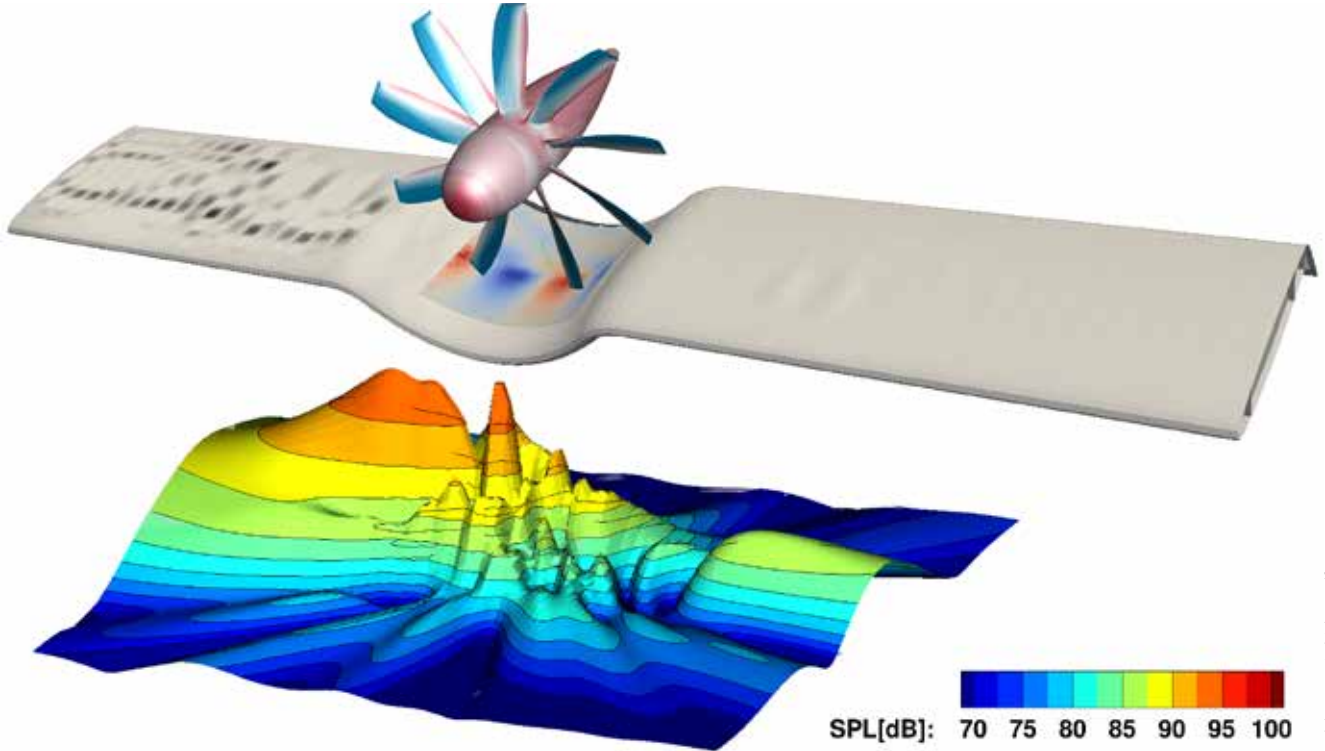
The new high-lift flap works in accordance with the principle of "active blowing".



The flow turning around the profile creates a greater pressure differential between the upper and lower sides of the profile and therefore more lift for the aircraft. Above: Functional model of the shape-adjusted structure. Below: High pressure is shown in orange and low pressure in blue in both flow patterns.



Graphics: AG Radespiel / Illustrations: AG Monner



Model: AGs Friedrichs, Delfs, Langer

Unconventional positioning of the propeller above the aerofoil. The coloured surfaces of the propeller and the aerofoil show how the calculated surface pressure is distributed. Below it is the noise level determined approximately 150 metres below the wing. It is 6 decibels less than the values for a propeller in front of the wing.

Our vision for 2050 foresees a requirement for transport which uses airports close to cities, thus satisfying the demands of the industrial society for fast point-to-point connections.

However this objective presents challenges where noise emissions and the permitted size of the airport and its infrastructure are concerned. The noise pollution must be reduced to a level equivalent to the noise in large towns and cities today. And furthermore, to reduce the length of the take-off and landing runways, aeroplanes will have to have high-lift systems with more additional lifting capability.

One potential solution is seen in flaps near which a thin stream of air is actively blown out at the junction between the main wing and the flap (see illustration on the left). This approach makes it possible to exercise a high degree of control over the flow turning of the wing with the thin wall jet which results in added lift. The power required to blow out the stream is the critical factor, at least for civilian aircraft.

Collaborative Research Centre 880 at the Technical University in Braunschweig "Fundamentals of High Lift for Future Civil Aircraft" has been working on this growing need for new technology for high-

lift systems since 2011. The significance of the different technologies investigated by its researchers can only be evaluated under consideration of the numerous physical interactions on an aeroplane. Evaluating the technology is a key area for the researchers who use simulations of aircraft designs to capture quantitative data on the interactions.

A reference configuration has been developed which represents the vision for a new generation of low-noise short take-off and landing airliners. It describes a 100-seat aircraft which services over 90 percent of all the possible



point-to-point connections in Europe and which can operate at a very large number of airports with short runways (800 meters). Powerful propeller-driven engines and a high-lift system based on high-lift flaps with active blowing are designed for progress towards the 2050 vision.

