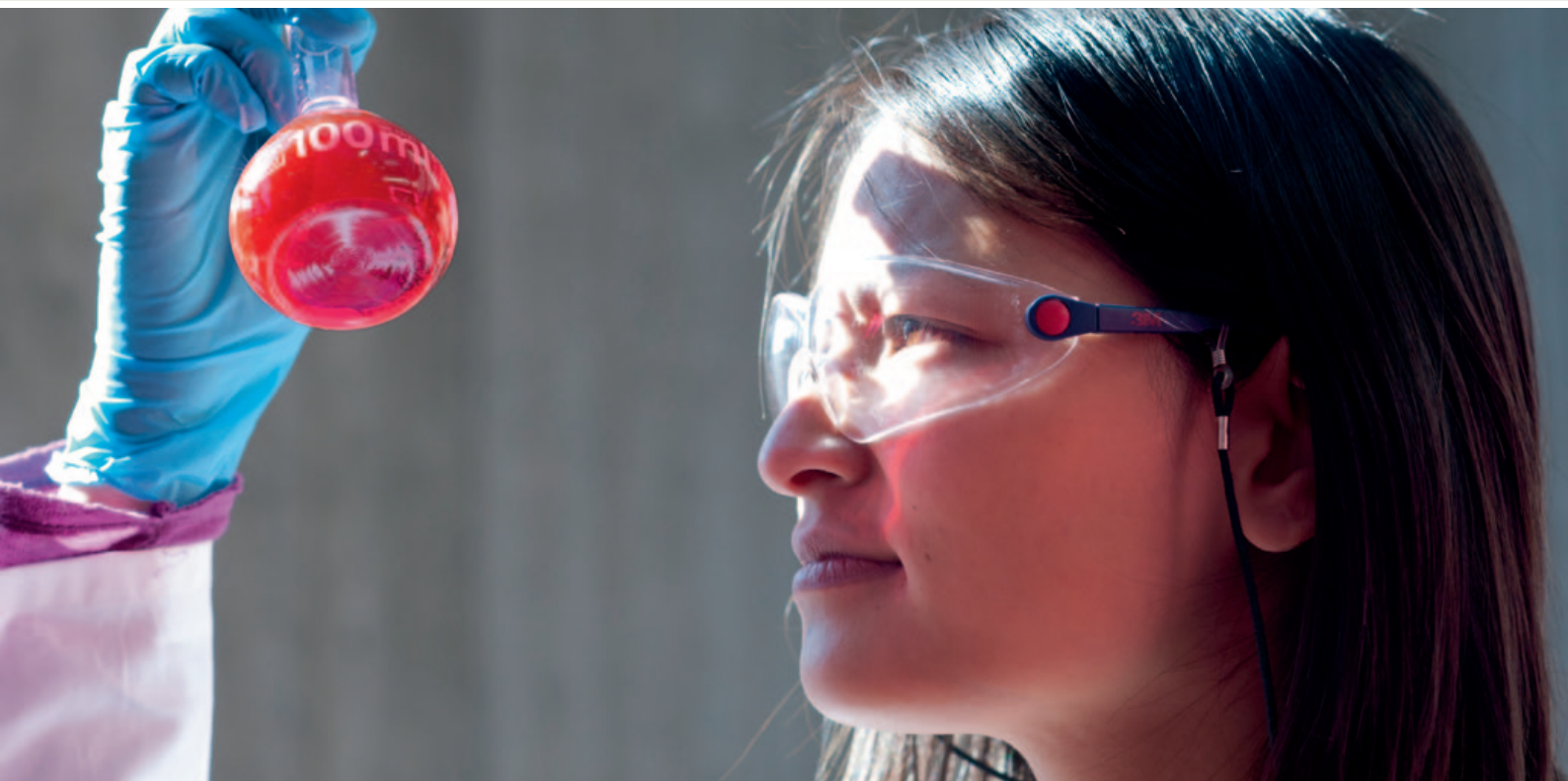


UNIVERSITÄT
BAYREUTH

Research at the University of Bayreuth.





Sculpture: Stephan Balkenhol

Welcome to our campus,

we are delighted to introduce you to our dynamic, research-focused university, which has built a strong reputation even beyond Germany's borders. The University is an attractive destination for scholars from around the world, and we were recently recognized for this success by the *Alexander von Humboldt Foundation*. The Foundation currently lists the University of Bayreuth among the top ten institutions.

There are many reasons for this distinction. Chief among them is that we are one of the first universities in Germany to emphasize close collaboration between powerful academic disciplines, and we have been doing this since 1975. Our interdisciplinary focus is now one of the University of Bayreuth's signature features. We offer talented students an excellent study environment in strategically selected focus areas, one that is also highly attractive to researchers.

The latest findings in our fields of research are, of course, beyond the scope of this brochure. But we hope it will give you a clear idea of our work and the many opportunities that we provide at the University of Bayreuth. Our campus is where friendships are made, collaboration is initiated, and ideas are conceived.

If you need space to let your ideas unfold, look no further.

The Rondell forms the heart of our campus university. It's only a short walk from here to the BGI as well as to other locations such as the cafeteria, the Audimax, the law and science departments, and the library.



The University of Bayreuth >>

Where ideas and research come together.

Top-notch research thrives when scholars are given enough space to think and are provided with abundant inspiration. Scientific exchange profits tremendously from the wide variety of disciplines our communicative campus brings together. The University of Bayreuth is dedicated to interdisciplinary research. Its exceptional research infrastructure provides an optimal setting for scientific work.

In retrospect, it is now clear how prudent it was back in 1975 to establish a university based on combining strong subject areas with interdisciplinary research and teaching. The questions facing our globalized society are becoming more and more complex, and the answers can only be found through strong cross-disciplinary cooperation – one of the University's main assets. The University of Bayreuth is characterized by academic freedom, scientific progress, and practical relevance, all of which are understood in the context of social and cultural responsibility.

An internationally renowned university

A growing number of researchers are drawn to the University's academic spirit and its outstanding research environment. This may be due to the *Bavarian Research Institute of Experimental Geochemistry & Geophysics*, known worldwide for its excellence, the internationally renowned *Institute of African Studies*, and our Botanical Garden, which offers a first-rate environment for engaging in ecological field work.

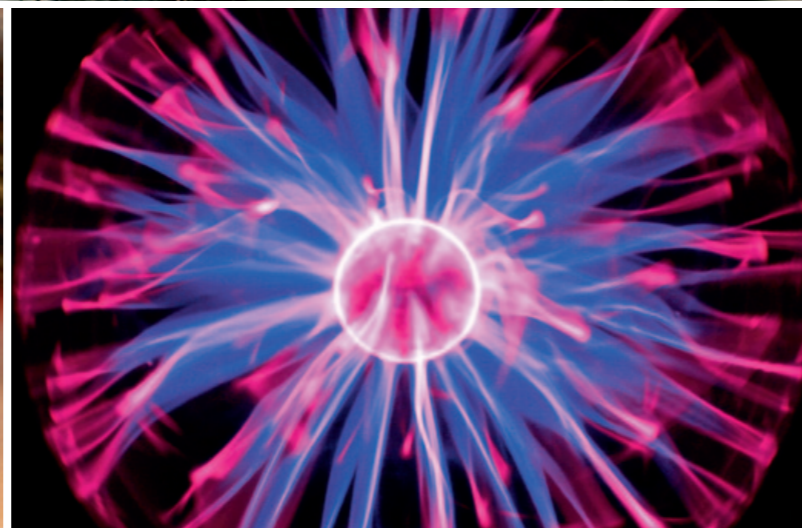
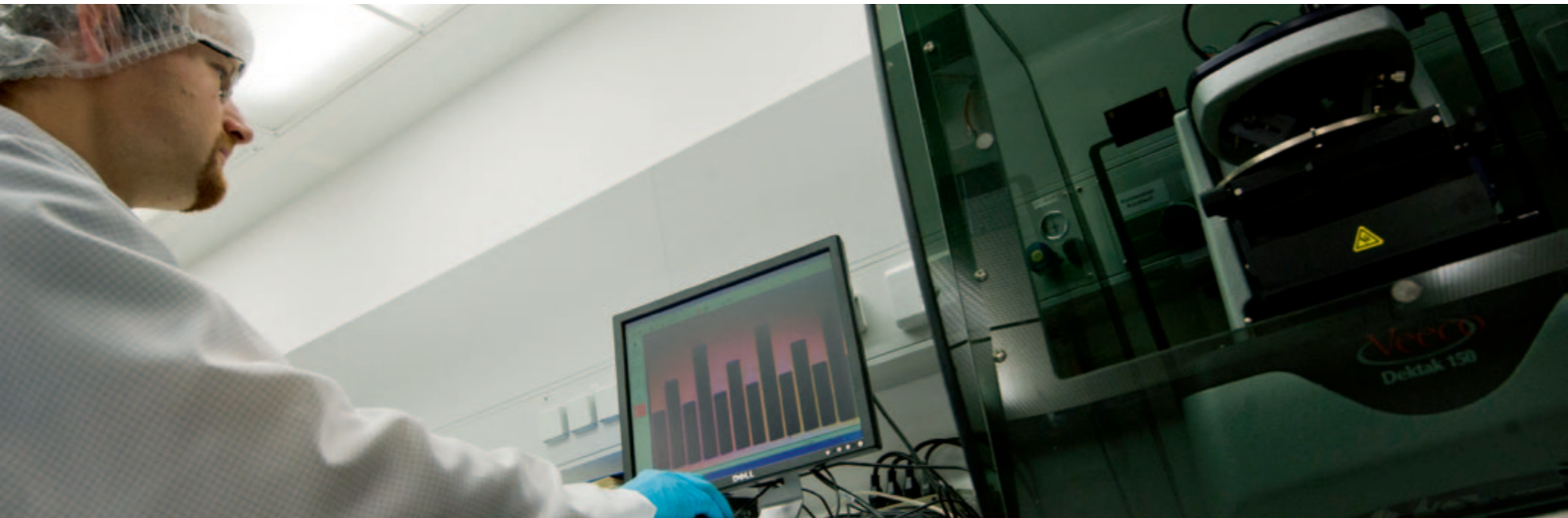
The University of Bayreuth belongs to an extensive international network and partners with more than 150 foreign universities and scientific institutions. Doctoral candidates will also benefit from the programmes offered by the *University of Bayreuth Graduate School*. The *Graduate School* aims to intensify the level of academic exchange as early as the first phase of independent research and supports interdisciplinary education by offering additional teaching and training opportunities.

