

1/2009 ▶ "Warning! Gypsies!" ▶ Cosmic Intruders under Observation ▶ The Janus-faced Composer ▶ Reproduction – A Delicate Balance ▶ A Forum for Research Management ▶ "Murmur of Amazement"



In this issue

Secrets of the Universe

Atomic nuclei, photons and neutrinos rain down continuously on the Earth from space. At the Pierre Auger Observatory in Argentina researchers examine these particles, gaining new insight at a level never before attained.

Page 4

Art and Ideology

The work of Winfried Zillig and other notable German musicians after 1933 was characterised by contradictions that are hard to fathom: Ambitious modernism co-existed side by side with the mindless currying of favour to propaganda.

Page 14

Science as a Pioneer

Although there is still a long way to go, a very promising start has been made in bringing Russian and European researchers together. This was apparent at an international conference in Moscow, organised by the DFG.

Page 26

Building Bridges

Establishing a new form of cooperation: Dr. Harald Leisch has been working at the German Embassy in Hanoi – on behalf of both the DFG and the German Foreign Office. In an interview, he shares his first impressions.

Page 27

Commentary

Dorothee Dzwonnek

A Forum for Research Management p. 2

How the DFG responds to the increasing complexity of scientific work

Natural Sciences

Bianca Keilhauer and Johannes Blümer

Cosmic Intruders under Observation p. 4

Studying high-energy particles with unprecedented precision

Humanities

Herbert Uerlings and Iulia-Karin Patrut

"Warning! Gypsies!" p. 9

Fascination and destruction: Society's way of dealing with the "Travellers"

Portrait

Rembert Unterstell

Adoptive Relationships in West Africa p. 13

Erdmute Alber investigates family networks on the "Dark Continent"

Humanities

Ulrich Konrad

The Janus-faced Composer p. 14

Creating music in the Third Reich: The example of Winfried Zillig

Life Sciences

Alexander Henke, Caroline Michel and Jörg Gromoll

Reproduction – A Delicate Balance p. 18

How the molecular mechanisms of hormones are being deciphered

Interview

The Excellence Initiative and its image abroad

"A Murmur of Amazement" p. 22

Marco Finetti speaks with Annette Schmidtman and Hans-Georg Kräusslich

On tour with german research

Eva-Maria Streier

Expansion and Excellence p. 24

India, as a research country, faces great challenges



Cover: MHVL / Private Collection

How Stereotypes Influence the Perceptions of a Minority

Carmen became a symbol of the proud, dangerous Gypsy, who rejects society's norms. Images such as this affected the way people viewed the Sinti and Roma for centuries. **Page 9**

Receiving mail from the Deutsche Forschungsgemeinschaft (DFG) is always interesting. Recently, some one thousand scientists and academics, as well as research administrators across Germany, received a brochure from the DFG Head Office in Bonn. In the brochure, the DFG presents its new programme for university and science management – under the well-founded assumption that the more than one dozen events and modules on topics such as research association management, finances and controlling, personnel recruitment and management, project management and conflict management or science marketing and press and public relations will be met with keen interest.

The fact that the DFG has become involved in this area at all – let alone its degree of involvement – may come as a surprise. At first glance, research management may not appear to be among the duties on which the DFG, as the central research funding organisation in Germany, should be concentrating. But it is only logical that it do so; in fact, it is imperative because management issues have become more important in recent years at universities and in research, and this importance will continue to grow.

Naturally, to be successful in research one first needs outstanding technical knowledge paired with creativity and the enthusiasm to perform research, the courage to take risks, scepticism of what appear to be final answers, patience and the famous bit of luck.

Moreover, managerial skills, such as planning, organisation and administration, play an increasingly important role, both a sign and a consequence of a far-reaching change: research takes place in larger associations in which up to several hundred people work, such as in the Collaborative Research Centres of the DFG and the institutes of the Excellence Initiative. These associations in particular, but also the universities and other research institutions, enjoy more freedom that they give themselves through

flatter hierarchies and freedom that is given to them on an institutional level through the withdrawal of the state from university administration, a process that has already commenced. For the individual researchers, larger research networks and more freedom bring, above all, more responsibility.

There are other issues as well: for example, knowledge of funding opportunities in times of stagnation or

This fact automatically makes the topic of management a concern, even a responsibility, of a funding organisation the size of and with the standards of the DFG, which now supports more than 20,000 research projects per year with funding exceeding two billion euros.

The DFG accepted this responsibility early on. In doing so, it wanted not only to meet the



Illustration: Lichtenscheidt

reductions in governmental funding, as well as in international competition, is of ever-greater importance, as is the ability to communicate in light of the growing interest of the public and the media in research and the results it produces.

It is certainly not an overstatement to say that apart from the actual research work, management of this work is, in many cases, just as important for the success of a research project.

concerns associated with the increased importance of the management aspect, but also to eliminate a conspicuous discrepancy: although managerial competence is essential for those working in research, few are actually trained in this area. Management topics do not generally play a role in technical education. Even in the academic training programmes, which themselves are very limited, there are few offerings in Germany. Thus, it is often left up

to individual creativity, intuition and ability to improvise in areas where there is a much greater need for solid knowledge and strategies.

Against this backdrop, the DFG, together with the Center for Science and Research Management (ZWM) in Speyer, started two training series in 2004, which have proven themselves for five years now. One, with lectures, seminars and workshops, targets

in their careers in order to bring modern approaches to the institutions.

With the new “Forum Hochschul- und Wissenschaftsmanagement” (University and Research Management Forum), the DFG is now taking a big step further. This event series, also offered together with the ZWM, is directed at the two target groups who bear

an offer for professionalisation, but also a promising approach for breaking down the increasing tension between science and administration. Already 15 years ago, then DFG President Wolfgang Frühwald stated, “We must restore the balance between research organisation and research activity.” This mission is even more important today – and is good reason for the DFG to become intensely involved

Dorothee Dzwonnek

A Forum for Research Management

From planning to personnel management, from governance to self-evaluation: why the DFG responds to the increasing complexity of scientific work – and how it sets its own course in doing so

young leading professionals at universities, non-university research institutions and funding organisations and, thus, in the DFG itself. That, too, is logical, since management knowledge is increasingly important for the review, supervision and funding of research projects.

The second training series is focussed on young researchers who need to become acquainted with management knowledge early on

the brunt of the management responsibility: at the chief researchers in research associations of all types and at the research administrators who, in addition to the traditional academic professions, are now present in many projects and who have come to embody the increased importance of management issues.

With the considerably expanded topics and content and its two target groups, the DFG considers the new programme to be not only

and set its own course in the area of research management.

The author is Secretary General of the DFG.

The brochure on the DFG’s research management programme can be requested from the DFG Head Office, Human Resources, Kennedyallee 40, 53175 Bonn, Germany.

Cosmic Intruders under Observation

Atomic nuclei, photons and neutrinos rain down continuously on the Earth from space. At the Pierre Auger Observatory in Argentina researchers study these high-energy particles with unprecedented precision – and hope to uncover some of the universe's secrets

By Bianca Keilhauer
and Johannes Blümer

Anyone who drives through the Argentinian Pampas, along the foot of the Andes Cordillera, and approaches the small town of Malargüe in the Mendoza Province from the north, will notice large plastic tanks at regular intervals at the roadside – lined up like a string of pearls. 1,600 of these tanks, each 3.4 metres in diameter and around 1.5 metres tall, form the 3,000 square kilometre detector array of the Pierre Auger Observatory. The tanks are supplemented by telescopes positioned at four different points around the detector field boundaries: on clear, dark nights they observe cosmic rays with unprecedented precision. Here, more than 400 scientists from 17 nations investigate the most energetic cosmic rays.

Cosmic rays in the form of high-energy atomic nuclei, photons and neutrinos constantly bombard Earth from space. Their energies range from the rest energy of a hydrogen nucleus up to macroscopic values of several Joules – concentrated in a single particle! The measured record corresponds to around 300 times the collision energy of the LHC particle accelerator at CERN in Geneva, which entered service on 10 September 2008. However, the intensity of cosmic rays decreases rapidly with energy, making observations of events enormously difficult.

The majority of low-energy particles originate in our own Milky Way, where they are probably catapulted to the observed energies in the “shock fronts” of supernova explosions. The galactic magnetic field deflects these particles numerous times during their journey, making their sources impossible to identify. However, this changes drastically at the highest energies: there are no known objects in the Milky Way capable of generating

the kind of energies recorded and the galaxy itself cannot capture such particles magnetically.

It was not until November 2007 that the Pierre Auger Observatory managed to recognise a relationship between the arrival directions of the most energetic cosmic particles and the positions of extragalactic objects in the southern sky. Apparently active galaxies, with black holes of several hundred million solar masses at their centres, can provide the extreme conditions in their environs re-

quired for the observed accelerations.

Above the mid-energy range cosmic ray events are too rare for direct observation using balloon or satellite experiments. But higher energies allow new, indirect methods of detection. The primary particle collides with an atomic nucleus in an air molecule when it penetrates Earth’s atmosphere and thus generates numerous secondary particles. These, in turn, retain enough energy to participate in energetic interactions and create further particles.