The noise of the airflow around the wings and the undercarriage can be reduced drastically if the aircraft flies more slowly. This causes the noise of the engines to become more noticeable. One of the concepts pursued in Braunschweig is to shield off the noise of the propeller-driven engines with a clever arrangement of the engines relative to the wing. The aerodynamic, acoustic and structural effects have been examined using simulations of a tractor propeller in front of the wing compared to the arrangement with the propeller above the wing. The research revealed that it was possible to reduce the noise level on take-off by six decibels. Further-

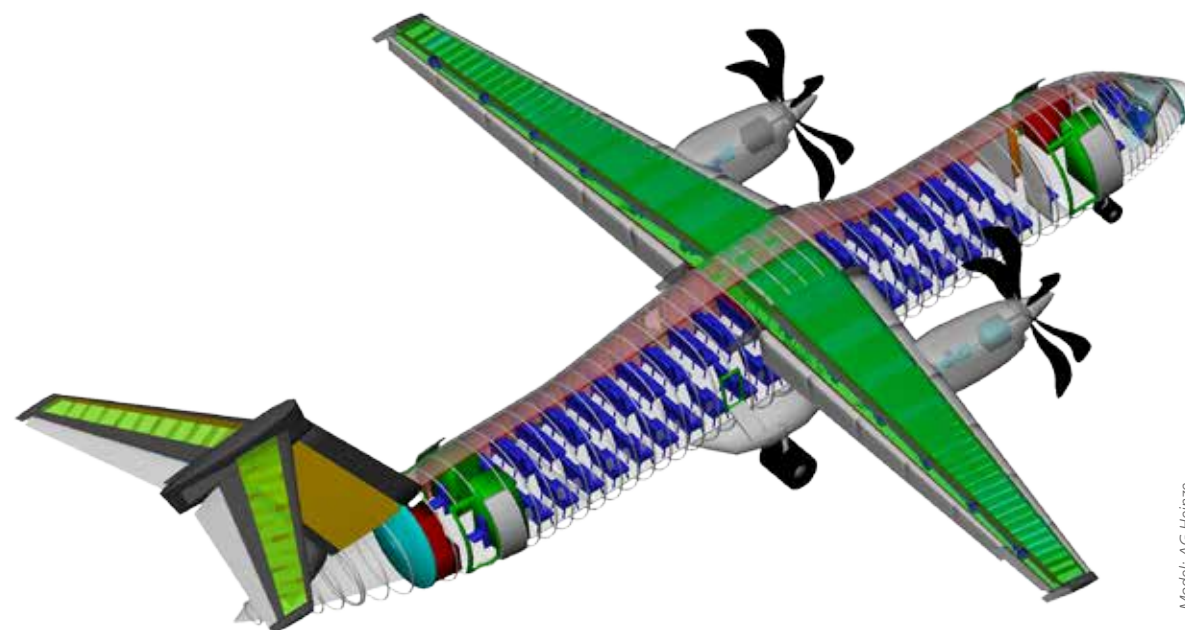


Experiments proving the efficiency of active blowing in the water tunnel at the Technical University of Braunschweig. Optical flow measurement technology methods are used here.

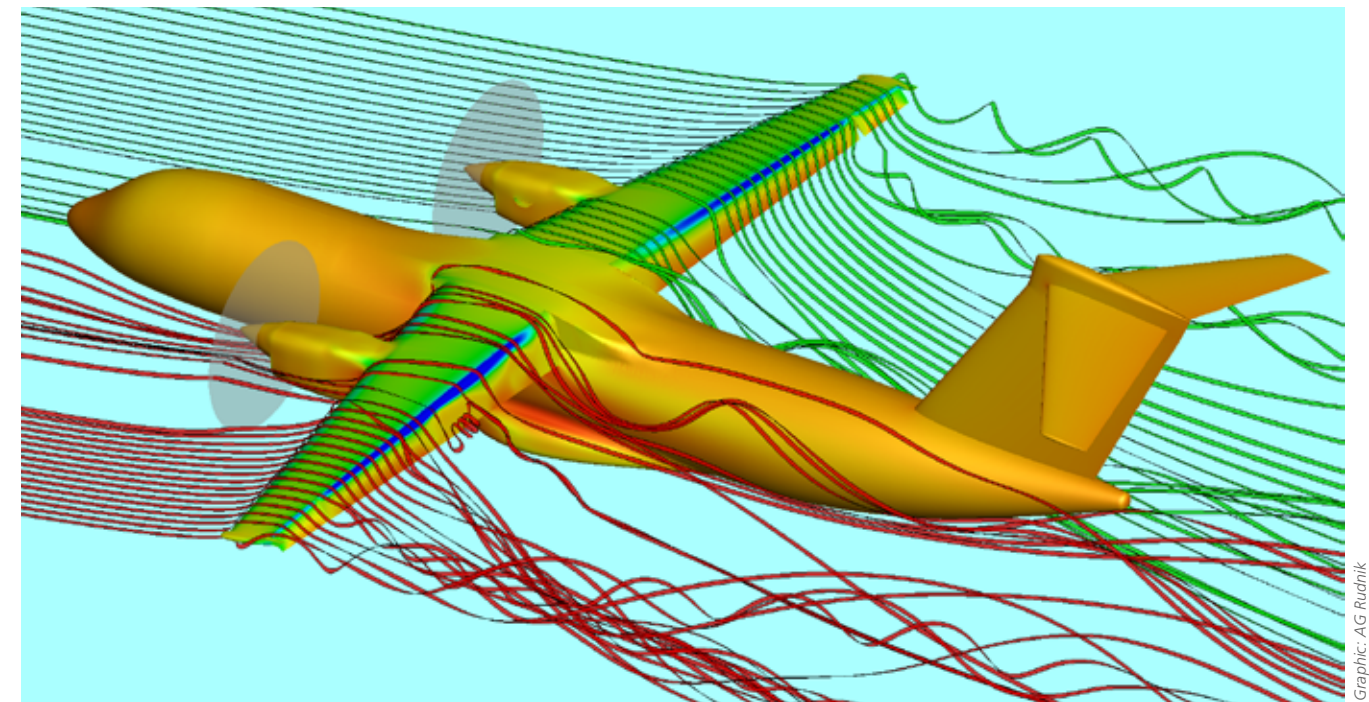
more, the vibrations of the wing structure resulting from the close proximity of the propeller blades and the upper wing surface could be predicted and damped with the use of porous surfaces.