University of Bayreuth – a prudent decision

Anyone who comes to Bayreuth can expect to find the best possible research conditions. Our communicative campus is fertile ground for academic work. We emphasize quality over quantity. It is easy to start up a conversation, and you are certain to find plenty of inspiration for your next research project.

The University of Bayreuth seeks and fosters talented researchers, regardless of their background or gender. We are committed to equal opportunity on all levels and offer students, teachers, and researchers plenty of creative space. They benefit from global collaboration with universities, research institutes, business enterprises, and international organizations with exciting future prospects for everyone.

Our university is dedicated to interdisciplinary research and offers the best possible opportunities, with its modern research facilities and excellent infrastructure.



Funding for the University of Bayreuth >>

Third-party funding offers the best support.

You can expect to find the best conditions for funding your research at the University of Bayreuth. This is due in large part to the outstanding research results that earn the university prominent awards and honours time and again, including *ERC Grants, Heisenberg and Lichtenberg Professorships*; as well as the *Emmy Noether Junior Research Groups* for young scholars.

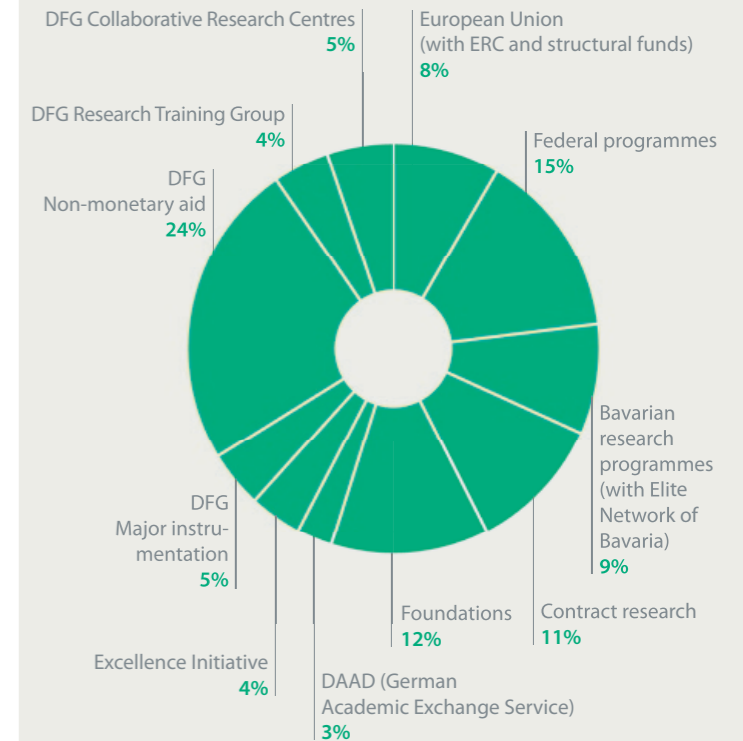
Thanks to our outstanding research results, a considerable portion of our public funding comes from third-party sources, accounting for more than 40% of our total government support.

These funds come from a variety of sources, both public and private, but primarily from the highly regarded research funding programmes of the *German Research Foundation (DFG)*, the *European Research Council (ERC)*, and the *Elite Network of Bavaria (ENB)*.

The University of Bayreuth also conducts research in many innovative areas, which receive funding from national and international sources.

Our researchers delve into the social issues of our times. They work closely together with companies and play an active part in civil society, most intensively in our region and in Germany but also more and more often in collaboration with our international partners around the globe.

Third-party funding for the University of Bayreuth



Faculties >>

An alliance of strong disciplines.

We are a small, top-notch campus university with a focus on building quality infrastructure rather than promoting growth.



The University of Bayreuth's signature approach is to bundle and coordinate research in interdisciplinary specializations. We combine strong research in selected academic disciplines with the innovative power of interdisciplinary collaboration.

The results are entirely new fields of research, such as Experimental Ecology, Macromolecular Chemistry, and African Studies, which the University pursues as a way to "fill gaps in the scientific market".

Our performance-oriented faculties form the basis for this "crossover philosophy". We believe that, more than anything, strong academic disciplines lay the basic foundation for an interdisciplinary teaching and research university. They provide a disciplinary and interdisciplinary focus that raises the University's profile within Germany and abroad:

- Faculty of Mathematics, Physics & Computer Science
- Faculty of Biology, Chemistry & Earth Sciences
- Faculty of Law, Business & Economics
- Faculty of Languages & Literature
- Faculty of Cultural Studies
- Faculty of Engineering Science

The University of Bayreuth deliberately concentrates on six faculties. We find this to be the best size for nurturing and fostering our faculties across the board. These are ideal conditions for earning top marks in teaching and research.

Excellent research requires excellent scientific resources.

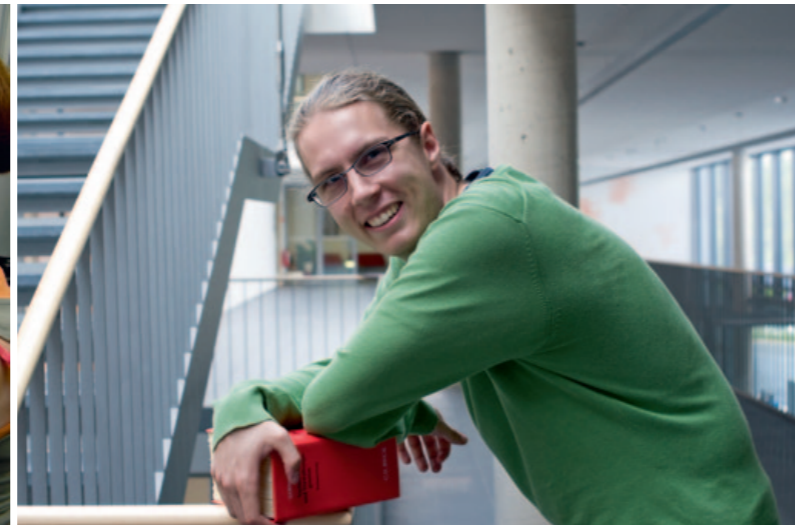
Top research requires the right environment in order to develop its best potential. That is why the University of Bayreuth has outstanding research centres that have long been international magnets for research and teaching. Our academic disciplines work closely together, allowing interdisciplinary research to be conducted at the highest level:

- Bavarian Research Institute of Experimental Geochemistry & Geophysics – BGI (Bayerisches Geoinstitut)
- Bayreuth Institute of Macromolecular Research – BIMFB
- Bayreuth Centre for Colloids & Interfaces – BZKG B
- Bayreuth Centre for Molecular Biosciences – BZMB
- Research Centre for Bio-Macromolecules – BIOmac
- Bayreuth Centre for Material Science & Engineering – BayMAT
- Bayreuth Centre of Ecology & Environmental Research – BayCEER
- Institute of African Studies – IAS
- Bayreuth Institute for American Studies – BIFAS
- Research Centre for Modelling & Simulation of Socio-Economic Dynamics – MODUS
- Centre for Teacher Education – ZLB

Research Centres and Special Facilities >>

An ideal setting for research.

Junior researchers in Bayreuth have equal access to key labs, research literature, and research space. The ability to work directly with internal and external partners gives them the best possible research environment.



The Research Units at the University of Bayreuth are each associated with a faculty. They bring together research topics that are of interest to the University. Research Units can become Research Centres by developing multi-disciplinary research associations.

Faculty of Mathematics, Physics & Computer Science

- Centre for Mobile Learning with Digital Media
- Centre for Mathematics & Science Education – Z-MNU

Faculty of Biology, Chemistry & Earth Sciences

- Demonstration Lab Biotechnology/Genetic Engineering
- Atmospheric Chemistry Research Laboratory
- Centre for Food Quality – ForN
- Limnological Research Station
- Centre for Mathematics & Science Education – Z-MNU

Faculty of Law, Business & Economics

- Institute for European Law & Legal Culture
- Institute for Banking Law & Policy
- Centre for German & European Energy Law
- Centre for German & European Food Law
- Centre for Family Business
- Companies, Capital Markets & Taxes – CoCapT
- Centre for Law of Sustainable Development – FoRNE

- Research Institute for Social Law & Health Economics
- Centre for Consumer Law – FfV
- Centre for Media & Business Law – FWMR
- Institute for Economic Crimes/Business & Medical Ethics – FoWUM
- Institute of Management in Medicine & Health Sciences – IMG

Faculty of Languages & Literature

- Bayreuth Academy of Advanced African Studies
- Research Institute for Music Theatre Studies – FIMT
- Iwalewahaus – the University of Bayreuth's Africa Centre

Faculty of Cultural Studies

- Bayreuth Academy of Advanced African Studies
- Institute for the Study of Religion in Contemporary Culture – IrG
- Iwalewahaus – the University of Bayreuth's Africa Centre

Faculty of Engineering Science

- Bayreuth Engine Research Centre – BEREC
- Research Centre for Materials & Surface-Finished Glass Products – WOPAG
- Centre for Energy Technology – ZET

Science and Engineering

(A) High Pressure & High Temperature Research

(A) Advanced Materials

(E) Energy Research & Energy Technology

(A) Polymer & Colloid Sciences

(A) Nonlinear Dynamics

(A) Ecology & the Environmental Sciences

(A) Molecular Biosciences

(A) African Studies

(E) Food & Health Sciences

(E) Governance & Responsibility

(E) Innovation & Consumer Protection

(E) Cultural Encounters & Transcultural Processes

Life Sciences

Humanities and Social Sciences

Focus Areas >>

How fields of research can emerge in uncharted territory.