Illustration: Karlsruhe Research Centre

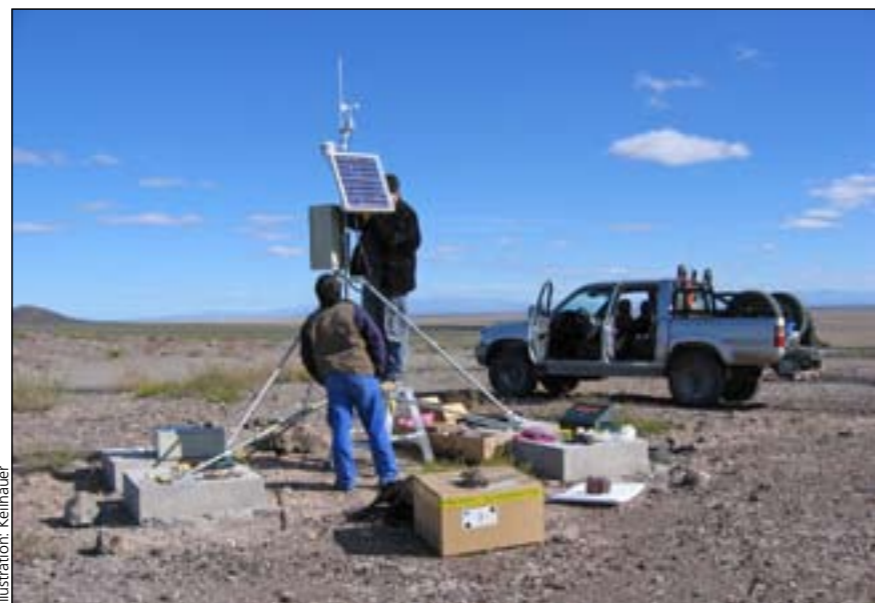


Illustration: Keilhauer

1,600 water Cherenkov tanks – with a spacing of 1.5 kilometres between tanks – have been installed in the expanses of the Argentinian Pampa Amarilla, forming the detector array of the Pierre Auger Observatory. Bottom: Two observatory engineers erect a weather station.

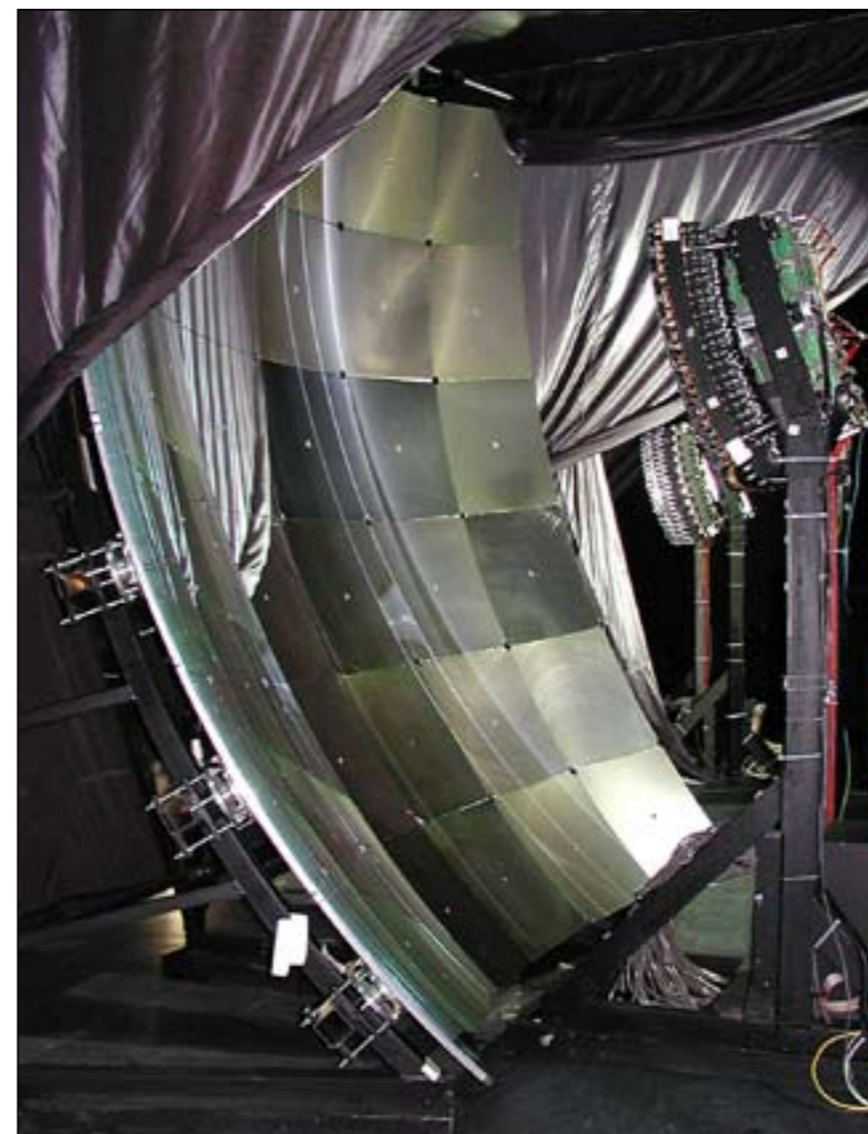


Illustration: Klages

Inside the “Los Leones” telescope station: Light enters the detector building from the right, falls onto the large, spherical mirror and is then bundled onto the camera. The fluorescence detector of the Pierre Auger Observatory comprises four buildings with six individual telescopes each.

This light, which is radiated along the particle cascade, is also detected by the electronic reflecting telescopes at the Pierre Auger Observatory. The combination of both of these methods of detection allows extremely precise measurement of the development of extensive air showers in the atmosphere, and the number and distribution of secondary particles at ground level.

The type, energy and direction of origin of the primary particles can be deduced from the data collected. These data will be collected by the Pierre Auger Observatory over a period of around twenty years, allowing possible sources of cosmic rays to be identified. A second installation is planned for 2010 in the northern hemisphere. The fluorescence telescopes play a key role in understanding these complex phenomena.

In contrast to the usual laboratory experiments under well-defined environmental conditions, an extensive air shower traverses the entire atmosphere from top to bottom. Temperature, pressure, density and humidity are continuously changing, introducing variability to particle interactions and

also influencing the fluorescent light. In addition, changes in the atmosphere over periods of days, or the seasons of the year, have a great impact.

The effects of these atmo-

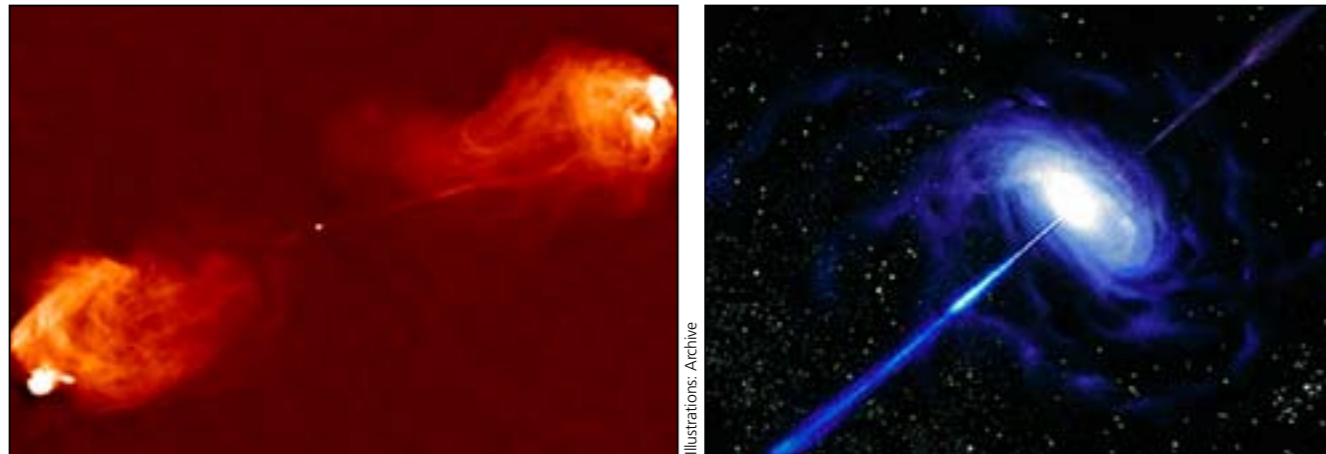
spheric factors on a precise reconstruction of the extensive air showers are at the focus of a DFG-funded research project. The Pierre Auger

spheric factors on a precise reconstruction of the extensive air showers are at the focus of a DFG-funded research project. The Pierre Auger

The data collected by the observatory provide insight on the type, energy and direction of origin of the primary particles

the continuous energy lost by the secondary particles in the atmosphere also excites nitrogen molecules, the main constituent of air. Excitation means that some of the molecule’s orbiting electrons are raised to a higher energy level. These states are unstable and the electrons almost immediately begin to spontaneously fall back to lower energy levels. The energy thereby released is uniformly radiated in all directions as UV fluorescent light.

spheric factors on a precise reconstruction of the extensive air showers are at the focus of a DFG-funded research project. The Pierre Auger



Illustrations: Archive

Observatory data are analysed for this purpose and weather stations are deployed at several locations in the 3,000 square kilometre detector array in order to continuously record the air conditions on the ground.

The measurements of the vertical atmospheric profile are much more complex. Temperature, pressure and humidity are determined as functions of altitude using meteorological radio probes attached to helium-filled weather balloons and lifted to heights of 25 kilometres. The journey takes around two hours and the radio probe data are transmitted to the receiving ground station every three to five seconds.

These radio soundings are dispatched approximately every five days by a specially built balloon launching station. Dedicated measuring campaigns were initiated, for example to find an answer to how the atmosphere changes between the hottest time of day, i.e. generally early afternoon, and the coolest time of day, just before sunrise, both close to the ground and at higher altitudes.

Following the on-site campaigns the recorded atmospheric data are analysed in Germany and stored in databases. It was thus possible to refine the reconstruction of extensive air showers using the previously captured weather data. Moreover, work is ongoing on the theoretical principles behind the fluorescence



Illustration: Karlsruhe Research Centre

Top: Objects in the Universe under discussion as sources of cosmic rays – here, impressive ‘jets’ issuing from active galactic nuclei. Bottom: A radio probe just before being launched. It hangs on a helium-filled weather balloon to record meteorological data.

emissions as a function of the real ambient conditions, and the results are verified in smaller experiments.

One result: the light yield depends critically on temperature and humidity, meaning that these aspects also need to be taken into consideration for air shower reconstruction. The uncertainties involved in the reconstruction of the cosmic ray’s primary energy and the type of primary particle are related to fluctuations in atmospheric conditions. However, model atmospheres developed previously can only be improved for the reconstruction after several years of weather data recording in the Argentinian Pampa.