While this engine arrangement increases the thrust on take-off, cruising is less efficient which makes economical flying at speeds of 600 kilometres per hour and more impossible. It has been neces-

Design studies with a reference aircraft: a fuel-efficient and quiet airliner for efficient point-to-point connections in Europe.



Model: AG Heinze



Illustrative simulation with the reference aircraft: flow and distribution of pressure with the propeller idling (right wing) and with full engine thrust (left wing).

sary to bring together and use skills in aerodynamics, acoustics, structural dynamics and aircraft design to provide a thorough evaluation of the integration of the engines on the aeroplane.

Blowing thin wall jets over deflected high-lift flaps serves as a fundamental concept for a new form of auxiliary lift. The goal of keeping the energy for blowing as low as possible brought with it the idea of a shape-adjustable, lowerable leading edge. To do this, the geometry of the leading edge is changed with an internal mechanism during take-off and landing and thus adapted to requirements which are different from those of cruising.

This solution not only reduces the overhead involved in blowing by around 40 percent but increases the angle of attack of the aerofoil that can be used for flying. Shape-

adjustable morphing leading edges have the advantage over slats of not needing a slot through which air flows, thus removing a major noise source. A new deformable aircraft skin linked to the interior adjustment mechanism has been invented in the Collaborative Research Centre.

The flow around the wing and engine, fuselage and tail unit has been simulated for further investigation of the effectiveness of the aerofoil profile. These simulations show that the propeller generates the additional lift required on the aerofoil, but also additional resistance which derives from the nonuniformity of the flow along the span. The strong propeller slip stream also presents the potential danger of unwanted aerodynamic forces around the fuselage and the tail unit.

Research over the coming years will look at improving the effec-

tiveness and the sustainability of the new technology, the ability to estimate and predict possible uncertainties for industrial realisation and studying the overarching economic potential and environmental issues. The researchers are looking optimistically towards the future.



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Graphic: AG Rudnik



Rembert Unterstell

# Anything but Ordinary

Diatoms, corals and icefish: Hermann Ehrlich studies the biomineralisation of marine organisms which survive even the most extreme conditions. His aim: innovative biomaterials. We meet a creative mind who found his calling late in life.

Creative lateral thinking and pursuing your own course are highly valued in academia – at least in theory. In the day-to-day world of university research, however, the opposite is normally true. If you want to make progress in your career, it's often easier to fit into the mainstream. And sometimes it's a long, rocky road that leads to success and recognition.

That was certainly true for Hermann Ehrlich, who was appointed to a DFG-funded Heisenberg professorship at TU/Bergakademie Freiberg in Saxony only in 2013. Now 59, the powerfully built man with distinctive moustache and thick greying hair, who receives visitors to his institute with warmth and courtesy, found his vocation late in life. His academic career path

has been unusual and he came late to his own particular field: biomineralisation and extreme biomimetics is a niche field, but at a high, interdisciplinary level. Soon after being appointed, Ehrlich brought the International Symposium of Biomineralisation to Germany and the "resource university" of Freiberg for the first time.

But the route to becoming a highly regarded biomineralogist and biomaterials researcher was by no means direct. Born in 1957 in Stebnik, western Ukraine, he was fascinated by biological phenomena from an early age ("From hamsters to working with the microscope, everything drew me in"). He studied biology at the Ivan Franko National University of Lviv and later at Lomonosov Moscow State University.

He obtained his doctorate there in 1984 with a biochemistry thesis on vitamin B 12 and then continued his research work in Lviv.

In 1990, after the fall of the Iron Curtain, he and his family moved to West Germany in what proved to be a major change that would have significant consequences. He spent two years as a fellow of the Alexander von Humboldt Foundation at TU Braunschweig, before taking a break from his academic career. For ten years he was self-employed as a scientific advisor to various companies, and this "industry experience" allowed him to understand the toughness of a competitive market, careful investment decisions and industrial cooperation. "For ten years I didn't exist from a research point of view," he says succinctly.

Then he gave it another shot – this time in East Germany, more specifically at TU Dresden, where he began working in biomineralogy at the Max Bergmann Center of Biomaterials. Sitting opposite Ehrlich, you can easily believe that he staked everything on one card with tremendous energy, tenacity and persistence. For three years he was a group leader at the Institute of Bioanalytical Chemistry in Dresden. In 2011 he completed his habilitation in Kiel, after which he was soon offered a professor's post in Freiberg.