Did you know that some of Africa's most promising scholars are doing their doctoral research in northern Bavaria? Have you heard that the Airbus A380 takes off with the help of advanced materials from Bayreuth? Isn't it reassuring to know that in the future the quality and origin of groceries will be monitored more effectively thanks to Bayreuth's food and health sciences research?

These are only a few of the many questions whose answers you'll find at the University of Bayreuth. The next generation of Africa scholars, for example, are here at the *Bayreuth International Graduate School of African Studies (BIGSAS)*. Regarded as a leading educational institution, the School has received €10 million in funding from Germany's federal and state governments. The Airbus project took off thanks to the close collaboration between our chemistry, physics, and engineering departments and the University's research centres working in the field of polymer research. And Consumer Protection studies is now at home in the focus area *Food & Health Sciences*. Scholars in this new field at Bayreuth seek to identify the relationships between food quality, nutrition, general health choices, and physical well-being.

The drivers of scientific innovation at the University

The examples above are just a small sample from the 12 focus areas from which the University of Bayreuth derives its excellent international reputation for research and teaching. But what makes them so successful? The focus areas are where all of the University's drivers of scientific innovation meet. Researchers combine the strengths of their individual subject areas to address strategically chosen cross-disciplinary research priorities, thereby strengthening the University of Bayreuth's innovative potential.

Two steps to world-class research

The established focus areas are known as the *Advanced Fields* (A). These are carefully selected research concentrations whose centres collaborate with global leaders in their fields. In contrast, the *Emerging Fields* (E) represent the newer interdisciplinary fields that have developed in response to critical, socially relevant demand for such research. Both the *Advanced Fields* and the *Emerging Fields* offer scholars a diverse range of unique opportunities to contribute to cutting-edge research.

(A) Advanced Fields

(E) Emerging Fields

African contributions to African research.

African studies cover all of the Africa-related research and training activities conducted by Bayreuth's academic community in 40 different disciplines, from cultural and language studies to economics and law to the earth sciences and biosciences.



What can we learn by comparing the political cultures of Guinea-Bissau, Libya, South Africa, and Zambia? How do we bring long-term solutions to Africa's violent conflicts? What socio-ecological conditions are driving waves of migration in countries such as Mali and Senegal, and what is the impact of climate change on these trends?

At the University of Bayreuth, we work together with African scholars to find permanent solutions to the many current problems on the African continent. More than 100 of our university's scholars conduct research and teach classes both on Africa and in Africa.

3 fields of research, 12 departments, 6 faculties

Our interdisciplinary research approach has led us to come up with a wide range of main disciplines and topics, which we combine into three general fields of research: *uncertainty, innovation and social order; knowledge, communication, and boundaries; change as a process, discourse, and policy*. This broad range of disciplines and the links between them are unique within the German-speaking countries. Our research covers 40 different subject areas, from cultural and language studies to the social sciences, economics, and law to the Earth sciences and biosciences. Our researchers also benefit from a network that the University has been steadily building over the past few decades. For example, we work closely together with 31 universities in 25 African nations, which makes it much easier to work on the various projects.

A house for Africa

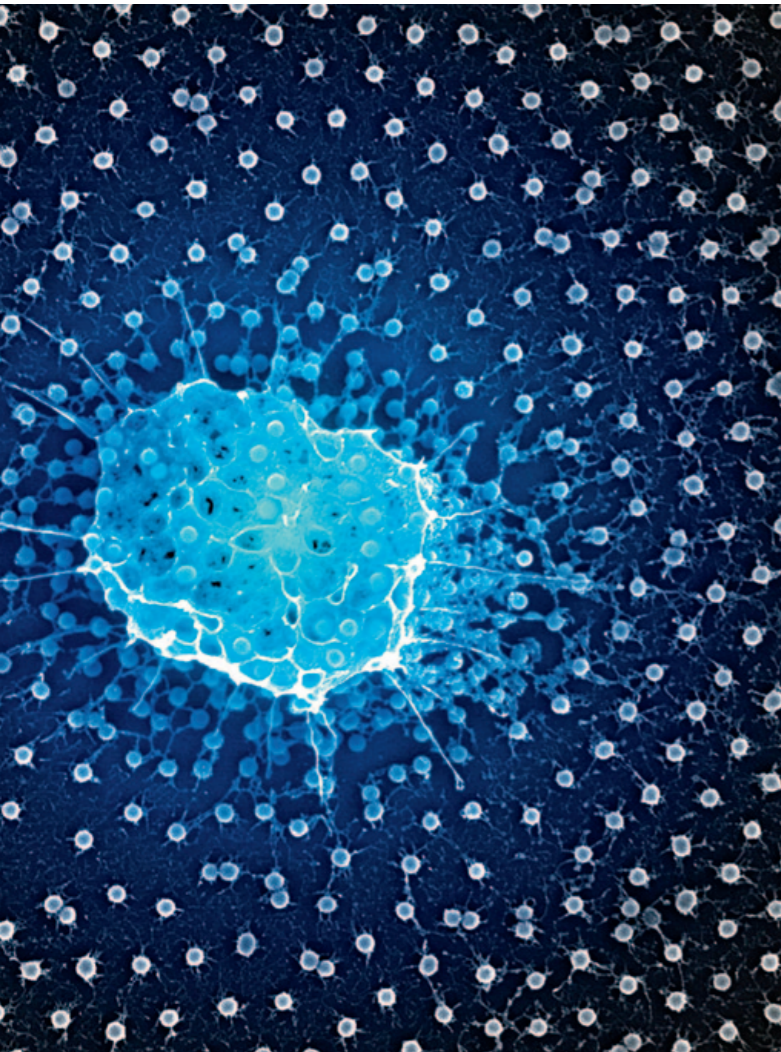
The *Institute of African Studies (IAS)* coordinates both research and teaching and develops new approaches to the focus on Africa. A number of academic institutions, such as the *Iwalewahaus*, belong to the institute. The *Iwalewahaus* has been researching and documenting contemporary African culture since 1981 and acts as an international meeting place for artists as well as a bridge to the general public with its exhibitions. The transdisciplinary *Bayreuth Academy for Advanced African Studies* provides research opportunities that go beyond regional African studies. Our African research is reflected in a great many publications and in its third-party funding. For example, the IAS projects have received more than €40 million in grants over the past ten years from sources such as the *DFG*, the *Volkswagen Foundation*, the *BMBF*, *DAAD*, and the *Kulturstiftung des Bundes*.

Excellent environment for nurturing junior researchers

The *IAS* steers junior scholars through their training and also forms the institutional umbrella for a number of special Africa-related institutions at the University of Bayreuth, including the *DFG-funded Bayreuth International Graduate School of African Studies (BIGSAS)* and a training centre for legal studies at the University of Dar es Salaam, which is funded by the *German Foreign Office* and the *DAAD*. Our university library also has the second largest collection of books and media on Africa in Germany, with 155,000 volumes and media items, which are available for research and teaching. The *IAS* is now a model for other African research centres around the world.

New materials for the 21st century.

More than 30 research groups from 3 faculties concentrate on the Polymer & Colloid Science focus area, as a signature feature of the University of Bayreuth and one of its unique selling points nationwide.



An impressive example of innovative, interdisciplinary materials science research – polymer and colloid science is currently one of the fastest-growing disciplines in the world.

Polymer and colloid science is based on the traditional fields of chemistry (organic, inorganic, physical, and biochemistry) and includes the theoretical and experimental physics of polymers and colloids in addition to specific areas of engineering relevant to polymers.

Nationally unique – world-renowned

Polymer and colloid science has been a research priority at the University of Bayreuth since 1975. The efforts of more than 30 working groups from three different faculties working in the field of polymer and colloid science have become a hallmark of the University. Their success has resulted in greater international visibility and numerous coordinated research projects. The *Polymer Symposium (BPS)* and the conference series entitled *Light Harvesting Processes (LHP)*, which is regularly organized by members of the focus area, have become internationally renowned events within the scientific community.

Research across the spectrum

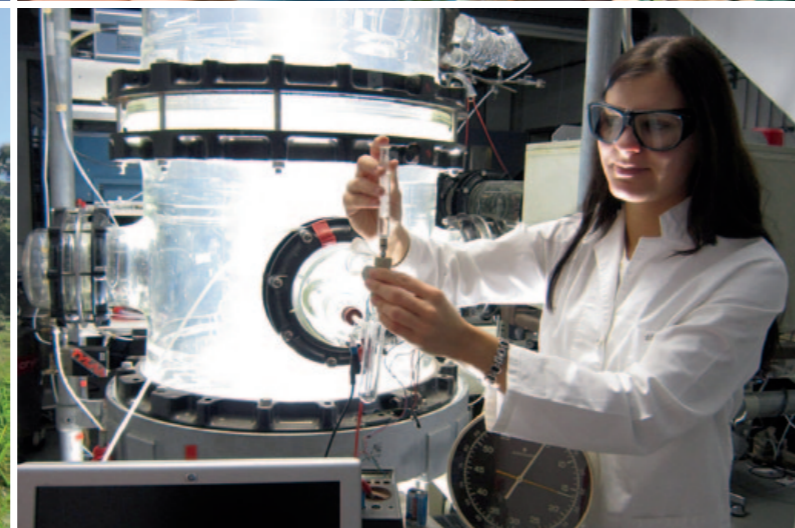
The University of Bayreuth's research spectrum covers all aspects of modern polymer and colloid research. These aspects range from the development of new catalysts for polymerization to the synthesis and characterization of new polymers, colloids, and functional materials, and even to the development of new polymer materials. Physical and physio-chemical properties of polymers, colloids, and functional materials are also being investigated. This spectrum is complemented by research in the areas of colloid science, polymer processing, polymer technology, theoretical and experimental polymer physics, organic-inorganic hybrid materials, biomaterials, bioconjugates, and bi-macromolecules.