The use of real-time atmospheric data in reconstructions of highest-energy air showers remains an open objective for the future. This objective may help to interpret these extremely rare and therefore “valuable” events with the highest possible precision – and thus to obtain new understanding.

Dr. Bianca Keilhauer and Prof. Johannes Blümer work at the KIT Center for Elementary Particle and Astroparticle Physics (KCE-TA) (KIT-Centrum Elementarteilchen- und Astroteilchenphysik) at the Karlsruhe Institute of Technology KIT (Karlsruher Institut für Technologie). KIT is the cooperation of University of Karlsruhe (TH) and the Karlsruhe Research Centre (Forschungszentrum Karlsruhe).

Contact: Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe



A large group of children follows a bear tamer. This photo was taken in Berlin in 1927. Most of the Roma who came to Germany from Eastern Europe in the early 20th century earned a living as showmen and entertainers.

Illustration: Rom e.V., Cologne

“Warning! Gypsies!”

Between fascination and destruction: Society’s way of dealing with the “Travellers” has undergone many changes over the centuries. Even today, stereotypes influence our views of the Sinti and Roma

By Herbert Uerlings and Iulia-Karin Patrut

How have people treated the poor and aliens over the past two centuries? Alongside the Jews, the “Gypsies” are one of Europe’s oldest ethnic minorities. The history of both of these groups over the centuries has been one of unpredictable alternation between social inclusion and exclusion – going as far as the inhumane genocide of the Holocaust in the 20th century.

The social status of the Gypsies has been influenced by a wealth of changing projections, images and stereotypes among the majority of the population. For example, the Gypsy Romance movement in 19th century Europe reflected the longing to break out of the restrictive bourgeois conventions of the age. One of the best known fictional Gypsies, Bizet’s *Carmen*, both fascinated and threatened the middle-class audiences of her time. Early 20th century criminologists, on the other hand, categori-

cally viewed every Gypsy they set eyes upon as a delinquent by birth. In retrospect, the Gypsies’ social status became ever more precarious as the establishment of nation states on the European continent progressed, and the more efficiently a given territory could be controlled. Change did not set in until decades after the Second World War.

When they arrived in Europe in the Late Middle Ages, it was initially easy for the Gypsies to be integrated into the prevailing view

of the world. They were travellers, led by a "ruler" or "prince", who earned their living by performing skits and artistic feats and whose wanderings were based on religious motivation. At the time, that was nothing unusual. Nevertheless, their social status remained low and it was easy to revoke any rights of abode they were granted. The Gypsies were seen as poor and alien. In the eyes of the majority this soon justified their expulsion, and in Eastern Europe even slavery.

By the 15th century it had already become commonplace to describe people who, at the time, were believed to come from the distant and unknown land of Egypt or, as became accepted knowledge from 1800 onwards, from India – in other words, "foreign people". Simultaneously, the word also developed a new meaning, that of "travelling people", "tricksters" and "vagrants". Seen in this light, the Gypsies were no longer simply foreigners, but mere local "thieves" and "riff-raff", as the scholar Camerarius expressed the accepted doctrine held in Europe in and around 1600. The imprecision of these two contradictory meanings of the word "Gypsy" – as a race and as people on the fringe of society – subsequently made it possible for as large a group as possible to be persecuted and suffer social exclusion.

At most, only some of those stigmatised as Gypsies, a term which was later frequently used to refer to anyone without permanent residence, were actually members of the Sinti and Roma peoples, who were officially recognised as an ethnic minority in Germany in the early 1980s. Prevailing popular notions about Gypsies, as reflected in historical lexicons, travel journals, police records, and literary and artistic representations, had a varying influence on their legal and social status.

Whereas the social stigmas of homelessness, antisocial behaviour and aversion to work paved the way to and drove social exclusion, the impression of Gypsies as a race in its own right were not always



ENFANT ENLEVÉE PAR DES NOMADES

Illustration: Musée d' Histoire de la Ville de Luxembourg / Private Collection

negative. To the historian and philosopher Johann Gottfried Herder, for example, who considered Gypsies to be "a foreign race within Europe", they were a nation that was forced to subject itself to a strict process of assimilation if it wished to remain in Germany. In the latter half of the 19th century, on the other hand, the Gypsies were increasingly viewed as an early Arian tribe on account of their Indian origins, and thus at least distantly related to the majority of the German population and, as such, should retain its character. This led to a more posi-

tive image and acceptance of the Gypsies in the "Arian" world of German mythology and art. Admittedly, this was merely symbolical acceptance, which was subsequently abandoned by the racist policies of the National Socialist regime.

A pan-European comparison which reconstructs the multifaceted developments in numerous different countries provides an insight into the forms and functions of social exclusion and inclusion of the Gypsies. The history of the Sinti and Roma in Europe, who are now estimated to number some eight

million, has always been linked to generalisations and "Gypsy" stereotypes and the so-called "Gypsy lore", which has circulated the entire continent for centuries. These attributions deserve closer investigation. In popular culture it is evident that differing perceptions of Gypsies developed in the countries and cultural regions of Eastern and Western Europe. It is striking that the Gypsy idols such as Preciosa, Carmen, Esmeralda and Quasimodo (the Hunchback of Notre Dame) all originate from the West European tradition. Evidently, it was only this tradition that gave rise to memorable figures, whose character was such that they became widely known and have remained so to the present day. A similar result is seen if we look at the works of a popular German author. If Karl May, an author from the late 19th century, describes Gypsies in a positive light (which is not uncommon), they are generally "Gitanos".

Serious accusations. Left: The newspaper "Petit Journal" from 1902 warns of "Gypsies as child snatchers". Right: A sign from the 18th century banning "Gypsies" and warning them of draconian punishment should they dare to enter. Bottom: A romanticised painting "Zigeuner im Walde, vom Ortschaftschulzen über ihre Legitimation ausgefragt" ("Gypsies in the Woods – the Inspection of the Settlement License" by Ludwig Knaus) dating from 1855.



Illustration: Musée d' Histoire de la Ville de Luxembourg

East European Gypsies, on the other hand, are generally perceived in the collective consciousness as being devalued, primitive and weak-minded. This may be explained by their status as slaves in Romanian principalities. They are typically described as destitute and poor, and superficially romanticised paintings and early photographs often show them dressed in rags and living in makeshift tents, mostly in poses that indicate they are resigned to their fate. Travel journals also describe them as being hungry and as beggars. Nevertheless, in spite of all the negative images, there were also attempts to idealise the "freedom for the Gypsies" and "Gypsy art" in Eastern Europe, as exemplified by the "Hungarian



Illustration: Dr. Hans Peters Verlag

Gypsy Music", which has become popular in Austria.

The knowledge about Gypsies in German-speaking countries frequently refers to these severely devalued communities of Gypsies from Eastern Europe. Prominent examples of this are Heinrich Moritz Grellmann's "Historischer Versuch über die Zigeuner" (Dissertation on the Gypsies, 1787), the importance of which for Eastern Europe is hard to overestimate, and the writings by the ethnographer Heinrich von Wlislöcki, dating from the late 19th century. Wlislöcki studied the customs and conventions of the East European "Wandering Gypsies of the Siebenbürgen" and attempted to present their myths, songs and dances as "genuine Gypsy folklore" to a broad German audience.

In social and political dealings with Gypsies there are some serious differences to be found between different countries, as well as many similarities. This is partially due to the differing forms of rule, the differences in economic situation, the social and ethnic composition of the population and, last but not least, the changing perception the majority had of itself. In the Romanian principalities, for instance, Gypsies were treated as slaves from the 15th century until 1855/56, and could be sold, auctioned and forced to do any type of work. Gypsies were accepted by society (not least because the society relied on their manpower), but held a very low social status.

In the territory that subsequently became the German Empire there was almost no attempt made to integrate the wanderers in the economic structure of society until the 19th century. This economic exclusion was at times accompanied by

symbolic inclusion – by way of the dreams of "genuine Gypsy art" and the myth of them being the "original Arians". Since the Gypsies who lived on German territory were first and foremost considered to be foreign vagrants, those Sinti who managed to exploit economic niches and settle in villages and towns were generally no longer

ful. The position of the Gypsies remained unstable. As servants, itinerant workers, soldiers and "court jesters" they were near the bottom of the social ladder. As was the case throughout 19th century Europe, they provided the musical accompaniment to the dreams of freedom dreamed by the majority of society. Interestingly it was precisely these "Gypsy orchestras" which, initially in the Austro-Hungarian Empire, gave no inconsiderable number of Gypsies a chance to climb the social ladder. The related issues demand further investigation by means of comparative analysis.

The interim findings of the DFG research project "Fremde im eigenen Land. Zur Semantisierung der ‚Zigeuner‘ von 1850 bis zur Gegenwart" (Foreigners in their Own Country. The Semantisation of the 'Gypsy' from 1850 to the Present Day) have been published in three omnibus volumes ("Fremde Arme – arme Fremde" (Foreign Paupers – Poor Foreigners), 2007, "Europa und seine ‚Zigeuner‘" (Europe and its 'Gypsies'), 2007; "‚Zigeuner‘ und Nation" ('Gypsies' and Nationality), 2008) as well as in the catalogue of the exhibition "Achtung, Zigeuner! Geschichte eines Missverständnisses" (Warning! Gypsies! A History of Misunderstanding), which was on display at the Musée d'Histoire de la Ville in Luxemburg from March until October 2007, during Luxembourg's year as the European Capital of Culture.

Prof. Dr. Herbert Uerlings and Dr. Iulia-Karin Patrut teach and research in the Department of German at the University of Trier.