After a few years of catching up, he had established his own field of research: biomineralogy and extreme biomimetics. Bionics or biomimetics uses nature as its model, aiming to imitate natural phenomena or products to develop bio-inspired materials and technologies. The basis for this is biomineralisation, one of the oldest mechanisms in living things, which can be seen

in marine creatures in skeletons, shells and teeth. Specifically, Ehrlich is interested in organisms which live in extreme conditions – in the icy waters of the Antarctic between –1.9 and 4 degrees Celsius, in the scorching heat of volcanic springs at 60 to 80 degrees Celsius or in absolute darkness. "These are habitats that were once simply inconceivable," says Ehrlich, and it's as if the idea of the previously unthought of spurs him on to take ideas further.

His aim is to develop innovative biomaterials and biocomposites which can be used for implants or applications in biomedicine. There was a reason why Ehrlich chose to focus on life in water. "Everything began in the ocean," he says.

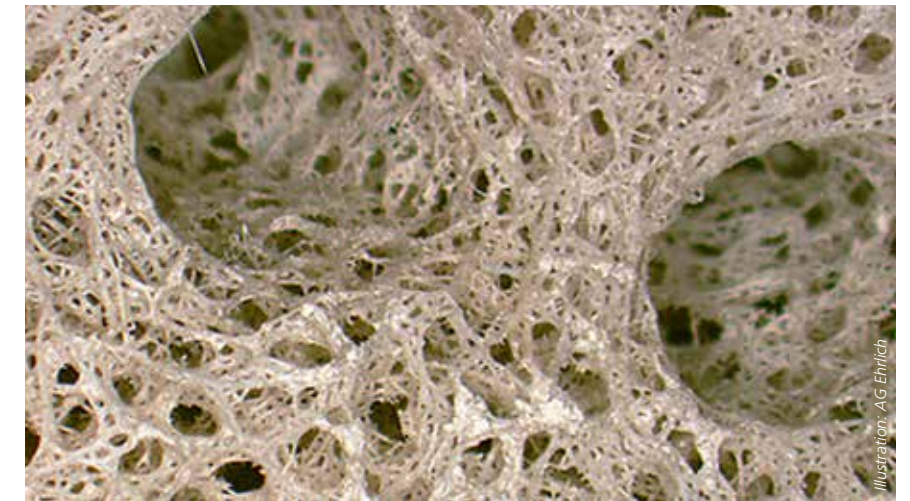
The ocean is the laboratory of life. It is also home to the very old species which Ehrlich uses as model organisms: sponges, found in all the world's oceans; the archaic, colony-forming corals; and finally diatoms, one of the main components of marine plankton. Another attractive object of research is the Antarctic icefish, whose circulatory system is adapted to the extreme outside temperatures ("protected by antifreeze proteins – better than any antifreeze in a can"). Ehrlich is always concerned with the blueprints and principles of nature in extreme habitats – this is the angle of approach which he combines with a materials science perspective.

Life in extreme conditions as a vehicle for new knowledge – is it significant that the man who left the comfort zone of the average career also studies extremes in nature? You could certainly make a case for that, but what was certainly equally important was that he demonstrated courage, determination and resili-

ence ("I bounce back from things") to progress in his work – even as far as being published in *Nature*.

Hard work was combined with the luck that favours the bold: in 2014, Ehrlich's team together with researchers from the University of Basra discovered an imposing 28 square kilometre coral reef in the

explains Ehrlich. "It gets this from the harmful greenhouse gases in our atmosphere. Because more and more CO<sub>2</sub> is accumulating there, the alga is spreading. This is evidence of continuing climate change." So diatoms are climate indicators – but might they also be suitable for biological filter systems in sewage treatment?



The stunning structure of a deep-sea glass sponge. By taking inspiration from the blueprints found in nature, it may be possible to create new biomaterials for the world of tomorrow.

Persian Gulf. It was a sensation, and so was the environment in which the corals live: the water is murky, with visibility of barely one metre, strong currents and a very volatile water temperature. Hospitable it most certainly isn't.

Just a year earlier, the biomineralogist had discovered and published what was, at 500 million years old, the oldest chitin yet known. Ehrlich found the chitin, a biopolymer which is one of the basic building blocks of life, in a fossil sponge dating from the Cambrian period.

Finally, Ehrlich also uncovered the secret of the success of a diatom that goes by the picturesque name of "Didymo". "To form calcite for its growth, this type of alga needs fairly large amounts of carbon dioxide,"

That remains to be seen. But what is certain is that bionics still offers great potential – now with the addition of extreme bionics/biomimetics. Ehrlich has found recognition for his field – he is currently adding to an introductory textbook on the subject – and he believes in it. He believes that chitin-based biomaterials have a great future.

It's good to know that innovations can always emerge from the margins of science – and that researchers who come in from outside or who pursue unconventional routes (whether by choice or necessity) can contribute to this. Sometimes creative lateral thinking and following your own course is exactly what is called for.

**Dr. Rembert Unterstell**  
is Publishing Executive Editor of *german research*.



Illustration: AG Ehrlich



Christian Voigt

# Night Flight to Nice

Every year, Nathusius' pipistrelle bats migrate thousands of kilometres between their summer and winter habitats. On the journey, echolocation and evolutionary adaptations keep them safe. But that's not enough to protect them from the hazards of the modern environment: Wind turbines are increasingly proving to be a death trap for the protected species.