Millions in grants from the German Research Foundation (DFG)

For over 30 years, science at the University of Bayreuth has been shaped by its collaborative research centres, research associations, EU-sponsored projects, and DFG-sponsored research training groups. Our success in polymer and colloid science is also reflected in our funding. For instance, a €15 million grant was awarded for the establishment of the *Bavarian Polymer Institute*. This institute is led by the University of Bayreuth in cooperation with the Universities of Erlangen-Nürnberg and Würzburg. Finally, a brief comparison: in terms of DFG grants for the research field of Polymer Chemistry, the University of Bayreuth and the University of Mainz were head and shoulders above any other German university.

An excellent climate for environmental research.

In Bayreuth, we conduct internationally renowned research in the areas of global change, biodiversity, ecosystems, and environmental protection and offer excellent training for junior researchers and students.



How do organisms respond to their environments? How do symbiotic communities and ecosystems work? What are the consequences of climate change, changing land use, and widespread pollution of the environment? How can we preserve biological diversity and ecosystem integrity and protect our natural resources over the long term?

These are the core research topics addressed by this focus area, where they are examined with an interdisciplinary approach by biologists and geoscientists. We connect basic research with questions about protection and use, and we link controlled laboratory and field experiments with the documentation of natural patterns and processes. The core topics are complemented by applications in environmental law, environmental informatics, and technologies being investigated by three other faculties.

Global change: ramifications, forecasts, solutions

Changes in climate and land use can be observed all over the world. Researchers in this focus area analyse material cycles in soil and water and explore the ways that past, present, and future changes affect organisms and the way they interact with one another. Our researchers also develop strategies for adapting to global change and mitigating its effects. We are investigating ecosystem processes and their regulation, stability, and interactions in order to find the most sustainable ways to make use of their benefits: for example, biomass production, carbon sequestration, and drinking-water supplies.

Fostering biodiversity

In our focus area, researchers investigate biodiversity patterns of organisms on a range of different scales and identify key controlling mechanisms. We explore the stability of biodiversity and its role in ecosystems, and look at ways to protect diversity for future generations. Our research focuses on plants, animals, fungi, and microorganisms in association with the fields of genetics, classifications, and functions – in locations ranging from fields in temperate regions to tropical rainforests.

Environmental protection and nature conservation: strategies and implementation

Air, water, soil, the climate, many species, and even entire ecosystems are all exposed to a variety of risks. Most of these risks are caused by humans. The researchers in our focus area analyse the extent and sources of these dangers, develop technology and management solutions, and manage the implementation of these solutions.

Regional and international research

We conduct research locally, regionally, and globally. The Bayreuth Centre for Ecology & Environmental Research (*Bay-CEER*) supports researchers by offering an extensive infrastructure and service structure – from laboratories and study sites to workshops, scientific conferences and meetings, and cross-disciplinary networking opportunities. The result: world-class research in the areas of global change, biodiversity, ecosystems, and environmental protection, not to mention an excellent education for students and young scholars.

Investigating the inner workings of the world.

The Bavarian Research Institute of Experimental Geochemistry & Geophysics conducts spectacular experiments. Our internationally renowned high pressure and high temperature research explores the unknown depths of our planet.

Have you ever imagined that there could be a water reservoir in the transition zone of the earth's mantle at a depth between 410 and 660 km, covering an area comparable to all the oceans on the surface of our planet? Not least, we have the research conducted by the Bavarian Research Institute of Experimental Geochemistry & Geophysics (BGI) to thank for this revolutionary discovery.

The goal of Bayreuth's high temperature and high pressure research is to understand, interpret, and quantify geological conditions and processes by conducting laboratory experiments, especially those investigating the physical and chemical properties of materials under extreme pressure and at extreme temperatures. The institute's research objectives are primarily related to the Earth sciences, but there is overlap with the fields of solid-state physics, chemistry, and materials science.

Paving the way for international research methods

The BGI has outstanding scientific instruments that enable the institute to develop new methods. Many experimental techniques that were first developed here are now being used in labs throughout the world. The BGI has a collaborative management structure, which gives junior scientists a great deal of freedom and the opportunity to let their scientific talents unfold. All labs are shared by everyone. And the entire technical staff as well as all other resources are assigned to the institute as a whole and not just one of the three chairs.

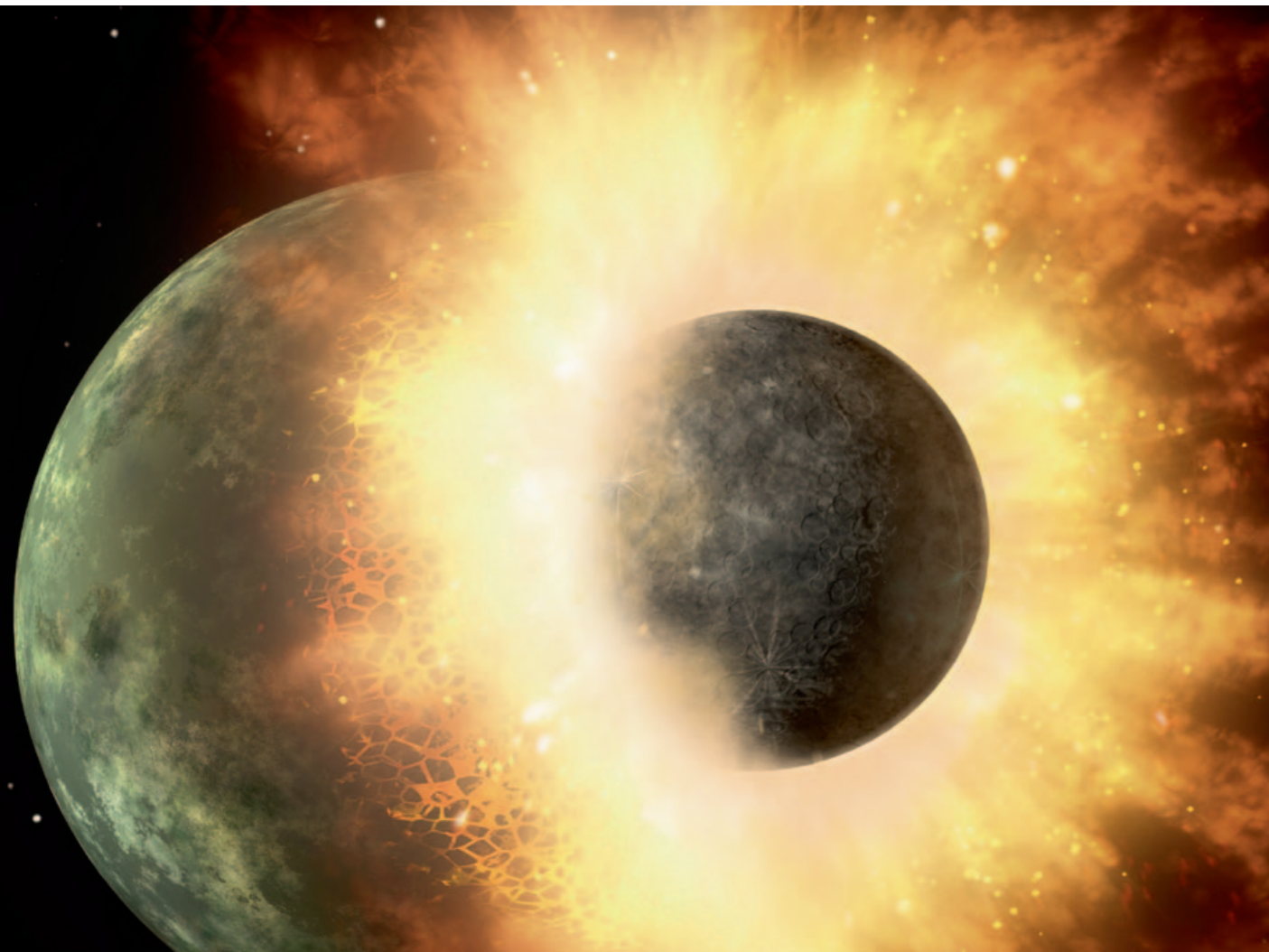
Global contributions to global research

The BGI collaborates on many interdisciplinary research projects – on the university campus and around the world. It has formal collaboration agreements with DESY in Hamburg, the Geodynamics Research Centre of the Ehime University in Japan, the Lunar and Planetary Science Institute in Houston, and the Forschungs-Neutronenquelle (FRM II) in Garching, Germany.