Contact: University of Trier, FB II Germanistik, Neuere deutsche Literaturwissenschaft, 54286 Trier, Germany



Illustration: Musée d'Histoire de la Ville de Luxembourg / C. Weber

Adoptive Relationships in West Africa

Social anthropologist Erdmute Alber investigates changes in family networks on the "Dark Continent" – and has an eye on Europe as well

By Rembert Unterstell

She can still clearly remember the first visit. That was in December 1991. At that time, Erdmute Alber travelled as a doctoral researcher in ethnology to the West African Republic of Benin. The further she travelled from the airport of the large harbour city of Cotonou towards the small bush villages in the north, the more "foreign and frightful" this world appeared to her. "That was true culture shock", said Alber, "I thought that after previous research visits to Latin America, I knew what life in a third-world country meant."

Nevertheless, Alber became interested in the poverty-stricken agricultural country and its inhabitants, and, today, nearly 20 years and numerous research trips later, she feels completely comfortable there. She is no longer viewed by the Baatombu people – who are the focus of her research – as an aid worker, rather as "a somewhat mysterious white person who wants to know everything", she emphasised.

Ethnologic field research in West Africa: For the 44-year-old social anthropologist at the University of Bayreuth, who has been a DFG Heisenberg professor since 2008, this has much to do with "tenaciously driven, participatory observation", and less to do with romanticised ideas of what it means to be a travelling researcher. Based on written archive sources from the last 150 years and her numerous interviews in Benin, she had already studied the faces of governance and the conflicts of the Baatombu with a country undergoing change during the course of her doctoral research at the FU Berlin. In addition to her work with documentary materials and the interviews, she recorded her observations in a field diary every day.

In the process, Alber discovered something irritating: Even in the time around 1900, nearly all children were apparently raised not by their biological parents, but rather by "social parents". And today as well, two thirds of girls and more



Illustration: Unterstell

than half of boys still do not grow up in the house of their actual mother and father.

How is this to be understood? And according to what rules do the Baatombu give up their own small children to other families and accept children that are not their own so matter of factly? The researcher couldn't let go of these questions – initially within the scope of the DFG project "Social Parenthood" at the FU Berlin, then, since 2002, as a junior professor at the University of Bayreuth with focus on Africa. Alber, the first female Heisenberg professor in the humanities anywhere in Germany, is currently studying the changing kinships, namely the changing of roles, status and provision of sustenance of the grandparent generation. Quantitative surveys

and the computer-supported evaluation of those surveys complement the spectrum of methods. Equipped with these tools, Alber's work involves the comparison of families in northern Togo and Benin. Her results have caught the attention of others in her subject area, both nationally and internationally, as well as of the media. For example, DER SPIEGEL sent a reporter to visit her in the field to report on the "adoptive relationships" in West Africa.

Alber's academic life also includes courage, initiative, and, not least of all, organisational skill. For her, it has been "a matter of course" that her two daughters, Judith Lilly and Marlene, have accompanied her on research trips from a very young age. Thus, in addition to her involvement in the promotion of young researchers, she also works to advance the compatibility of research and family. The chances for equal opportunity that are so often spoken of are not what is important to her, what matters is the lived equal opportunity, a fact that also holds true in her work as the women's representative at the "Bayreuth International Graduate School of African Studies".

Learning from Africa: for Erdmute Alber, this means understanding that all forms of parenthood and childhood and the associated perceptions and values are culture specific. The widely varying expectations of motherly love and family happiness in Europe and Africa are socially and culturally shaped. Alber: "Is it possible that this can allow us to be more at ease with respect to new forms of family and courses of childhood and also to help us see their positive potentials?"

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



Illustration: private

The Janus-faced Composer

The work of Winfried Zillig and other notable German musicians after 1933 was characterised by contradictions that are hard to fathom: Artistically ambitious modernism coexisted side by side with the mindless currying of favour to ideological propaganda

By Ulrich Konrad

The sound of a militaristic fanfare opens the “Musik zur Feierstunde am Reichsparteitag 1939”, composed by Winfried Zillig (1905–1963). “A thousand years of hollow longing rails from the red cloth, blood and

demise and tears, smoke and ruins, suffering and hate and cursing!” are the lyrics of a musically simple “banner song”. The event, the lyrics, the primitive musical style, the knowledge of the crimes linked to the location and the era when this “work” was composed all make a clear and simple judgement seem

obvious: “Nazi music” by a “Nazi composer”.

It is hard to imagine that Zillig’s Verlaine songs – melancholy, introspective, a late return of romanticism that were permeated by modernism, and a quiet ode to France – were not only penned by the same hand, but even at almost

the same time, in 1940. In a euphoric essay, the philosopher and musicologist Theodor W. Adorno compared the “exceptional” nature of these songs with works by Gustav Mahler and Arnold Schönberg. It is even more astounding when, in addition to this two-faced nature of his works, you take into consideration the fact that this composer composed music using a very individual and in part highly complex twelve-tone series, not only during the period he spent under Schönberg in Berlin, but right up until the late 1930s and then again after the Second World War. For instance, Zillig’s opera “Das Opfer” (The Sacrifice) opened at the Hamburg State Opera in 1937 thanks to its heroic and contemporary subject matter – it is about Robert Falcon Scott’s expedition to the South Pole – in spite of the fact that the composition technique has to be seen as a clear acknowledgement of the Jew Arnold Schönberg, who had already been forced into exile at the time. Admittedly – and this is where the real musicological challenge lies – a detailed look reveals that although Schönberg’s twelve-tone technique forms the foundation of the opera, the music itself avoids provocatively atonal sounds through compositional interventions, making the overall sound impression a little more pleasing.

Works by one and the same composer that are in such stark contrast to each other attracted the attention of a research group at the University of Würzburg to a previously neglected phenomenon. Although it was well documented by contemporary historians that beyond the “zero hour” that marked the break at the end of the war in 1945, German society was characterised by a certain continuity, and the fact

Facing page: Winfried Zillig at work. Right: A fanfare corps of the Deutsches Jungvolk (German Youth, part of the Hitler Youth for boys aged 10 to 14) at the annual Reichsparteitag in Nuremberg in 1938. The Nazi regime exploited the ideological conformist music by Zillig and other composers for its own purposes.

that musicologists have been able to contribute numerous details to the overall picture from biographies and the history of cultural institutions, continuity was nevertheless generally viewed, from the point of view of musical composition, as picking up again after the war where things had stopped at the end of the 1920s, rather than as a continuous development with key themes that continued uninterrupted through the 1930s and ’40s. The “Third Reich” was considered to be compositional no man’s land.

Guided by an understandable aversion to all things connected in any way whatsoever with the evil ideology of National Socialism, many artists and scientists turned their backs on composers from the most directly affected generation. Others, on the other hand, perceived and respected their artistic abilities, but denied the need to relate the music to the circumstances in which it was composed. The writers of musical history created a detailed picture of individuals and establishments in Nazi Germany, while running the risk of losing sight of the developmental trends of the music itself.

Can an artist’s or composer’s political – or even apolitical – attitude result in his work being discredited in principle? Does he necessarily become irrevocably “unbearable”, as an artist, simply because of having stayed in Nazi Germany and remaining active there, thus becoming morally questionable? Are his works allowed to be given the “honour” of being the subject of scientific examination? Or – another point of view that is still widely held – are the circumstances in which a work came into being and the attitudes of its creator entirely irrelevant for artistic consideration?

The answers to such questions seem clear on at least one point: A carefully considered judgement can only be reached following thorough clarification of the facts and with a deep understanding of the subject matter. As obvious as this realisation may seem, in scarcely any other area does the scientific point of view continue to be so strongly influenced by the emotions, consternation and political attitude of the actors as when it comes to the history of the 1930s