It's a balmy August evening on a Baltic Sea beach near Pape, 15 kilometres south of Liepāja in Latvia. When the sun sets, thousands of Nathusius' pipistrelle bats will embark on their annual journey south. They will fly along the Baltic Sea coast to Poland, continue on to Germany and then bear south toward southern and western France. Although these bats only weigh around 7 grams, making them very lightweight, they have been known to cover distances of more than 4,000 kilometres. Astonishingly, we scarcely see or hear them as they fly by. That's why this spectacle of nature is so seldom observed.

But where the bats fly, it's anything but quiet. In flight, bats emit echolocation calls with a noise level of up to 120 decibels – that's as loud as a pneumatic drill. But because the frequencies of bat calls are above our hearing threshold, we remain oblivious to them. If we could hear in the ultrasonic range, in autumn and spring we would listen with awe to the bats' annual migration.

*A Nathusius' pipistrelle, the "queen of the night", coming in to land. They weigh just a few grams, but every year these animals travel thousands of kilometres between their summer and winter habitats.*

So where do they come from, all the bats that cross Germany in a south-westerly direction every autumn? What strategies do they employ when they set off southwards on their autumn journey? And do bats behave like migratory birds during flight? These are key questions for a DFG-funded research project which is being conducted by the team at the Leibniz Institute for Zoo and Wildlife Research (IZW).

Near Pape, together with colleagues from the University of Agriculture in Jelgava, Latvia, the team manages the world's biggest bat trap. The north-facing entrance to the net trap is easy to see: it's 15 metres high and 50 metres wide. The net narrows to a capture area just a few square metres in size. Every year, several thousand animals fly into the trap during the autumn migration. They are ringed, examined and then sent on their way again. When the animals are located again, it allows the researchers to work out their migration routes and the spatial links between summer and winter habitats.

The team also collect other data, for example relating to flight speed. This is done by recording the echolocation calls of passing bats with an array of microphones.

The distance between the microphones is accurately measured, making it possible to calculate the position of the bat at the time of a call using the differences in elapsed time. Since bats normally emit an echolocation call with every wingbeat, it is possible to determine the three-dimensional flight path and thus the flight speed during migration.

"Theoretically", bats, in accordance with their species-typical wing morphology, should "select" an optimum migration speed to conserve energy for the marathon flight. To test whether bats actually exhibit aerodynamic optimisation, we first need to measure the relationship between metabolic performance and flight speed. In the wind tunnel at the Max Planck Institute for Ornithology in Seewiesen, Bavaria, these measurements are taken with Nathusius' pipistrelles.

Normally, bats and birds exhibit high energy conversion at low and high flight speeds and the lowest energy conversion at medium speeds. To calculate the CO<sub>2</sub> production rate of bats in flight, we offer them the stable carbon isotope <sup>13</sup>C in the form of bicarbonate. This is harmless to the animals and is exhaled relatively quickly in proportion to the car-







Illustration: Oliver Lindecke

Not far from the Pape Biological Station in Latvia is one of the world's biggest bat trap nets. Thousands of animals are captured during the autumn migration. They are ringed, examined and then sent on their way again.

bon dioxide production rate. By measuring these exhalation rates before and after a one-minute interval of flight, we can work out the bat's  $\text{CO}_2$  production rate. There is no need for the animal to wear a breathing mask, which would also alter its aerodynamic characteristics. It's always fascinating to watch the animals flying

through the wind tunnel as they propel themselves with their powerful wingbeats.

But where do bats get the energy for their (long-haul) flights?

All bats at temperate latitudes hunt insects at night using echolocation. They also do this during their migration along the Baltic Sea coast on their way south. But do they use the energy content of their food immediately as fuel, or do they, like birds, mainly live off their fat reserves? The relative proportion of heavy to light stable carbon isotopes in the breathing air of migrating bats gives us useful information. An animal's fatty tissue usually contains a lower proportion of  $^{13}\text{C}$

*Nathusius' pipistrelles in flight in the wind tunnel at the Max Planck Institute for Ornithology in Seewiesen.*

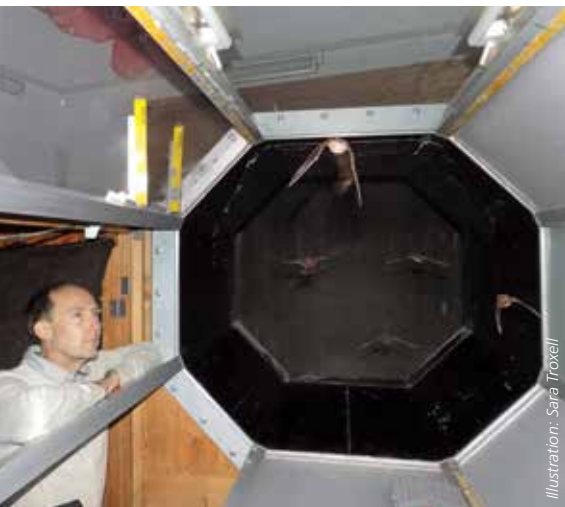


Illustration: Sara Toxell

than its food. The ratio of  $^{13}\text{C}$  to  $^{12}\text{C}$  in exhaled carbon dioxide allows us to work out whether an animal is mainly burning fat. We assumed that bats depend on insects as prey for their marathon flight. Indeed, it turned out that in favourable weather conditions the animals do use the insects they consume as an energy source. But at lower temperatures they live off a combination of freshly consumed insects and stored fatty acids.