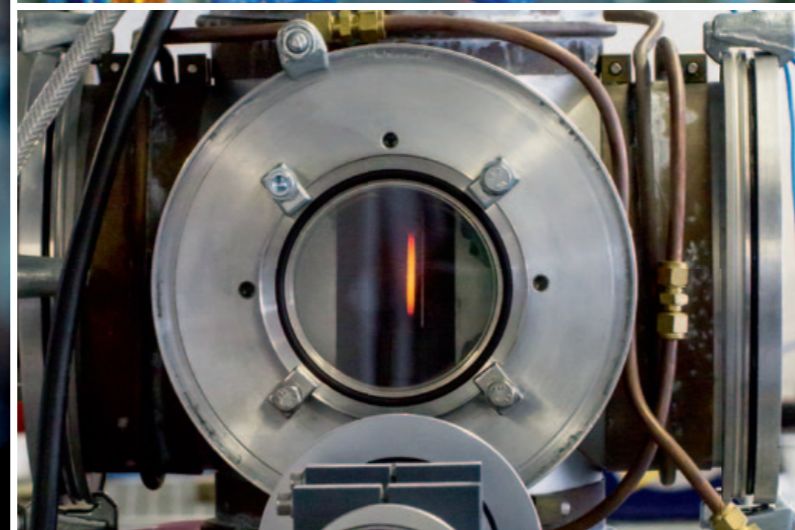
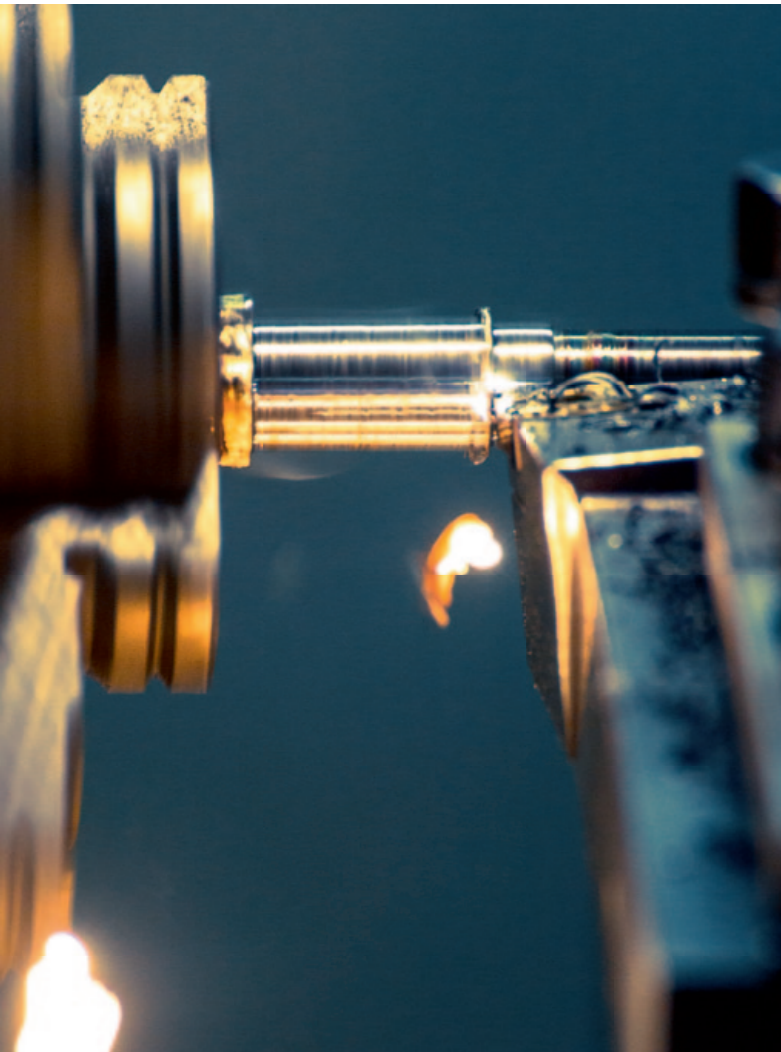
Along with classic experimental approaches, the BGI also has a research group that deals with the computer modelling of material properties and processes in the Earth's interior. One focus of the current research lies on the interaction between the Earth's core, the lower and upper mantle, and also processes near the surface.

Top research has its own reward

The BGI's great importance is underscored time and again by national and international awards, such as the *Leibniz Prize*, *ERC Advanced Grant*, *Sofja Kovalevskaja Award* as well as numerous international distinctions such as the *James B. Macelwane Medal* of the AGU and the *Bowen Award*. In addition, the institute has published more than 40 original papers in *Nature and Science* over the past 15 years.



The Bayreuth concept of materials research is to develop new materials for information, energy, transportation, manufacturing, and medical technology as well as to improve on existing ones.



Ⓐ Advanced Materials >>

Materials of the future will be more stable, lighter, more innovative, and safer for the environment.

How can the future means of transportation be made lighter in weight? Can a brake disk still brake safely at temperatures above 1,000 °C? Can we change the inner structure of materials and thereby create new ones? What plastics are biodegradable?

The search for new materials of the future is a challenge facing the entire world, and one that the more than 200 scientists of the *Advanced Materials* focus area are pursuing with passion. Developing new materials means breaking new ground. At the University of Bayreuth, we therefore look beyond material classes and rely on particularly close interdisciplinary collaboration with the natural and engineering sciences.

Focussing on ceramics, metals, polymers, and composites

Our research efforts focus on new materials for information, energy, transportation, manufacturing, and medical technology. We work with materials such as ceramics, metals, polymers, and composites and develop or improve new materials on this basis. Our work covers the entire research and development chain, from synthesizing new materials and manufacturing industrial materials to components and recycling.

Our strength lies in close collaboration across academic disciplines

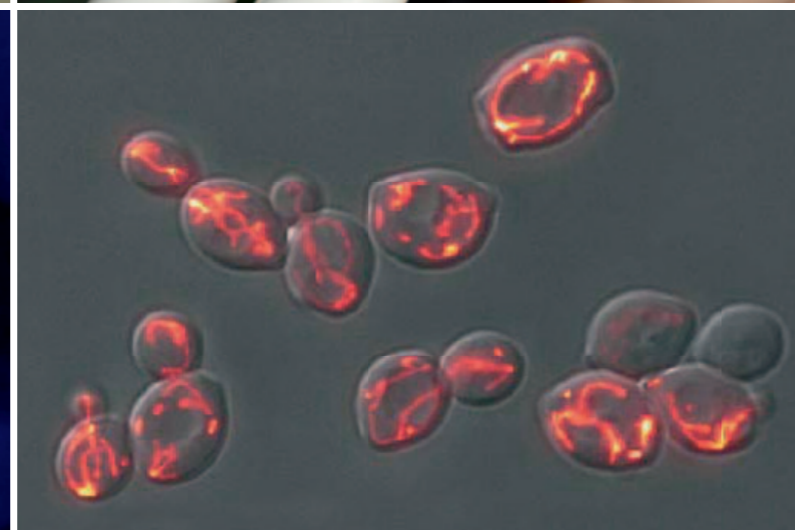
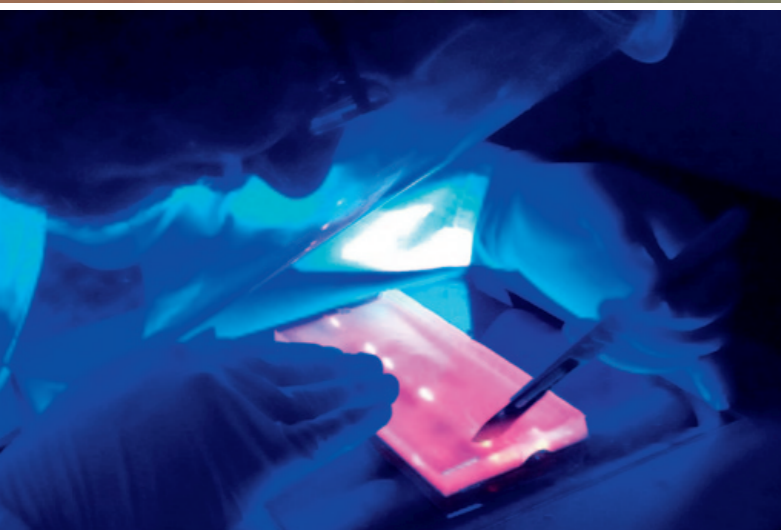
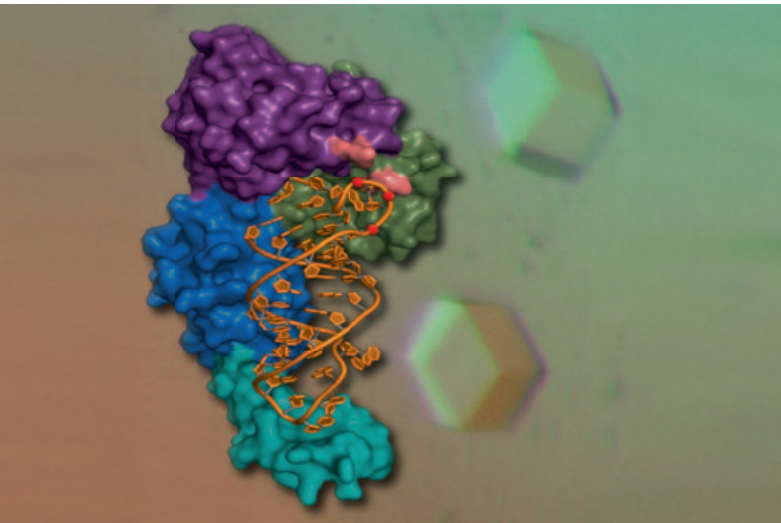
Bayreuth's material research is rooted in the faculties of Engineering Science as well as Biology, Chemistry & Earth Sciences. Interdisciplinary collaboration links the materials sciences with the research groups in chemistry, physics, mathematics, and the biosciences, as well as with the *Bavarian Research Institute of Experimental Geochemistry & Geophysics (BGI)*. The *Bayreuth Centre for Material Science and Engineering (BayMAT)* coordinates the interdisciplinary and cross-faculty research and development work. As one of the University's key scientific institutions, *BayMAT* initiates major research associations between the members and introduces applications for research results in the materials sciences.

High-tech research at the international level

Other material research institutions at the University are the *Bayreuth Centre for Colloids and Interfaces (BZKG)*, the *Bayreuth Institute of Macromolecular Research (BIMF)*, and the *Research Centre for Glass Composites and Surface-Refined Glass Products (WOPAG)*. The University of Bayreuth has also established the highly innovative field of biocompatible materials with the *BioMed Centre* and the *Biomaterials Chair*. The University's materials researchers collaborate internationally with research institutes in many European countries, in the United States as well as in Africa and Asia. Bayreuth maintains close ties with a series of industrial enterprises and SMEs in the area of applied research.

Structure, dynamics and function of biomacromolecules.

At the intersection between biology, chemistry, physics and the applied natural sciences, biochemistry, and molecular biology have become a focal point of research and teaching at the University of Bayreuth.



As a centre of research, Bayreuth plays a leading role in the molecular biosciences in Germany. The University's strength traditionally lies in the study of the structure, dynamics, and function of biomacromolecules.

The funding ranking of the *German Research Foundation (DFG)*, among other things, demonstrates this great achievement. The Bayreuth life sciences have consistently occupied the top five places in the ranking for nearly 20 years, based on grants awarded per researcher.

The molecular interplay between cellular processes

Our research focuses on the biophysical, biochemical, and cytological investigation of the spatial structure and function of biomacromolecules. Our scientists study the complexes with other macromolecules and small organic molecules as well as the higher biological structures that they form. They focus on chromosomes, organelles, and entire cells, as well as on the way they are organized in tissue. The focus area thus gains comprehensive, functional, and mechanistic insight into the molecular interplay of cellular processes on multiple scales, from building individual macromolecules to details of their interactions with other molecules and also their functional influence on cellular structures.