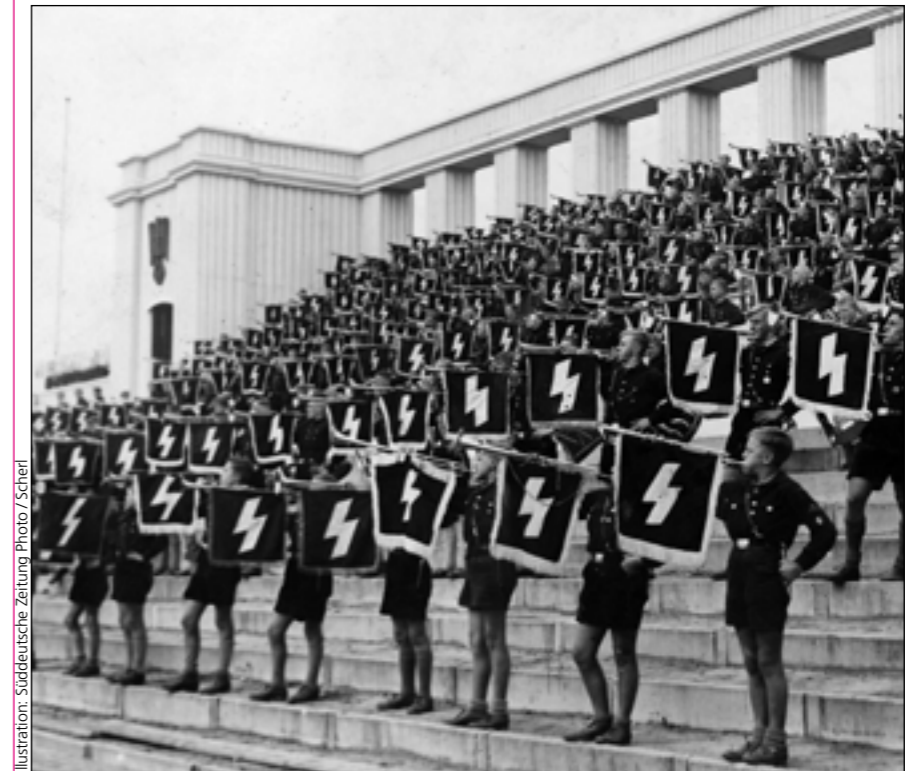
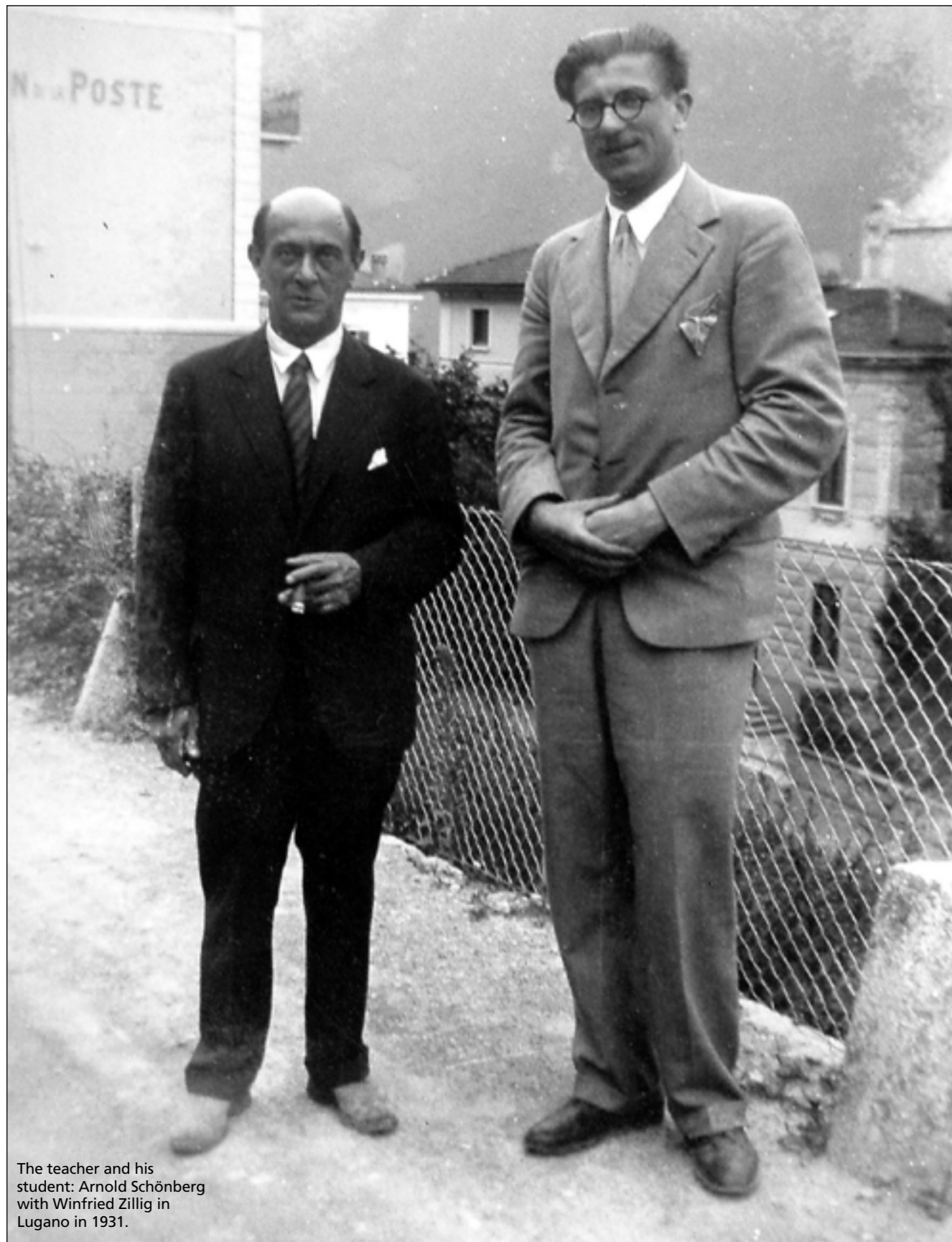


Illustration: Süddeutsche Zeitung/Photo/Schierl



The teacher and his student: Arnold Schönberg with Winfried Zillig in Lugano in 1931.

illustration: private

and 1940s (especially in Germany). The same also applies to musical history. Particularly an emotionally loaded form of expression such as music thus demands an objective, scientific approach, all the more. The brief but nevertheless heated debate about the performance of Hans Pfitzner's Eichendorff cantata "Von deutscher Seele" by the ideologically untainted conductor Ingo Metzmacher and the German Symphony Orchestra in Berlin on 3 October, 2007, showed that the fear some may have of reflex reactions in this area, which is justifiably burdened by ethical and moral concerns is by no means unfounded.

The study by the group from Würzburg clearly shows that Winfried Zillig is no isolated case. Rather, numerous composers who were not only able to continue their public career, but whose composition is also characterised by a remarkable degree of variety, between the historic milestones of 1933 and 1945 prove that it is a phenomenon typical of the era. For instance, Wolfgang Fortner (1907–1987) – who composed serious chamber and orchestral music as a young musician – composed a cantata in neobaroque style for the bicentennial anniversary of the University of Göttingen in 1937, after having previously qualified for this honour by composing songs for the Hitler Youth. Even as late as 1941, he was still publicly a vociferous opponent of Schönberg's "atonal" twelve-tone technique. From the 1950s onwards, however, Fortner used this method of composition in his own works without any qualms and continued to do so over the course of his ongoing artistic development.

Similar trends can also be observed in the life and work of other composers such as Karl Höller (1907–1987), for example. During the Third Reich he composed subtle symphonies and chamber

music, while simultaneously writing "heroic music", spurred on by Goebbels, in which he subjugated his own personal style to meet Nazi expectations. This example also makes it possible to reveal how it was possible to create ideologically conformist music that was suitable for propaganda purposes by making deliberate compositional changes to what had originally



illustration: private

"A thousand years of hollow longing rails from the red cloth ..." – a militaristic "banner song" dating from 1939 penned by Zillig.

been an artistically ambitious, individual musical language. A prime example that demonstrates the ambivalence of musical expression is Carl Orff (1895–1982), whose *Carmina Burana* is now a firmly established as part of the concert repertoire, was composed in 1937, just one year after the debut of his piece "Olympische Jugend", which he wrote for the Nazi Berlin Olympics, in Frankfurt am Main. It was celebrated as an "ode to the strength of unbroken primal instincts", and stylistically conformed completely to the Nazi regime's musical expectations.

Although the Würzburg study is still underway, clear trends are already evident, even now: There is no clear-cut dividing line between music, which on the one hand was subjected to the Nazi aesthetic – which, it should be mentioned, was in itself always contradictory and unclear – and on the other hand represented an ideal state of art and a free, individual will to create. The musical life of the average citizen remained comparatively unaffected, at least on the surface, even aspiring to represent an element of modernism, as long as the composer was not expressly ostracised as a Jew or a Bolshevik. Even if the music critics subscribed to an ideological or denunciatory vocabulary, this did not necessarily mean official state condemnation or persecution of a particular piece or artist.

Conflicting interests and power struggles within German culture in the 1930s and 1940s led to a polycracy in the musical landscape, resulting in grey areas and niches for the musical public. There was considerable latitude, particularly for creative musicians, which had to be exploited judiciously, but was indeed exploited. Under these conditions there were many artistically significant composers who actively adapted to the situation by modifying their personal musical language to suit the prevailing conditions and demands. The detailed analysis of this process of adaptation and subjugation that is reflected in the scores is being undertaken in Würzburg with the aim of gaining a deeper understanding of the ambivalent behaviour exhibited by people living in a dictatorship.

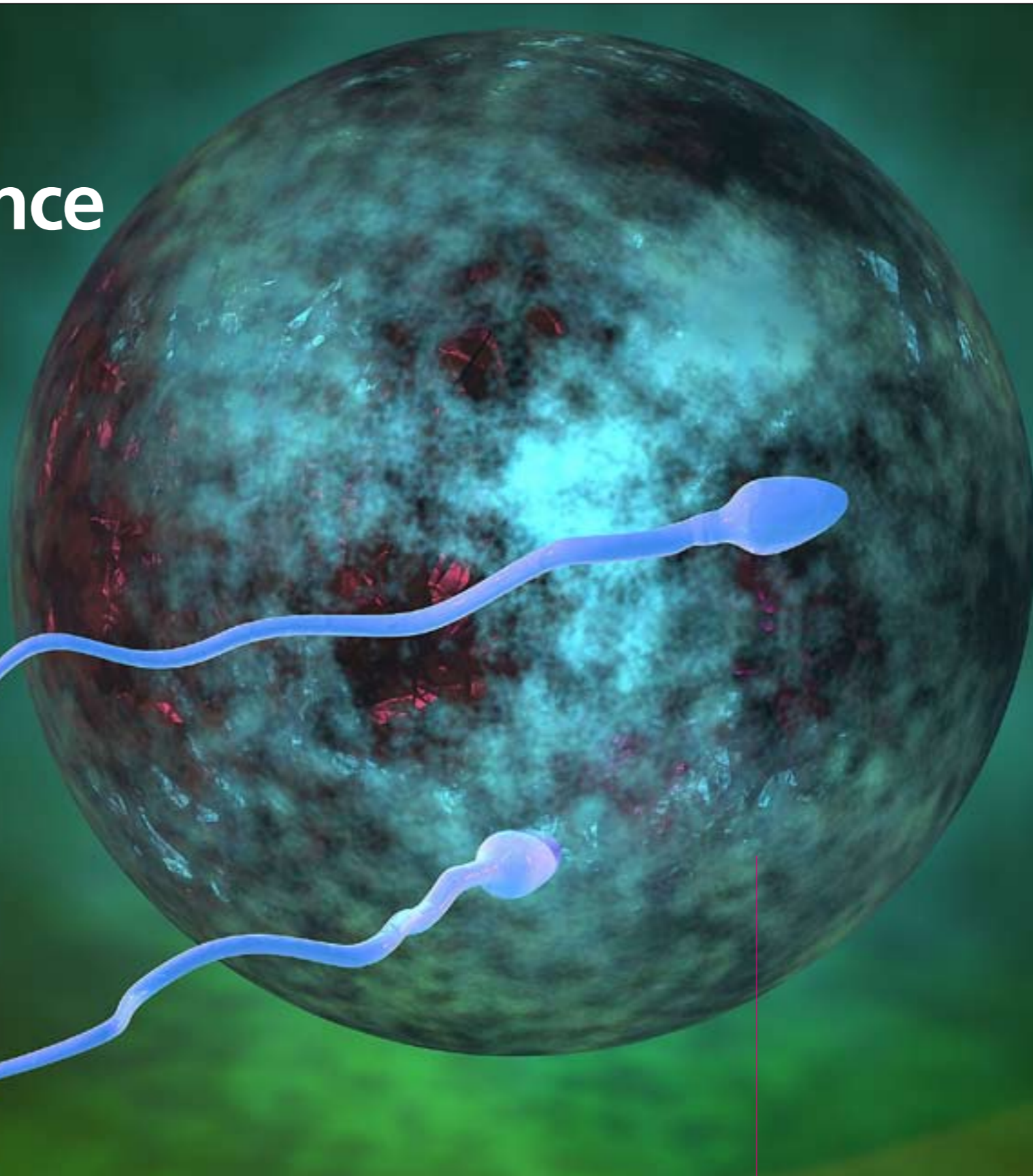
Prof. Dr. Ulrich Konrad is a Professor of Musicology at the University of Würzburg.