By feeding them with  $^{13}\text{C}$ -marked fatty acids, we were able to demonstrate that these do not come from food but the bat's own fat deposits. So bats use the insect protein and their own fat deposits as energy sources. Birds and bats therefore use different primary energy sources for migration. This allows bats to continually top up their energy reserves as they migrate. Consequently, they need migration corridors with sufficient quantities of insects and also resting areas. However, during the autumn migration bats often spend days or weeks in one place before continuing. But evidently they do not do this to top up their body reserves.

Bats rest during the autumn migration for courtship and mating. To attract females, male bats occupy quarters in which they sing with all their might. When a passing female is enticed into the courtship quarters by the ultrasonic vocalisation, mating often occurs. Female common noctule bats alternate between several mating partners, as has been proved by paternity tests of twin births. Unusually, female bats are able to store the sperm of their mating partners in the uterus and mobilise them again after a

five-month hibernation period. In March or April the egg cells are then fertilised, presumably before the bats travel further north without longer stops.

While they rest during the day, migrating bats lower their body temperature. They enter a state of reduced activity known as torpor. This saves energy and allows them to 'sit out' spells of bad weather. Although bats could afford to take more time for migration, they do not take advantage of it. On the contrary, the autumn migration takes place long before the majority of songbirds set off southwards. The reason could be the availability of food. In order to obtain energy for the migration flight, bats require a relatively high density of insects in the night sky.

If the weather gets too cold, they will not find any insects and will need to enter a long-term state of torpor, in other words hibernation. Due to hibernation, bats like the *Nathusius' pipistrelle* do not have to migrate further than western or southern France. Their overwintering area must be cold enough to allow hibernation but also warm enough to prevent the animals from freezing. The low temperatures in north-eastern Europe are also the reason why migratory bats, which mostly live in holes in trees, need to migrate. In the harsh Nordic winter, they would freeze to death in their holes.

Thanks to their physiological make-up, migration presents bats with a challenge which, although considerable, is manageable. It's new dangers that make the annual flight a hazardous venture for bats. Every year, an estimated 300,000 bats are killed in Germany alone when they collide with wind



Illustration: Christian Voigt

*Victim of a wind turbine strike. Ten to twelve bats are killed on every turbine each year.*

turbines. Around 70 percent of the casualties are migrating bats. From a random sample of these casualties, we calculated the ratio of heavy to light hydrogen isotopes in the hair keratin, which is typical for the latitude of their region of origin. The result: Many of the casualties were from Poland, Fenno-Scandinavia, Russia, Belarus or the Baltic states. The increase in wind power in Germany therefore has direct consequences, and not just for native bat populations.

There are simple ways of reducing bat death from wind turbine strikes. Because bats will only fly at wind speeds of up to around 8 metres per second, and are only active at night and in warm weather, turbines should be switched off in these conditions. The economic loss for the energy company is minimal as wind turbines produce very little energy at low wind speeds anyway. So far, measures like this are too seldom implemented in Germany.

Bats are, however, strictly protected under European and national law.

Migrating bats are capable of astonishing adaptations and achievements. Scientifically, there are still many unanswered questions about bat biology and migration. A better understanding of these fascinating animals and their migratory behaviour could perhaps help us to preserve these precious species.



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[www.batlab.de](http://www.batlab.de)







Isabel Heinemann

## “It’s a Family Issue!”

In American society, as elsewhere, social change has brought about a shift from the traditional nuclear family to more diverse forms of family, fatherhood and motherhood. But the much-cited change in family values and gender roles has not been linear – new research reveals a picture with light and dark sides.

When Hillary Clinton launched her campaign to be nominated as the Democratic presidential candidate for the 2016 election, she placed family at the centre of her thoughts. This was no mere coincidence. From reducing the wage gap between men and women to the naturalisation of illegal immigrants, from the expansion of child-care to the recognition of same-sex marriages and families, she framed her sociopolitical aims as family issues: “This isn’t a women’s issue. It’s a family issue. [...] In America, every family should feel like they belong.”

Unlike most of her predecessors, however, Clinton was not referring to the strengthening of a supposed historically inherited model of a “traditional family” consisting of a male breadwinner, housewife/mother and children. Instead, she offered a pluralistic, integrative concept of the family which recognises women’s rights and equality as well as the rights of same-sex couples and unrestricted access to birth control.

This picture of the family is, it would seem, so widely accepted that it was able to find its way into a nomination address for the highest office in the land. By contrast, in the 1990s at the height of the debate on liberal and conservative values in the USA (the “Culture Wars”), similar views expressed by the then First Lady were denounced as “radical feminism”. With hindsight, Ronald Reagan’s victory over Jimmy Carter in 1980 can partly be explained by the fact that many voters preferred Reagan’s traditional family rhetoric to Carter’s advocacy of a pluralistic national family policy.

So how has the way in which Americans view family and gender



roles changed during the course of the 20th and early 21st centuries? Where are the lines of conflict and the divides in the debate? What have been the impacts of the changes in family life? And to what extent has there been a change in family values? These questions are being addressed by the DFG-funded Emmy Noether group “Family Values and Social Change: The US-American Family in the 20th Century” at the University of Münster.