The focus area is built around the research groups for biochemistry, biomaterials, biopolymers, microbiology, genetics, and cell biology, to which are added experimental physics and plant physiology/genetics as well as organic and

bioorganic chemistry. Research groups in the focus areas of *Polymer & Colloid Science, Nonlinear Dynamics, Ecology & Environmental Research*, as well as *Food & Health Sciences* (emerging field) collaborate beyond their own focus area.

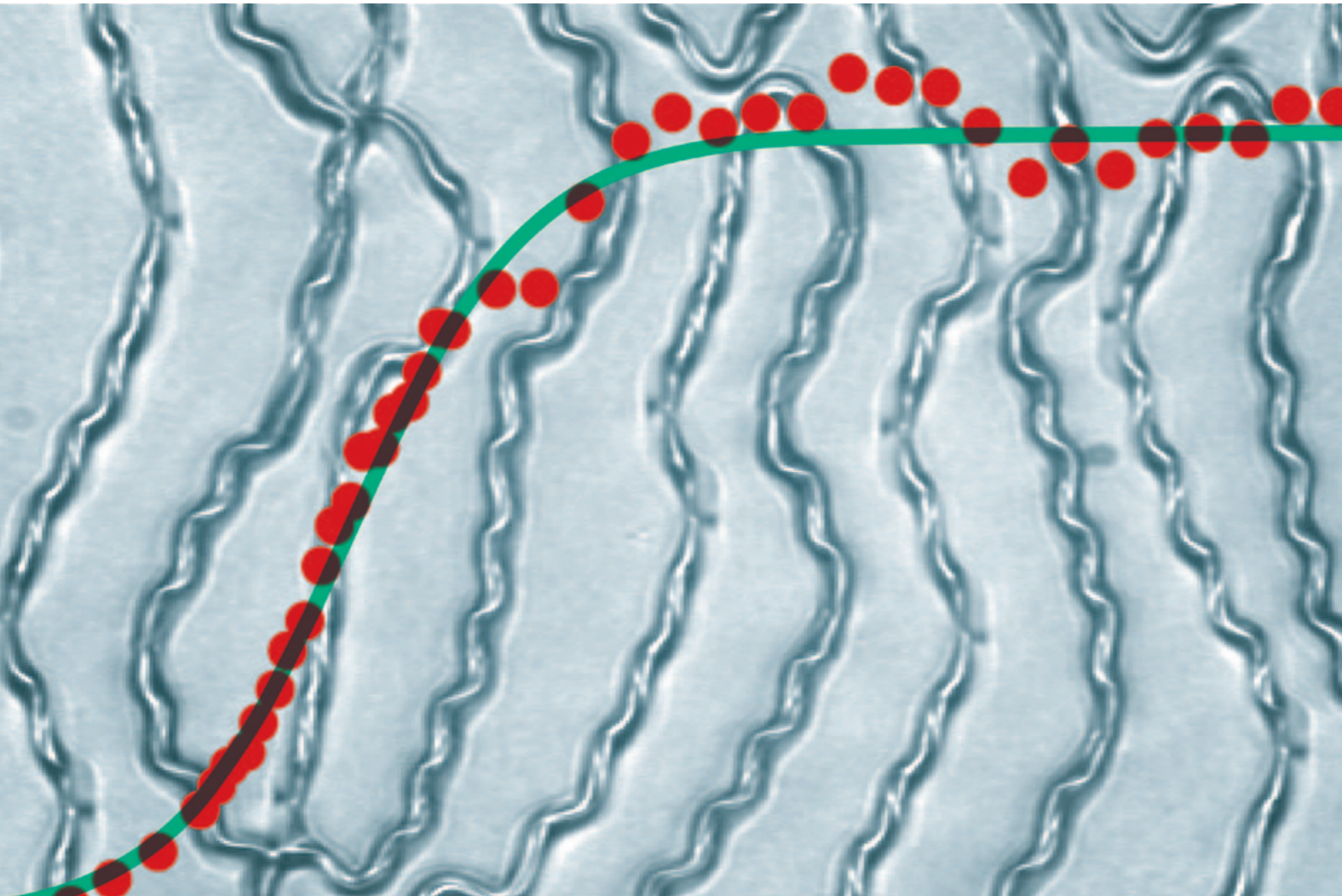
From basic research to developing future technologies

Bayreuth scientists in the Molecular Biosciences focus area study, among other things, magnetic nanoparticles that are formed as magnetic field sensors from certain microorganisms that thrive in bodies of water. They have optimum magnetic properties that make them a good choice for bio-engineering applications. Provided with additional functions and properties that do not occur naturally, these so-called magnetosomes can be used as new types of magnetic nanomaterials in applications such as biomedical diagnostics.

Bayreuth research at the intersection between biology, chemistry, physics, and the applied sciences thus forms, for example, the basis for rapid developments in future technologies in genetic engineering, biomedicine, and molecular biotechnology. Other innovative projects have led to collaboration with companies such as *AMSilk GmbH* and successful spinoffs such as the biotechnology firms *Ribopharma* and *ALNuMed GmbH*, and the *Friedrich Baur BioMed Centers (GmbH)*.

Understanding complex processes.

Structures that form in a complex liquid under the influence of an electrical field are shown in the background of this image. The growth of these structures over time, indicated by the red measuring points and the solid green line, follows the universal nonlinear mathematical law of such symmetry-breaking structural formation phenomena.



At the University of Bayreuth, research on nonlinear dynamics focuses on systems in which degrees of spatial freedom play a role: i. e., a change in a spatially and temporally dependent quantity is a nonlinear function of the initial state.

Our research can be divided into mathematical “foundations and methods”, “model studies” (characterizing the dynamic behaviour of mathematical models using analytical and numerical methods), and “experimental investigations” (experiments from the natural sciences).

Nonlinear dynamics and structure formation in complex systems

The objective of this interdisciplinary research focus is to arrive at general principles of space-time dynamics in nonlinear media. This ranges from simple and complex fluids (plasmas, fluid crystals, ferrofluids, superfluids, colloidal and granular suspensions, thin films) to “soft materials” (polymers, membranes, biological systems), solid-state bodies (catalytic surface reactions, superconductors, magnets), and even galaxies. Geocological and geophysical systems are also examined from the perspective of nonlinear dynamics. One crucial aspect is the recording and controlling of ordered and unordered (chaotic or turbulent) space-time structures. In addition, bifurcation and stability analysis play a central role in solving mathematical equations.

1,500 publications, 300 dissertations, 22 professorial dissertations

The focus area’s research achievements are impressive. After only five years we can look back at over 1,500 publications in peer-reviewed journals that correspond with over 300 dissertations. In addition, 22 professorial dissertations at the University of Bayreuth are related to this field. The fact that the *Volkswagen Foundation* funds a *Lichtenberg Professorship for Theoretical Physics* at the University of Bayreuth also attests to the attractiveness of this focus area.

World-class research

Proof of our researchers’ extensive national and international professional networks can be found in the more than 1,000 publications co-authored by external scholars. Our international reputation is demonstrated by the fact that in the field of this focus area more than 13 *Humboldt Award winners* have visited the University as guests. With the help of the *Krupp Foundation*, the University has also recently succeeded in attracting two leading scholars from abroad. One of these scholars was awarded one of only five of the *Volkswagen Foundation’s “W3” Lichtenberg Professorships* in Germany, thereby anchoring the collaboration agreement between the University of Bayreuth and the *Max Planck Institute for Plasma Physics* in Garching.

Innovations, what they mean for consumers, and how we handle them.

A wide-range of disciplines work together in this focus area so that all aspects of consumer protection can keep pace with the innovative market dynamics.



Our society is competing on a global scale. In particular, industry is under enormous pressure to innovate. Exciting ideas and inventions are essential in order for innovations to become a commercial success in our technology-oriented country. However, innovations also require protection. Not only do we need to protect ideas but also to ward off risks associated with innovations. However, risks and the need for protection are not infrequently also innovation drivers in their own right.

Society, in turn, is constantly confronted with new innovations and must evaluate them with a view to consumer protection. Existing rules often fall short of doing this, or they must be constantly updated to protect every individual person without restricting innovative freedom. Conversely, many innovations strengthen consumer protection and make it a driver of innovation. The University of Bayreuth's focus area "Innovation & Consumer Protection" conducts research in the area around this flash point. It deals with the economical, legal, social, political, cultural, and technical consequences of innovations on society. Tasked with this far-reaching mission, the focus area is nevertheless unique throughout Europe.

Innovations on the test bench

The University's communicative campus is an ideal platform for posing the complex questions explored in this research specialization. To ensure that all aspects of consumer protection keep pace with the market dynamics in the future, a wide range of disciplines work together: *business admin-*

istration, empirical economic research, economic research, healthcare economics, fundamental legal and economic disciplines, engineering science, consumer behaviour research, microeconomics, macroeconomics, media studies, public law, comparative law, languages and literature, criminal law, consumer law, business informatics, economic policy, and civil law.

Cutting-edge consumer protection

The results of intensive interdisciplinary collaboration form the basis for legislative advances in national, European, and international law. Thanks to this research, it is also possible to take aspects of consumer protection into account in future innovation concepts at an early stage. The great importance of consumer behaviour and the role of innovations in competition also make this research directly relevant to the economy.

Excellent environment for junior scholars

The focus area also provides an excellent environment for fostering outstanding young talent. With the *DFG Research Training Group*, the *Management Science* doctoral programme, and the institutionalized and third party-funded research groups within the *Research Centre for Consumer Law*, the focus area has an excellent structure for nurturing junior scholars.

Many companies today operate globally, maintain production units abroad, and experience collaboration as intercultural challenges.



Ⓔ Governance & Responsibility >>

Finding answers to the most pressing questions of our times.

Our society is constantly undergoing economic and ecological changes that keep raising questions of some urgency. The fields of law and economics as well as cultural studies have taken on the task of finding persuasive answers to these questions.