Contact: University of Würzburg, Institute of Musicology, Residenzplatz 2A, 97070 Würzburg, Germany

Reproduction – A Delicate Balance

No lutropin, no offspring: hormones play a decisive role in reproduction. Their molecular mechanisms are now being deciphered

By Alexander Henke, Caroline Michel
and Jörg Gromoll



It must be your hormones", is frequently heard in a mocking or even reproachful tone when we encounter moodiness, hot flashes, stress symptoms or weight gain. However, this causal remark is often spot on because hormones participate in many important physiological processes in the body that are not controlled directly by the nervous system.

The London-based physiology professor Ernest H. Starling introduced the term "hormone" in 1905 for a substance produced in an organ and then released into the blood stream that transports it to its target organ. These target organs have receptors that are specific to a particular hormone and which transmit the effect of the hormone into the cell.

Hormones and their receptors play a fundamental role in reproduction. Without them, there is no sexual differentiation between men and women, no normal puberty and no reproduction. Of particular importance in this respect is the luteinizing hormone, lutropin, which has a key function in the reproduction of vertebrates, including the reproduction of humans. The hormone lutropin is synthesised in the pituitary gland of the brain, where it is secreted into the blood stream. It acts on the ovaries and testes. In women, lutropin triggers ovulation during the menstrual cycle, but in men it stimulates the testes into synthesising the sexual hormone testosterone, which is in turn responsible for triggering puberty with its associated voice change. It is also responsible for building up muscles, the growth of body hair and sexual desire.

The effects of the hormone are transmitted by the lutropin receptor, which is found in cells of the testes and ovaries. The signal is transmitted into the cell by a receptor located in the cell membrane. The resulting signal cascade leads to the production of other hormones such as oestrogen or testosterone.

Although hormonal regulation of reproduction and sexual differentiation has been known for de-



Illustration: Nordhoff

En route to in-vitro fertilisation: a human egg cell is anchored with a holding pipette. The "polar bodies" at the top and the outer egg membrane are visible. A single sperm can now be injected directly into the egg cell.

grave changes normally mean that the respective individuals do not have progeny and thus become extinct. However, this obviously does not apply to the highly fertile common marmosets and other species of New World monkeys.

The explanation for the fertility of the common marmoset is the presence of another hormone known as chorionic gonadotropin (CG). This hormone, which is produced only by Old and New World monkeys, is synthesised by specialised cells in the embryo and promotes embryonic development in the mother. CG thus makes a pregnancy possible in the first place. During gestation, its production is taken over by a tissue in the uterus, the placenta. Moreover, the CG hormone has acquired another fascinating role in the course of evolution: during pregnancy it stimulates the production of small quantities of testosterone in male fetuses. This testosterone is extremely important for the development of the immature testes and growth of the penis.

In the common marmoset, the CG hormone is produced not only by the placenta, but also by the pituitary gland where it has simply replaced the function of the missing lutropin. Lutropin and CG hormones are not only closely related to each other, but they also have a common evolutionary origin: the CG hormone developed from the lutropin hormone due to gene duplication. Whereas one gene copy retained its original function, the other one was modified and acquired a new function, which has become essential for maintaining the pregnancy of New World monkeys.

The common marmoset and the other New World monkeys have a further surprise in store. Not only has the hormone system changed, but also the lutropin receptor. In

New World monkeys, this receptor is unable to differentiate between lutropin and CG hormones. In other words, the lutropin receptor in New World monkeys can interact very efficiently with the CG hormone, but rather poorly with lutropin itself. However, this is not even necessary because lutropin is no longer produced in common marmosets. Whether lutropin was switched off in the pituitary gland before the receptor lost its ability to bind lutropin, or vice versa, is currently being investigated.

Both lutropin and CG exert their hormonal effect via the lutropin receptor, thus creating a system of two hormones and one receptor. Its complex chronological sequence of interactions

A common marmoset mother with her young. Studies of primates can help to deepen our understanding of the evolutionary principles and molecular mechanisms of hormones in reproduction.



Illustration: Henke

(CG hormones during pregnancy, lutropin for normal reproduction) is essential for fertility and normal sexual differentiation in humans. Defects in one of the components of the hormone/receptor system have serious consequences for hormone-regulated sexual differentiation. In patients who have such a genetic defect, this may mean that they do not enter puberty, are infertile, and in serious cases it may disturb the development of secondary reproductive organs, such as the penis. These patients then exhibit a female phenotype despite of having a male genotype with a Y chromosome. As a result, the normal path of sexual differentiation runs in the female direction, and male development requires additional hormones, such as testosterone produced by the action of CG.

Because in humans CG hormones are only produced by the embryo and placenta of a pregnant woman, the presence of this substance is used as the criterion

for a positive pregnancy test. The historical development of pregnancy tests is interesting in this respect. The so-called "frog pregnancy test" was carried out in pharmacies up to the 1950s. Urine from women with a suspected pregnancy was injected under the skin of clawed frogs kept in the pharmacy. If the woman was pregnant, the CG hormone prompted the female frog to lay eggs within 48 hours. Parallel to this, Dr. Selmar Aschheim and Dr. Bernhard Zondek developed a further test in the 1930s. In this test, the woman's urine was injected into prepubescent female mice. The animal was killed two days later and the ovaries were investigated for any signs of ovulation. The pregnancy test was positive if this was indeed the case.

Analogously, young female rabbits were injected with urine instead of the mice. The Anglo-American euphemism "the rabbit died" meant that the pregnancy test was positive, although the rabbit did not survive even if the test was negative. These tests were relatively reliable and were widely used to test for pregnancies.

Research on the reproductive hormone system is fascinating not only from the scientific and medical standpoints. Reproduction is directly linked to the continued existence of humankind and is of particular importance in an era in which there are immense environmental and sociocultural impacts on human fertility. For this reason, scientists are trying to understand the true meaning behind sayings such as "it must be your hormones" and also make the biological relationships comprehensible and transparent at the same time.

Dr. Alexander Henke, Dr. Caroline Michel and Prof. Dr. Jörg Gromoll are working at the University Clinic of Münster.

Contact: Universitätsklinikum Münster, Centrum für Reproduktionsmedizin und Andrologie, Domagkstraße 11, 48129 Münster, Germany

► www.klinikum.uni-muenster.de

acades and are well researched, the evolutionary and molecular mechanisms of the hormone/receptor function have received little attention. To date, most of the work on the effects of lutropin has been carried out with rats and mice. However, these rodents do not provide adequate answers regarding molecular mechanisms in humans

Reproduction is fascinating from the scientific and medical standpoints and is also directly linked to the existence of humankind

because the reproductive hormone systems of humans and rodents are too different. Moreover, many hormones appeared relatively late during evolution

and are therefore only found in primates. This is why studies using apes to discover the mode of action of hormones in human reproduction are important.

Studies of the reproductive system of the common marmoset, in particular, have given an enormous boost to scientific un-

derstanding of reproductive hormones. The common marmoset (*Callithrix jacchus*) is a South American species of New World monkey who evolved from the Old World monkeys of Africa and Asia about 35 to 40 million years ago. Common marmosets are comparatively small, have a relatively short

reproductive cycle and are easy to keep. They are thus suitable for biomedical research, particularly in investigations of the nervous system and the brain, the immune defence system, reproduction as well as in preclinical drug trials.

Paradoxically, our studies showed that the common marmoset does not produce lutropin in its pituitary gland. How is this possible? Although other species are able to live without this hormone, they are not capable of reproduction. Such

"A Murmur of Amazement"

How well known is the Excellence Initiative abroad, and what is its image? Following an information and advertising tour through the USA, Marco Finetti talked to Annette Schmidtman from the DFG and Hans-Georg Kräusslich from the cluster of excellence "Cellular Networks"

german research: Mrs Schmidtman, representatives of the DFG and other funding organisations spent a week travelling through the USA with the coordinators of nine "excellence institutions". Why, precisely?

Annette Schmidtman: Do good and speak about it – the old maxim applies here, too. The Excellence Initiative has already achieved a lot in the German higher education and science system, as you know, and – over and above that – the changes to our system are lasting. We wanted to let people know about these changes and promote this process of change.

Isn't the Excellence Initiative the talk of the town in the USA too, for instance thanks to the large number of American peer reviewers involved in the two rounds of the selection process that have taken place already?

Schmidtman: Of course, a lot of American scientists were involved in the review and decision-making process, but in comparison to the whole of America and all of the scientists and academics there are in the USA, they were just a drop in the ocean. We were targeting the directors of American universities and young researchers, in particular and they showed an incredible amount of interest! Wherever we went, there was always a great thirst for information ...

That you were able to quench?