The idea of family is ubiquitous, even more so in the USA than in other western industrialised nations. It isn’t just in election and presidential speeches that family is presented as an emotionally inflated “basis of the nation”: it is portrayed by advertisers and the entertainment industry, while social experts and religious movements conduct heated debates about its condition and future prospects. Although the USA has neither child support,

parental leave nor paid maternity leave, much less a specific family policy, in politics and in the public perception, the family is ascribed a central importance for the state of society. The impression given is that community life can only be changed and improved through intervention at family level. Since the beginning of the 20th century, the dominant image has been that of the nuclear family consisting of parents and their children – that they are also

*In the 1920s, the American eugenics movement attempted to convince families of the importance of genetic health and hygiene. The photo shows a farming family from Kansas who won the fitter families contest at the local agricultural fair. Photo dates back to 1927.*



Illustration: American Philosophical Society, Graphics 1672

white and middle-class goes without saying.

Starting from the discursive omnipresence of family in a rapidly changing society, the research team is studying the relationship between social change and the change in family values and gender norms. Do attitudes towards family change because the social structure of society changes (for example through the economic rise of the middle class), or does the renegotiation of norms (for example in marriage law or abortion law) imply social change in relation to the family? The chosen approach is a diachronic one, spanning the period from the end of the 19th century to the 1990s.

The research is conducted through a variety of avenues. Isabel Heinemann is studying the history of the debate between journalists, experts and affected individuals on divorce, female wage-earners and reproduction, while Claudia Roesch is analysing the treatment of Mexican immigrant families. Anne Overbeck is investigating attitudes towards African-American mothers and Andre Dechert the visual negotiation of fatherhood in the 1980s and 1990s. The feature common to all of the projects is that they primarily use public debates, expert discourses and the statements of social protest movements as their sources. This enables them to analyse and question how the growing pervasiveness of science in all areas of society has changed conceptions of family, fatherhood and motherhood. In very simplified terms, it can be noted that phases of accelerated normative change (1920s, 1940s, 1960s/70s, 1990s) have always been followed by phases of restoration and self-reassurance, without however fully going back on the liberal renegotiations. In debates



*The “ideal family” of the 1950s. This image was extremely influential because it was presented in the media and widely disseminated.*

on family, particular significance is also attached to the factors of “race” and “class” – a feature specific to American society.

In the eyes of many contemporary observers, three developments particularly jeopardised family and therefore society: divorce, women going out to work and the separation of sexuality and reproduction. At the same time, these aspects formed the starting points for social emancipation movements and expert discourses throughout the 20th century. The threat posed to the family by divorce was already causing concern at the end of the 19th century, as the first national divorce

statistics revealed steadily rising numbers. Until World War I, however, especially among sociologists as representatives of a new academic discipline aimed at interpreting social processes, divorce was presented as an adaptation to the modern age, thus counteracting the scepticism of many church representatives. But it was not until the 1970s that the introduction of no-fault divorce brought a significant step forward for liberalisation. This came with high social costs at the time, as the economic security of mothers seemed increasingly precarious owing to the loss of the maintenance obligation.

The new women’s movement had been highlighting the conse-



quences of the lack of social equality for women and mothers since the 1960s, and one of the factors to which this was attributed was the discrepancy between child-rearing activities and career options. For many sociologists, demographers and doctors between the 1950s and the 1970s, paid work for women, especially mothers, represented a danger to the nation as they feared a massive decline in the birth rate. This did not, however, apply to Afri-

can-American women: the same experts did not believe it was desirable for them to reproduce. Until the late 1960s they even refused to recognise African-American women and their husbands / partners / children as “families” at all. Representatives of the African-American civil rights movement, on the other hand, insisted on a traditional family model as the foundation for successful emancipation – disregarding the rights of African-American women.



For non-white women, the right to choose, the core demand of the new women's movement, had a much more fundamental meaning than access to contraception and legal abortion. Into the 1970s they still faced forced sterilisation, while their insistence on the “right to reproduce” brought them into conflict with the white women's movement. At the other end of the social spectrum, following the legalisation of abortion by the Supreme Court in 1973, an acrimonious, sometimes violent anti-abortion movement emerged, whose arguments were based on both the right to life of the embryo and the protection of family on religious grounds. The interweaving of the three debates on divorce, female wage-earning and reproduction therefore shows how much the categories of race and class determined the subjective chances of self-realisation and enjoyment of the rights guaranteed by the Constitution.

The results of the project clearly demonstrate that since the mid-1960s there has not been a linear shift in values from materialistic values and traditional gender roles to a pluralistic understanding of the family, as sociological research, in particular, has claimed for a long time. The resistances and counter-movements, not only in the form of a virulent anti-abortion movement but also the statements of conservative social experts and church representatives, were too great. As well as liberal values, the 1960s revealed

*The American family of the 1950s was also portrayed as a community of consumers. Here is a typical advertisement from that time from American Airlines.*



Left: An ideal world portrayed in the U.S. television series “Family”, filmed between 1976 and 1980. It was broadcast on German television until 1981. Right: An African-American mother from a poor district of Chicago, 1970.

decidedly restorative tendencies in relation to family: racist welfare and reproduction policies, prejudice on the part of the white women's movement, and traditional family values as an argument used by the African-American (male) civil rights movement. At the same time, liberalisation processes were not only a phenomenon of the 1960s and 1970s. An acceptance of divorce, equal rights for women and careers for women was already evident among many contemporaries at the beginning of the 20th century.