Our interdisciplinary collaboration focuses on five research areas that study different aspects of *Governance & Responsibility*:

Family-run enterprises and SMEs

The *Research Centre for Family-Run Enterprises* and the *Research Centre on Business Management for Questions of Medium-sized Companies* at the University of Bayreuth study management, organizational, and business processes in small and medium-sized enterprises. Family-run enterprises, on the other hand, encounter a great many social and tax-related issues that often arise only through the personal relationships between the shareholders. Another current topic is governance, which we examine from the perspective of social science, business management and economics, as well as the law.

Financial markets and regulation

This field of research deals with the financial markets. We look for conclusive answers in three subject areas: the basic structure of market regulation, the dynamics of and limits to bank regulation, as well as the efficient regulation of the capital markets.

Global enterprises

We also seek ways to adapt governance models and look for new approaches to international cooperation. Lastly, many companies today operate globally, maintain production units abroad, and experience collaboration as cultural challenges.

Structures and processes of collective decision-making

We focus attention on analysing electoral systems, representation of preferences, and effective governance structures. We also compare international electoral systems; investigate the decision-making structures of governments, parliaments, and companies; and analyse decision-making results and processes. One special focus lies on responsible and sustainable policymaking.

Social responsibility and sustainability

This area of research investigates empirical and normative governance structures of individuals, organizations, and societies. We study successful concepts in the area of corporate social responsibility that deal with specific industries and company sizes on the regional, national, and international level. Other questions deal with sustainability in the areas of energy management, energy policy, and energy law.

Gaining a better understanding of society, politics, economics, and the environment.

Understood as basic research, this field of research investigates the origins of cultural and intercultural processes from diachronic and synchronous perspectives and also studies their functions and impact.



We study the origins of cultures and the ways in which they change – globally, transnationally, nationally, regionally, and locally. How do cultures view themselves? How do they interact and what impact do they have on society, politics, economics, and the environment?

Conclusive answers to these questions can play a vital role in improving communication and knowledge-sharing in all areas of human life. Regionally, we focus on Europe, Africa, and the Americas. Literature, history, (music) theatre, religion, media studies, psychology, languages, sociology, law, economics, and computer science all work together in the following main areas of study:

Education

We investigate transcultural teaching methods in schools and universities as well as in other areas of education, such as specialist and management training.

Diasporas

We are interested in the social, cultural, political, and economic changes that are primarily stimulated by mobility, settlement, and networking among migrant groups.

Forms of expression

How is knowledge constructed? We study the origins and development of communicative behaviour and the function of different forms of expression and media in transcultural processes and encounters between cultures.

Bodies

Our research here focuses on body (constructions) as a medium for symbolic communication as well as the central repository of experience and the senses that give us access to the world.

Religions

Our focus here is on the research areas of "Tolerance and Pluralism", "Religion and the Body", and "Religion in Secular Space".

Risk

We research fictional and nonfictional risk scenarios based on literary texts, film, (music) theatre, analogue and digital media, and we study their influence on cultural and transcultural processes.

You are what you eat.

How do we guarantee food safety and variety for consumers in a Europeanized and globalized market with a view to safeguarding health?



How do we promote health maintenance in an aging society? What foods are healthy and why? Is it possible to sustainably produce adequate quantities of high quality food? What set of rules will be our best guide through the conflicting range of priorities between safety and economic feasibility, enjoyment and endangerment, consumer rights, and lack of information?

The University of Bayreuth's focus area *Food and Health Sciences* seeks answers to these questions. Our goal is to gain a science-based and practical understanding of how to guarantee a healthful, sustainable food supply and effectively safeguard our health. Our research expertise is rooted in food and consumer law, the ecology, biology, and chemistry of food, as well as the health sciences and kinesiology. The research area is divided into a total of four fields:

Nutrition, physiology, and health

Dietary patterns have an impact on human physiology and health-related behaviour. We study how these variables are rooted in social institutions and modern lifestyles.

Health prevention and health promotion

Endemic disease and cancer cause serious social and economic harm. Against this background, we investigate the health-promoting and preventive measures that are effective in promoting healthy lifestyles and preventing illness.

Food production and food quality

We study the sustainability and quality of food production methods. We also investigate the composition of foodstuffs as well as their quality and authenticity. Other main areas of our work are the biofortification of plant-based food staples, the diversity and dynamics of plant metabolism, as well as toxic heavy metals in food plants.

Food law and consumer issues

How do we guarantee food safety and variety for consumers in a Europeanized and globalized market in the interest of safeguarding health? Against this background, we seek answers primarily by further developing food-related legislation. The *Research Centre for German and European Food Law*, the *Research Centre of Food Quality* and the *Research Centre for Consumer Law*, as well as the *Institute of Management in Medicine* and the *Botanical Gardens* are involved in this work.

Energizing the future.

The transition from ecology/environmental sciences to energy research and energy technologies is often fluid. It is as difficult to imagine the environment without energy as it is to picture energy without the environment.



Germany's energy transition is accompanied by some enormous political and economic challenges, not to mention challenges in research and science. What is the best way to ensure an affordable and environment-friendly supply of energy for our society? Will electricity, natural gas, oil, and fuel still be affordable in the future? Will there be acceptance issues involved in the deployment of wind turbines and power lines? Will Germany remain an attractive place to do business despite rising energy costs?

The social implications of Germany's energy transition and the related energy issues are complex, diverse, and interdisciplinary. That's why the University of Bayreuth has developed the focus area *Energy Research & Energy Technology*. We are convinced that close cross-disciplinary collaboration is required to solve the energy problems of the future.

New paths in research and technology

First, engineers and researchers in the natural sciences are needed to analyse methods and processes for the production of energy and to find new materials for transforming, transporting, and storing energy. Research projects include developing new types of fuel cells, generating electricity from waste heat, building low-emission combustion engines and organic/hybrid solar cells, and studying regenerative electricity and the production of fluid fuels from CO₂, just to name a few examples.

Energy issues in a social context

Germany's energy transition has also raised some socio-political questions. For instance, can large-scale power plants be replaced by decentralized facilities, and can energy companies be replaced by communal or cooperative initiatives? What is the role of human behaviour in making energy use more efficient in the future? Can regulating power grids have a positive effect on competition in the energy sector? Electricity generated by nuclear power has been quite affordable, while renewable energy will be expensive, at least in the beginning. This raises the question of social justice: Who will reap the profits and who will foot the bill?

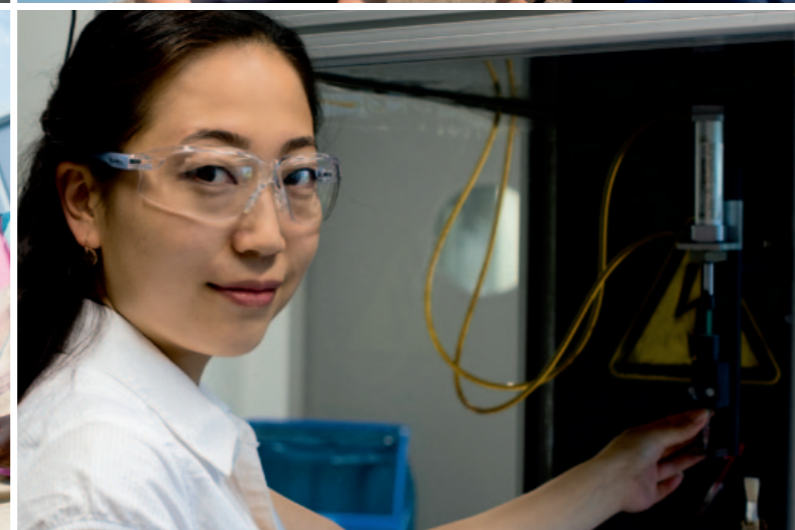
Innovations based on scientific discourse

The wide variety of topics addressed by the focus area *Energy Research & Energy Technology* is being investigated by dedicated researchers from a broad range of disciplines. These include chemistry, physics, engineering, law, economics, geography, and the social sciences. The focus area is a unique and promising interdisciplinary constellation. After all, the goal is to find compelling and innovative energy solutions for the future.

International Office >>

Check into science class.

Our Welcome Services provide assistance to all international students and all international scholars and scientists before, during, and after their stay at the University of Bayreuth.



The University of Bayreuth is happily one of the most popular German universities among foreign researchers. Our communicative campus and outstanding research facilities enjoy an excellent reputation internationally. Both international students and scholars as well as their families feel right at home here. Professional administrative and academic support awaits you!

The *Internationalization Audit* of the German Rectors' Conference and the *Humboldt Ranking* have confirmed that our university meets international standards in teaching, research, and service. The University's multicultural atmosphere also enriches and shapes the city and region. Our International Office – whose Welcome and Alumni Services were awarded accolades by the *Alexander von Humboldt Foundation* – welcomes you as a guest of our university. We help you get settled quickly so that you will feel right at home. We also stay in touch with you after your stay in Bayreuth.

Hospitality awaits you

As our international guest, you will receive administrative and practical support in all phases of your stay. Our range of services include assistance with visa matters and travel preparations. Once you arrive, our "Welcome Service" help you find a place to live and assist with administrative formalities. In addition, our English-speaking advisors will help you deal with all matters relating to pension benefits, taxes, and social security.

Your research project is in good hands

To help you make headway in your research project at the University, we provide assistance to scholars in all disciplines in planning and organizing international research activities. Here you can learn about the funding opportunities available for your project and how to submit the necessary applications. We also support you in planning and organizing countless forms of international research such as cotutelle agreements, international research training groups, and international research networks and partnerships. And when it comes to drafting and administering the necessary contracts, your documents are in good hands.

Make yourself at home

We want you to feel at home immediately on campus, in the city of Bayreuth, and in our region. For this reason, we organize regular get-togethers, excursions, and events in collaboration with local initiatives. To this are added academic events that allow you to present your research interests to a broad international audience in Bayreuth. All that's needed now is for you to arrive! It is best if you contact us prior to your arrival in Bayreuth. Check in. We're looking forward to meeting you!

Perfect infrastructure for your career.

We pay special attention to junior scholars. Doctoral candidates, postdocs, and those pursuing a Habilitation, as well as junior professors will find an ideal environment for their academic and non-academic careers at the University of Bayreuth.