Schmidtman: Well, a good two years have passed since the decisions in the first round of the Excellence Initiative were made and a good year since the second round, so it is definitely easier to talk specifically about the programme and about individual projects and no longer necessary to remain abstract or just political. First and foremost, the institutions

brought into being by the Excellence Initiative are now much more able to report on their work themselves. That was what was really new about this tour and what set it apart from the conferences held for young German researchers in the USA, where we already provided a lot of information about the Excellence Initiative in the past few years.

Mr Kräusslich, what particularly roused your interest in going on the tour, as a representative of one of the institutions created under the Excellence Initiative, even though it meant abandoning your cluster for several days?

Hans-Georg Kräusslich: That is indeed a very good question, especially



Do good and speak about it: Annette Schmidtman, Head of the DFG's Research Careers Division.

now that the research work has really got into full swing, but there were three things that made me want to go on the tour. Firstly, I wanted to tell people about the boost that the Excellence Initiative has brought about from my own personal point of view. Secondly, I wanted to show people how much is going on in the German scientific community as a whole, and thirdly, of course, I wanted to promote Heidelberg and my own cluster of excellence, "Cellular Networks".

Wasn't the latter perhaps the most important? After all, the tour was a good opportunity to recruit new people for your project.

Kräusslich: No, that wasn't our primary concern. All of the posts for professors and working group leaders in our cluster are already filled. Otherwise we wouldn't have made nearly as much progress yet as we have. But even if we had been looking for someone, we wouldn't necessarily have found them on this tour. The scientists and researchers who we spoke to covered a relatively wide spectrum of subjects, after all, quite apart from the fact that we wouldn't just have looked in Washington, San Francisco and Los Angeles, but worldwide.

So you didn't have any posts up your sleeve, with which you wanted to entice young postdocs back to Germany?

Kräusslich: No, and as far as I could tell, nor did the other institutions that took part in the tour. Nobody went on a recruiting drive.

One of the main topics in your conversations with the directors of American universities was the potential for cooperation, wasn't it?

Kräusslich: Yes, but here again, it was a similar situation as with the

young researchers. The work schedule for our cluster and for the other institutions is already established. Of course we discussed the potential for cooperation, but mainly in the medium or long term. The main focus of our conversations was on how much is changing for the better in the German scientific landscape ...

Schmidtman: ... and that was precisely what roused such immense interest and went down so well. The Americans were very impressed with the fact that we Germans have finally given up on believing in the fallacy that all universities are equal, and when we mentioned the fact that we can now pay a lump sum for the indirect costs incurred by a research project, during our stop in San Francisco, a murmur of amazement went through the room.

Mission accomplished? Has the dawn of a new age in German science and research finally been noticed?

Schmidtman: Absolutely! The foreign peer reviewers had already told us that, and now the American scientists and researchers, and the university directors, have confirmed it.

The Excellence Initiative is also intended to give research projects a genuine boost against the international competition, isn't it? Do you think that you are now taken seriously enough in the USA?

Excellence on Tour

The interview for *german research* took place one evening at Frankfurt Airport; Dr. Annette Schmidtman, head of the DFG's Research Careers Division, had just returned from a conference in Moscow (see the report on p. 28), Professor Hans-Georg Kräusslich from the cluster of excellence "Cellular Networks" had come from Heidelberg, en route to a meeting for coordinators. The participants in the US Excellence Initiative Information Tour had also taken off for their five-day tour to Washington, San Francisco



Promoting his university: Hans-Georg Kräusslich, coordinator of the cluster of excellence "Cellular Networks" in Heidelberg.

Kräusslich: Yes, German science is already taken very seriously as a whole. Of course, it depends on the results we produce, but we do our very best to be on the cutting edge internationally.

In Germany the Excellence Initiative has quite a negative image with some people, for instance because it supposedly puts too much emphasis on elitism or puts smaller universi-

ties or subjects at a disadvantage. Was that point raised at all during the tour?

Kräusslich: Sensitivities like that, or the typically German complaining that you sometimes encounter, didn't feature at all. The overall mood was very positive, although we did get some critical questions too.

For example?

Schmidtman: The young researchers were particularly critical about the career prospects and wanted to know what we do to promote equal opportunities, what opportunities there are for double-career couples, or how genuinely tenure-track has been implemented in Germany, for example. Those are still very real problems for some people.

Kräusslich: And the question about the future of the Excellence Initiative was raised time and time again ...

... a question that is raised very often in Germany, too ...

Kräusslich: ... but not only in Germany, which is only natural really, but even in the USA, where it isn't necessarily such an issue. But, almost everywhere we went, we were asked the same question: What's going to happen after the first five years? How sustainable is this initiative of yours?

Which is surely a question that is also important for the negotiations about the continuation of the Excellence Initiative, isn't it?

Schmidtman: Yes. Of course, we will emphasise what a positive image the Excellence Initiative has abroad in our discussions with the politicians in the weeks and months ahead. In that respect our tour of the USA sent a very clear signal that the initiative has to continue.

Will the information and promotion tours about the Excellence Initiative continue too?

Schmidtman: That is yet to be decided, but it's quite possible.

Where would you go next, in that case?

Schmidtman: We definitely ought to consider Asia. There is already great interest in everything to do with excellence and competition there.

As she begins to speak of her doctoral researchers, her eyes gleam. "They are truly the best. I returned to India to support these young researchers."

Dipshikha Chakravorty, professor at the Centre for Infectious Disease Research of the renowned Indian Institute of Science (IISc) in Bangalore, has made her decision. The scientist, 35 years old, worked with funding from the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) and the Humboldt Foundation for two years at the University of Erlangen. Afterwards, she was offered a continuance as well as a position in the United States. Though less rewarding financially, she accepted the appointment at the IISc, a research university founded a century ago by the industrialist Jamsetji Tata that is today one of the elite institutions of Indian science.

A total of 2,215 students, most of whom are doctoral researchers, work here at the spacious, tree-covered campus, which is full of exotic flora and fauna – an oasis in the hustle and bustle of Bangalore, a city of millions. The natural sciences, engineering sciences and computer sciences are taught here; the professor-to-student ratio is 1:5; all students receive a full scholarship; the publication rate is on par with international standards; and the university administration works to attract Indian scientists back from the United States.

The selection process is extremely competitive: of 20,000 applicants, only 500 are accepted. Anyone who is accepted here will likely find a position in the sciences upon graduation.

The behaviour of the young elite – the ten doctoral researchers who crowd around the visitors from Germany in Ms. Chakravorty's cramped laboratory – is anything but elitist. They report on their work, which ranges from salmonellae and typhoid to the development of immunisations and patent applications, in a friendly, unassuming, almost shy manner. And they also speak of their plans for the postdoc phase, which in most cases include a period abroad in spite of consid-



Illustration: Berg

Expansion and Excellence

India, as a research country, faces great challenges

By Eva-Maria Streier

erably improved conditions in their homeland. Among them is Akhil Kotian, 21, who has found a way from the IT sector back into science and who says matter-of-factly, "I didn't want to spend the rest of my days as a computer programmer."

Their mentor, Chakravorty, praises the excellent working conditions for the scientists at the IISc, including the opportunity to have one's own working group and the independence afforded to the faculty. She emphasises, "Unlike in Japan, for example, it is possible for a woman to pursue a career in science here."

We constantly encounter people with a mission on this trip, people

who are actively working on India's future as a science nation. We – a group of ten science journalists from daily and weekly newspapers, radio and television – visit India at the invitation of the DFG for ten days to see for ourselves the amazing developments in India's science and research sector. Accompanying us on the trip is Professor Jörg Hacker, vice president of the DFG and president of the Robert Koch Institute in Berlin, a renowned expert of the subcontinent.

On the one hand, there is a very restrictive selection process: numbers that are comparable to those of the IISc are seen at the Jawahar-

lal Nehru University in New Delhi and at the University of Hyderabad. On the other hand, there is a shortage of young researchers. How do these two facts fit together? In India, there are just 119 scientists per million people; in China, the number is 1,564; in Germany, 3,000; and in the United States, 4,600, as is explained to us by Sujatha Ramdorai, professor for mathematics and member of the National Knowledge Commission, a political counselling institution.

Of the 14 million students in India, only 36,000 are doctoral researchers. These include the ten at the Centre for Infectious Disease in Bangalore who are good enough to be competitive on an international level and who are idealistic enough to strive for the privation-laden and socially not fully recognised career of the scientist. Most graduates either move abroad, primarily to the United States, or accept well-paid positions in industry, above all in the IT sector, such as with SAP in Bangalore, or with a biotechnology company.

According to Ramdorai, structural reforms are necessary, including increased autonomy for the universities, improvements in research conditions and interaction between industry and academia. At times, the listener is reminded of demands made on the German science system. Ramdorai, who is also a person with a clear mission, requires substantial financial backing. Fifty-million euros need to be pumped into the system in the next five years, but it will take at least 20 years to implement the necessary reforms.

The Indian government has recognised the central role of education and research for the development of the country. The number of universities should be increased from approximately 300 to at least 1,200; eight more Indian Institutes of Technology should be added to the current seven; and 14 universi-

ties of excellence should be established, emphasises Dr. Ramasami, state secretary in the Ministry of Science in Delhi. Salaries for professors should be increased by 50 percent, and the profession of the researcher should be made more attractive for children and youth through programmes for this age group. More than 50 percent of the Indian population is younger than 25 years of age. The number of school-leavers will increase from the current 13 million to 30 million by the year 2025. A massive resource for talent!

Expansion and excellence: this tension will be the great challenge for India's science system in the coming years.

But optimism is running high: Professor Balasubramanian, former president of the Indian Academies of Science who, at age 69, still serves as impassioned research director of the Hyderabad Eye Research Foundation, sees India among the world's

the large cities and the non-existent environmental protection sometimes make it unbearable.