Social change and the shift in norms are part of an interdependent relationship full of tensions and conflicts, the complexity of which precludes a narrative of linear progress. Although Hillary Clinton

declared the “strengthening of the American family” one of her major political goals, her reformulation of family values for the 21st century – more integrative, more colourful and more egalitarian – did not help her win the election. Whether president Donald Trump – twice divorced, three times married, patriarch of a large patchwork family and avowed misogynist – will champion a renaissance of traditional family values, as some commentators assume, remains to be seen. Whether he will seek to ban legal abortion and same-sex marriage, as he promised during his campaign, is also unclear. It seems obvious, however, that one half of the electorate is completely alienated by the complexities of a modern society while the other half

adheres to more pluralistic norms and values. The family, still perceived as the “cornerstone of the nation” by many, will offer an ideal testing ground for any political attempt to overcome this divide.



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# The Deutsche Forschungsgemeinschaft

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is the central self-governing organisation responsible for promoting research in Germany. According to its statutes, the DFG serves all branches of science and the humanities. The DFG supports and coordinates research projects in all scientific disciplines, in particular in the areas of basic and applied research. Particular attention is paid to promoting early career researchers. Scientists and academics who work at a university or research institution in Germany are eligible to apply for DFG funding. Proposals will be peer reviewed. The final assessment will be carried out by review boards, the members of which are elected by researchers in Germany in their individual subject areas every four years.

The DFG distinguishes between the following programmes for research funding: In the *Individual Grants Programme*, any researcher can apply for financial assistance for an individual research project. *Priority Programmes* allow researchers from various research institutions and laboratories to cooperate within the framework of a set topic or project for a defined period of time, each working at his/her respective research institution. A *Research Unit* is a longer-term collaboration between several researchers who generally work together on a research topic at a single location. In *Central Research Facilities* there is a particular concentration of personnel and equipment that is required to provide scientific and technical services.

*Collaborative Research Centres* are long-term university research centres in which scientists and academics pursue ambitious joint interdisciplinary research undertakings. They are generally established for a period of twelve years. In addition to the classic Collaborative Research Centres, which are concentrated at one location and open to all subject areas, the DFG also offers several programme variations. *CRC/Transregios* allow various locations to cooperate on one topical focus. *Humanities Centres for Advanced Studies* are designed to support the transition in the humanities to an integrated cultural studies paradigm. *Transfer Projects* serve to transfer the findings of basic research produced by Collaborative Research Centres into the realm of practical application by promoting cooperation between research institutes and users.

*DFG Research Centres* are an important strategic funding instrument. They concentrate scientific research competence in particularly innovative fields and create temporary, internationally visible research priorities at research universities.

*Research Training Groups* are university training programmes established for a specific time period to support early career researchers by actively involving them in research work. This focusses on a coherent, topically defined, research and qualification programme. Research Training Groups are designed to promote the early independence of doctoral researchers and intensify international exchange. They are open to international participants. In *International Research Training Groups*, a jointly structured doctoral programme is offered by German and foreign universities. Other funding opportunities for qualified early career researchers are offered by the *Heisenberg Programme* and the *Emmy Noether Programme*. In so-called *Reinhard Koselleck Projects*, the DFG supports especially innovative research undertakings by outstanding scientists and academics.

The *Excellence Initiative* aims to promote top-level research and improve the quality of German universities and research institutions in the long term. Funding is provided for graduate schools, clusters of excellence and institutional strategies.

The DFG also funds and initiates measures to promote scientific libraries, equips computer centres with computing hardware, provides instrumentation for research purposes and conducts peer reviews on proposals for scientific instrumentation. On an international level, the DFG has assumed the role of Scientific Representative to international organisations, coordinates and funds the German contribution towards large-scale international research programmes, and supports international scientific relations.

Another important role of the DFG is to provide policy advice to parliaments and public authorities on scientific issues. A large number of expert commissions and committees provide the scientific background for the passing of new legislation, primarily in the areas of environmental protection and health care.

The legal status of the DFG is that of an association under private law. Its member organisations include research universities, major non-university research institutions, such as the Max Planck Society, the Fraunhofer-Gesellschaft and the Leibniz Association, the Academies of Sciences and Humanities and a number of scientific associations. In order to meet its responsibilities, the DFG receives funding from the German federal government and the federal states, as well as an annual contribution from the Donors' Association for the Promotion of Sciences and Humanities in Germany.



At the beginning of May there was a double cause for celebration in Berlin. Together with the Federal Ministry of Education and Research (BMBF), the DFG presented ten researchers (four women and six men) with the 2017 Heinz Maier-Leibnitz Prize, the most important award for early career researchers in Germany. Our photo shows the prizewinners (from right to left) Philipp Kanske, Christian Groß, Michael Seewald, Mandy Hütter, Ute Scholl, Marion Silies, Olivier Namur, Evi Zemanek, Christoph Kirchlechner and Andreas Geiger with DFG Vice President Marlis Hochbruck, Research Minister Johanna Wanka and DFG President Peter Strohschneider. Following the presentation of this year's awards, approximately 200 guests including researchers, politicians and other leading figures celebrated the 40th anniversary of the Heinz Maier-Leibnitz Prize. The award, now worth €20,000, has been conferred by the DFG and the BMBF to outstanding early career researchers since 1977 – as both recognition and an incentive to continue pursuing an academic career path. The prize is named after the atomic physicist and former DFG President Heinz Maier-Leibnitz, during whose period in office it was first awarded.



## Impressum

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