The University of Bayreuth pays especially close attention to the needs of its young scholars. Doctoral students, postdocs, junior professors, and researchers completing their postdoctoral qualification to teach at a professorial level (Habilitation) all find the ideal conditions for pursuing an academic career or a career outside of academia.

The fact that 201 junior researchers from the University of Bayreuth have been appointed as professors in Germany and abroad over the past 30 years is compelling.

Networking and support during your doctoral studies

At the University of Bayreuth, you are given the option of conducting your doctoral research individually at one of the University's six faculties or in a structured programme at one of the graduate centres. Either way, you will benefit from the services provided by the *University of Bayreuth Graduate School*, established as a support and service centre for all doctoral researchers. The aim of the *Graduate School* is to strengthen support for postgraduates at the University of Bayreuth in a sustainable way and to build up an interdisciplinary network that includes all doctoral researchers. It supports scientific exchange even in the earliest stages of independent research, and assures and develops university-wide quality standards. The *Graduate School* also provides transferable skills courses with additional teaching and training opportunities.

An academic career: postdoc, Habilitation, junior professorship

The University of Bayreuth also provides individualized career support following the conclusion of your doctoral research. Are you interested in pursuing an academic career in Bayreuth? Naturally, we are an equal opportunity university, and we actively support academic careers via coaching, mentoring, and dual-career support, which helps couples and families achieve an optimal work-life balance. Are you planning to start a career outside of academia after your doctoral studies? The University of Bayreuth offers a variety of ways to help you achieve your career goals.

Our graduate centres at a glance:

- *Bayreuth international Graduate School of African Studies – BIGSAS*
- *Bayreuth Graduate School of Mathematical and Natural Sciences – BAYNAT*
- *Bayreuth Graduate Centre for Cultural Studies, Social Sciences, and Humanities – BAYKULT*
- *Bayreuth Graduate Centre for Law, Ethics, Business Management, and Economics – BAYREW*

High chairs: just as important as academic chairs.

We are committed to equal opportunity and actively promote academic careers through coaching, mentoring, and dual career support, which helps couples and families combine careers with their private lives.



As a family-oriented university, we pride ourselves on offering ideal conditions for balancing a career, a course of studies, and a family.

For our dedication in this area, the University of Bayreuth has the privilege of calling itself a family-friendly university. The *Hertie Foundation's "work and family audit"* returned a favorable review of the work/family infrastructure on campus following the successful audits of 2006, 2010, and 2013. In 2016, the University of Bayreuth signed a charter to become a member of the best practice club for *"Family in Higher Education"*. This further highlights the commitment the University has shown to ensuring a family-friendly environment for research, study, and university administration over the past several years.

More than just child care

These opportunities include flexitime policies, teleworking arrangements – also for managers – flexible part-time options, and of course, childcare facilities on campus and in the immediate vicinity. We also consider special family life situations in our examination regulations for bachelor's and master's degree programmes.

Equal opportunity fosters innovative potential

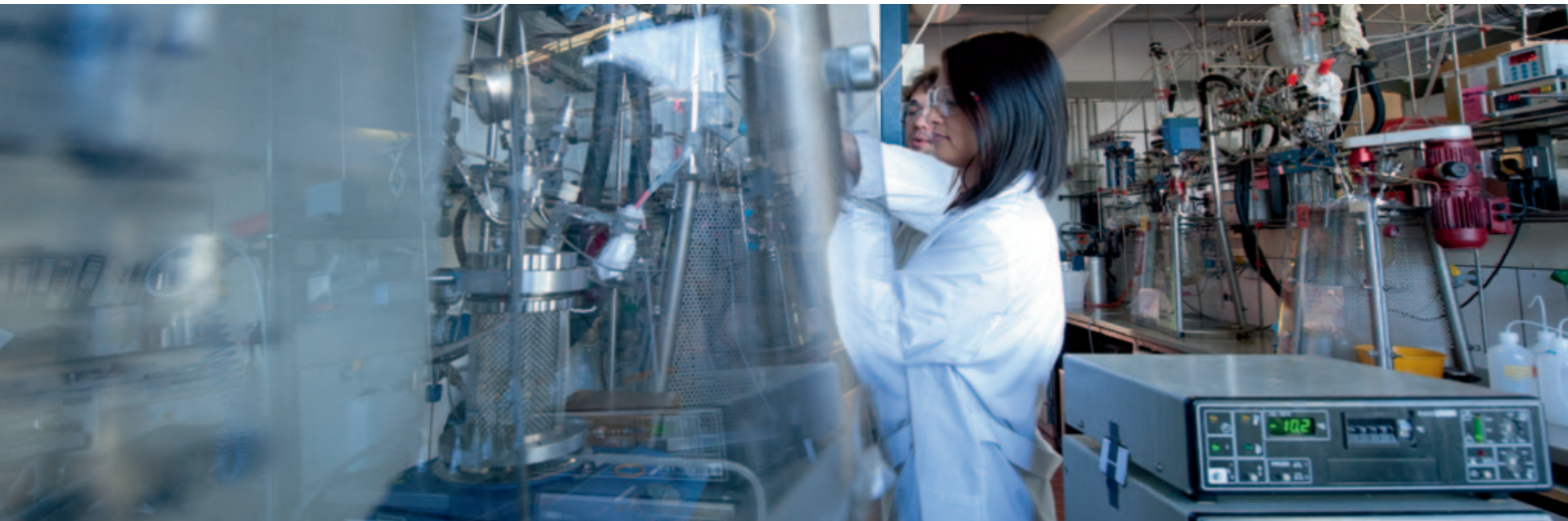
The University of Bayreuth has set itself the goal of increasing the share of women in leadership positions and in the science and engineering disciplines. They receive active support from our women's representatives, who help the University achieve gender equality. These representatives ensure that female scholars and students are not disadvantaged. Both men and women, regardless of their background or nationality, are given equal opportunities on campus. One thing is certain: the resulting diversity enriches our university and fosters its innovative potential.

Action, not words

Our *Women's Representatives* and *Equal Opportunities Department* make sure that the principles of equal opportunity get put into action. In this connection, key objectives are gender equality and increasing the proportion of women in the areas in which they are still underrepresented. In addition, the team has a *STEM promotion programme* aimed at generating interest in science and technology among high school girls in the region.

Taking care of business.

The University of Bayreuth actively helps secure the future of your company, not only by educating scientific talent, but also through many forms of knowledge transfer.



The business community's power of innovation goes a long way toward determining its competitive strength. For the University of Bayreuth, promoting and expanding good collaboration with the business community has therefore been a matter of course for many years now.

With its academic programmes, the University actively helps secure the performance of the business community. We assist companies in matters such as recruiting suitable specialists and managers, and we also offer numerous interesting advanced training programmes for employees. In addition, we form ties with suitable technology partners and research institutions.

Tapping into a university

The University of Bayreuth contributes to the future of your company not only by educating the best and brightest, but also by offering a range of knowledge-transfer opportunities. Through its various symposia, conferences, and lecture series, the University of Bayreuth offers you a variety of platforms for exchanging information. At these events, we will highlight the latest R&D trends and provide you with an overview of innovative products, processes, and services currently being addressed.

High-tech research offensive

Our research and development labs for users are a good example of the way in which the University of Bayreuth collaborates with the business community. These labs were opened in 2000 and are now an important interface with high-tech companies. Successful research takes place here in areas such as applied material research, advanced materials, nanotechnologies, biotechnology, automotive engineering, and nutrition. *Knowledge Transfer* moderates smooth collaboration between the University and business enterprises – from expert opinions, studies, consultations, analyses, and seminars to long-term complex research projects – a win-win situation for everyone involved.

Good climate for entrepreneurial spirit and new ideas

The University of Bayreuth is an important driver of innovation. It not only nurtures entrepreneurial thinking and action but also offers the space and a framework for new ideas and business models. Future entrepreneurs and “intrapreneurs” will thrive in this optimum environment. We offer, for example, outstanding basic research, an interdisciplinary campus, extensive research collaboration, and a business environment that is shaped by small and medium-sized enterprises and includes global market leaders. The University actively supports the exchange of knowledge and collaboration with the regional and national business communities. It also offers students and staff in all academic disciplines professional advice in forming companies and filing patents. They benefit from the many years of experience that the University has gained in advising transfer projects.



In Bayreuth, everyone knows each other, which cannot be said of large universities. In addition to the tight-knit campus, the city centre also has many charming places to meet.



Attractive Living Environment >>

A place to clear your mind.

Whether we came to the University to study, work, or conduct research – there is one point on which we can all agree: newcomers feel at home here in no time at all. The University of Bayreuth, with about 13,500 students, is a comfortable size, and it is also a place where you will make new contacts quickly.

With a population of around 73,000, Bayreuth is not particularly large city, but that's one of the things that makes it so appealing. You will always see people you know around town. The city may be world-famous for its annual opera festival, but it also offers a wealth of other cultural and artistic attractions, Wagner aside. It should come as no surprise that the town's party and pub scenes are firmly in the hands of the students. But you will be surprised how quickly you're able find your way around as you notice the boundaries between the campus and town centre becoming less and less distinct.

Welcome to our one-of-a-kind campus

It is both the heart of the University and a source of inspiration. It's where friendships are made, collaborations initiated, and ideas conceived, ensuring that our university remains a beacon of innovation. Scientific exchange profits tremendously from the wide variety of disciplines our cohesive campus brings together. That's probably why the University of Bayreuth has been able to celebrate so many awards and honours for its scholarly accomplishments.

Location is everything

Scenic northern Bavaria, right at Bayreuth's doorstep, is great for sports activities: cycling, hiking, mountain-climbing, canoeing, rafting, and skiing are all excellent ways to enrich your leisure time. However, if you do happen to crave the feel of a bigger city now and then, Nuremberg is only a one-hour train ride away and Munich is only two and a half hours away. You can reach Berlin in four hours by car and Leipzig in half that time. And don't forget: being in the heart of Europe means Prague is also only a three-hour drive away.



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