German politics as well has long recognised the opportunities that lie in India as a talent pool and in the economic factor of the enormous country. In the fall, German Minister for Education and Research Annette Schavan, German Minister of the Environment Sigmar Gabriel, and German Foreign Minister Frank-Walter Steinmeier visited New Delhi in turn. While most young Indian researchers continue to move to the United States, interest in Germany is, fortunately, increasing. Dr. Stefan Dreyer, director of the South Asian Goethe-Institut, reports an enormous increase in the demand for language courses. Knowledge of the German language is considered a professional qualification in service and knowledge industries such as those found in India. The DFG Office in Delhi, established in 2006,

has made a great contribution in deepening and – in some instances – establishing the scientific relationships between Germany and India. India: a young, democratic, English-speaking, fascinating country which, thanks to investments in science and education, will rapidly develop further. The coming years are certain to be exciting!



Illustration: private

five leading research nations within ten years. Areas of concentration will include nanotechnology, biomedicine, materials science and solar energy. And Claus Neumann, president of SAP Labs India in Bangalore, who has lived in India for nine years, is convinced that this part of the world will develop further very quickly and will remain exciting. He plans to stay, for the time being at least. Even if the lack of transportation infrastructure in

Dr. Eva-Maria Streier is Head of the DFG's Press and Public Relations Office.

Science as a Pioneer

DFG Conference in Moscow on European Perspectives on German-Russian Research Cooperation

By Eva-Maria Streier

In the end there was a vision: a European Research Area in which the exchange of scientists and scholars, research findings and technology would be as natural as the free movement of goods, people, services and capital. A vision for the year 2020.

Although there is still a long way to go in achieving this objective, a very promising start has been made in many areas. This was apparent at the international conference on "European Perspectives for Scientific Cooperation between Germany and Russia", which took place in Moscow at the end of February. The conference was organised by the DFG, with the support of the European Commission's delegation in Russia, and was attended by approximately 200 participants, primarily from Germany and Russia.

"Russia's integration into the European Research Area is one of the main objectives of the DFG's activities in Russia", emphasised the President of the DFG, Professor Matthias Kleiner, in his welcoming speech. The great potential for German-Russian cooperation in science that has developed over the course of many years can and must be utilised for the whole of Europe. Science has a pioneering role in this respect. The DFG's Russia Office, which was opened in 2003, shows that Russia plays a key role amongst its strategic partnerships.

The high level of German-Russian research collaboration that already

exists was demonstrated by presentations from a variety of areas of science. For example, the University of Stuttgart has been cooperating with the Khristianovich Institute of Theoretical and Applied Mechanics in Novosibirsk since the early 1990s, with aerospace engineers working on the development of hypersonic transport systems.



Podium discussion between Russian and European conference delegates: Professor Ernst-Ludwig Winnacker, Secretary General of the ERC, explains the new funding opportunities in Europe. Centre: Dr. Alice Rajewsky, Head of the DFG's Russian Office.

In archaeology there are very close scientific links between the two countries. For over 15 years German and Russian archaeologists have been working together on a number of excavations, explained Professor Hermann Parzinger, the President of the Prussian Cultural Heritage Foundation in Berlin. The cooperation is so effective and strong that German-Russian teams of archaeologists have even been collaborating on digs in other countries such as Yemen and Mongolia. The cooperation among students from the two countries, who often share accommodation at the base camp during the excavations, is a basis for trust and life-long scientific relationships and enrichment for both sides that should not be underestimated, Parzinger added.

In quantum physics scientists from the Institute for Solid State and Materials Research in Dresden are collaborating with the Moscow State University. In the life sciences an International Research Training Group, including doctoral researchers from the universities of Gießen and Marburg as well as the Lomonosov University in Moscow, has been studying enzymes since 2006. With a Marie Curie research training network funded under the 6th Framework Programme, the Research Training Group already has access to more European funding and locations.

How can the number of successful cooperation projects be increased and made more prominent at a European level? This question, which is asked by the Russians in particular, was evident throughout the entire conference. Professor Ernst-Ludwig Winnacker, Secretary General of the European Research Council (ERC) and former President of the DFG, also offered an answer, presenting the funding opportunities offered by the ERC. Programmes are available to outstanding scientists and researchers from any country in the world, provided that they do at least 50 percent of their work in a European country.

Associated team members in so-called third countries such as Russia can already be funded for work done there. Since the possibility of including Russia as an associate in the 7th Framework Programme is still under discussion at the political level, all of the speakers at the conference encouraged the researchers to continue and expand their cooperation, under the radar screen of politics, to attract joint European funding.

The new opportunities certainly had the intended effect. Professor Mikhail Ugryumov, an advisor to the

Executive Committee of the Russian Academy of Sciences, announced that the academy plans to set up a national contact point for the ERC. Konstantin Skryabin, Director of the Centre for Bioengineering at the Russian Academy of Sciences, called for the promotion of young, talented scientists and researchers and the

establishment of centres of excellence. Improved funding opportunities as well as uncompromising support for the very best students and researchers are the decisive factors for ensuring the success of the Russian science system too.

The great interest in individual consultations on national and Eu-

ropean funding opportunities and the success that has been seen to date already indicate that the vision of a free European research area by 2020 may not be so distant after all.

Dr. Eva-Maria Streier is Head of the DFG's Press and Public Relations Office.

"Building Bridges to Southeast Asia"

Interview with Harald Leisch

Dr. Harald Leisch has been working at the German Embassy in Hanoi since October 2008. He is responsible for the countries in Southeast Asia for the DFG, while simultaneously running the embassy's science & research office – on behalf of the German Foreign Office. To mark the occasion of the visit of the DFG's Secretary General, Dorothee Dzwonnek, to Hanoi (shown on the right in the photograph, with the ambassador Rolf Schulze and Dr. Leisch, from left to right) *german research* spoke to him about scientific cooperation in the region.



interests, on the other. These two roles complement each other very well. So far this "embassy model" has proven very satisfactory, from my point of view.

Can you give us any examples?

Leisch: How about two at one go? In Vietnam I am able to provide advice on the establishment of the National Foundation for Science and Technology Development as a representative of the DFG, which is based on the model of the DFG. This is a great opportunity for German science. Secondly, let me take the example of the Vietnamese-German University in Ho Chi Minh City, which was just founded in late 2008 and aims to become a research university. The fact that it has come into being goes to show that cooperative ventures are underway here.

What is crucial for the future?

Leisch: First and foremost the need to establish good networks, and to promote good researchers. The ideas and the initiative for this need to come from the scientific community. The DFG wants, most of all, to raise the awareness of the opportunities and promote Germany as a centre of research. This is aimed both at the scientists in their various subjects as well as the science managers and politicians. For example, we are planning a comprehensive information event about the Excellence Initiative in Germany as well as information seminars for young researchers.

Interviewer: Dr. Rembert Unterstell

german research: How did your job lead you to your current position in Hanoi?

Harald Leisch: As a geographer, I have had a long-standing interest in Thailand, as well as in Indonesia and Vietnam. Apart from that, I also spent four years in Hanoi as the coordinator of the Collaborative Research Centre "Sustainable Land Use in Mountainous Regions of Southeast Asia" from the University of Hohenheim, before moving to Bonn to join the DFG in 2006. The cultural background and my good network of personal contacts are very useful for my work here – and, of course, my knowledge of the DFG's funding programmes from both sides of the fence.

What makes Southeast Asia so interesting to funding organisations like the DFG?

Leisch: Let me start by pointing out that the scientific potential of each individual country is different.

Singapore, with its growing science parks and Thailand with its universities in Bangkok are way ahead of the rest of the countries in Southeast Asia. In general, though, the young, high achieving and highly flexible elite in this country and the other countries in the region is very interested in spending time working in Germany to help their career development. Looking at it from the other side, German funding organisations are interested in recruiting outstanding scientists and researchers and supporting good bilateral or trilateral projects.

What does your job at the German Embassy involve?

Leisch: As a representative of the DFG I am primarily a bridge builder. That involves providing a lot of information and establishing contacts, in both directions. As the embassy's science officer I am responsible for maintaining contacts in the political arena, on the one hand, and on representing our

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 young researchers. Researchers 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. *Transregional Collaborative Research Centres* allow various locations to cooperate on one topical focus. *Cultural*

Studies Research Centres are designed to support the transition in the humanities to an integrated cultural studies paradigm. *Transfer Units* 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 con-



Illustration: Querbach

centrate 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 young researchers by actively involving them in research work. This focusses on a coherent, topically defined, research and study programme. Research Training Groups are designed to promote the early independence of doctoral students 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 young researchers are offered by the *Heisenberg Programme* and the *Emmy Noether Programme*.

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 Society 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.

Impressum

german research is published by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation); Publisher: WILEY-VCH Verlag GmbH & Co. KGaA, P.O. Box 101161, D-69541 Weinheim; Annual subscription price: € 61.00 (Europe), US \$ 66.00 (all other countries) including postage and handling charges. Prices are exclusive of VAT and subject to change. Address of editorial staff: DFG, Press and Public Relations Office, Kennedyallee 40, 53175 Bonn; postmaster@dfg.de; www.dfg.de

Editor-in-chief: Marco Finetti (responsible for content); Publishing Executive Editor: Dr. Rembert Unterstell; Copy Editors: Stephanie Henseler, Angela Kügler-Seifert; Translation: SciTech Communications GmbH, Heidelberg; Printed by: Bonner Universitäts-Buchdruckerei (BUB); printed on chlorine-free bleached paper with 50 % recycling fibres.

ISSN 0172-1518

naugural ceremony in Tokyo: The DFG opened its office in Japan in mid-April. Directed by Dr. Iris Wieczorek (pictured left), it serves as a venue for exchange and dialogue for Japanese and German researchers. The office was opened by DFG President Professor Matthias Kleiner (second from the right). Other dignitaries present include the heads of the two DFG partner organisations, Professor Motoyuki Ono (Japan Society for the Promotion of Science) and Professor Koichi Kitazawa (Japan Science and Technology Agency), the German Ambassador Hans-Joachim Daerr, DFG Vice President Professor Konrad Samwer, and the Japanese physician and Nobel prizewinner Professor Makoto Kobayashi.



Illustration: Gantner-Richter