



Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Faculty of
Mathematics, Informatics
and Natural Sciences

Annual Report 2013/14



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Dear Readers, Colleagues, and all those interested in the MIN Faculty

The Faculty of Mathematics, Informatics and Natural Sciences has continued to develop extremely well. I am delighted to share with you the details of the outstanding Faculty of Mathematics, Informatics and Natural Sciences in this report.

The CliSAP and CUI clusters of excellence boast highly interesting research findings and first-rate departmental cooperation as reflected in achievements such as the successful procurement of state funding for research.

In addition to its key research areas Climate, Earth, Environment and Photon Science and Nanosciences, the MIN Faculty has identified three further key research areas and two areas of potential in which the Faculty, University, and external partners cooperate closely.

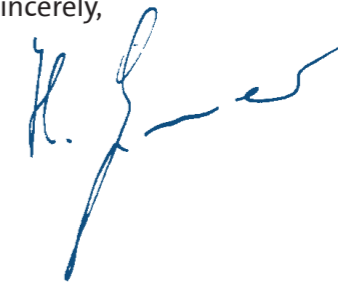
The extensive study reforms in recent years are beginning to bear fruit: our degree programs are running at full capacity and the service our academic offices provide is outstanding – as an external evaluation has confirmed. I would like to take this opportunity to thank the staff of the academic offices for their excellent work!

The long-term internationalization strategy is also taking effect. We are delighted to be able to offer students an ever-greater number

of master's programs in English as well as a comprehensive program in English for both German and international doctoral students. The MIN Faculty has successfully built up a global network with all strategically important partners.




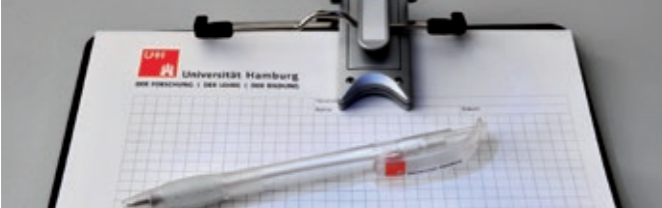


We would like to continue the development of the MIN Faculty by focusing on the offer of top-quality research and teaching. This can only strengthen the University – and therewith the MIN Faculty.

Sincerely,




Prof. Dr. Heinrich Graener
Dean of the Faculty
of Mathematics, Informatics
and Natural Sciences

The MIN Faculty in figures

	Faculty of Mathematics, Informatics and Natural Sciences	1
	Departments	6
	Research centers	2
	Federal clusters of excellence	2
	Collaborative research centers (SFBs), incl. participation	5
	Research training groups (GRKs)	5
	State graduate schools (incl. state and university-funded graduate groups)	5
	DFG research groups (incl. FOR participation)	10
	BMBF projects	80
	Students (major only) of which doctoral students	9,658 1,623
	Total applicants	8,246
	Places for new students (incl. master's programs)	2,633
	Number of programs (major)	43
	Total degrees awarded of which doctorates	1,530 313
	Ongoing state funding from the Free & Hanseatic City of Hamburg (FHH)—spending in 2014 ⁶⁾	EUR 97.8 million
	Externally funded expenses in 2014 excl. research vessels ⁷⁾	EUR 71.6 million
	Expenses on research vessels in 2014	EUR 21.1 million
	Sum of total expenses	EUR 190.5 million
	Employees (state and externally funded) ^{1) 6)}	1,991
	Academic staff ^{1) 2)} of which professors ^{1) 3)}	1,218 217
	Technical support, library staff, administrative personnel ^{1) 4)}	773
	Externally funded employees ^{1) 5)}	706
	Academic staff ^{1) 2)} of which professors ^{1) 3)}	639 30
	Technical support, library staff, administrative personnel ^{1) 4)}	67
	Proportion of women—academic staff	27.2%



1) Source: Paisy-Export 12/2014 [full-time equivalent]

2) Professors, research associates, and academic staff (incl. guest and acting professors)

3) Incl. junior professors and cooperations; excl. guest and acting professors

4) Technical support, library staff, administrative personnel; incl. trainees and staff at the botanical gardens

5) Incl. professors

6) Ongoing state funding = annual allocation from the FHH = basic funding

7) "Other funding" = external funding = funding from the DFG, BMBF, EU, industry, state funding, other income, faculty resources, and private funding bodies

Image—research: Universität Hamburg/MIN/Bischoff

Image—studies and teaching: Universität Hamburg/Sukhina

Image—proportion of women: Universität Hamburg/MIN/von Leliwa

Image—funding: Universität Hamburg/Baumann

Image—observatory: Universität Hamburg/MIN/Raupach

Research at the MIN Faculty

People—Ideas—Nature

In 2012, the MIN Faculty successfully secured funding in the second phase of the Excellence Initiative. **The Hamburg Centre for Ultrafast Imaging (CUI)** was granted funding until 2017, and a second funding period was also granted for the **Integrated Climate System Analysis and Prediction (CliSAP)** cluster of excellence.

Research overview

In its Structure and Development Plan (STEP), the MIN Faculty identifies research specializations, key research areas, and areas of potential.

The two Faculty research specializations are:

- Climate, Earth, Environment
- Photon Science and Nanosciences

The CliSAP and CUI federal clusters of excellence, three collaborative research centers, and two research training groups involving MIN pursue interdisciplinary and cross-university research within these two research specializations.

The three faculty key research areas were identified:

- Infection Research and Structural Biology
- Particle Physics, Astrophysics and Mathematical Physics
- Cognitive Systems

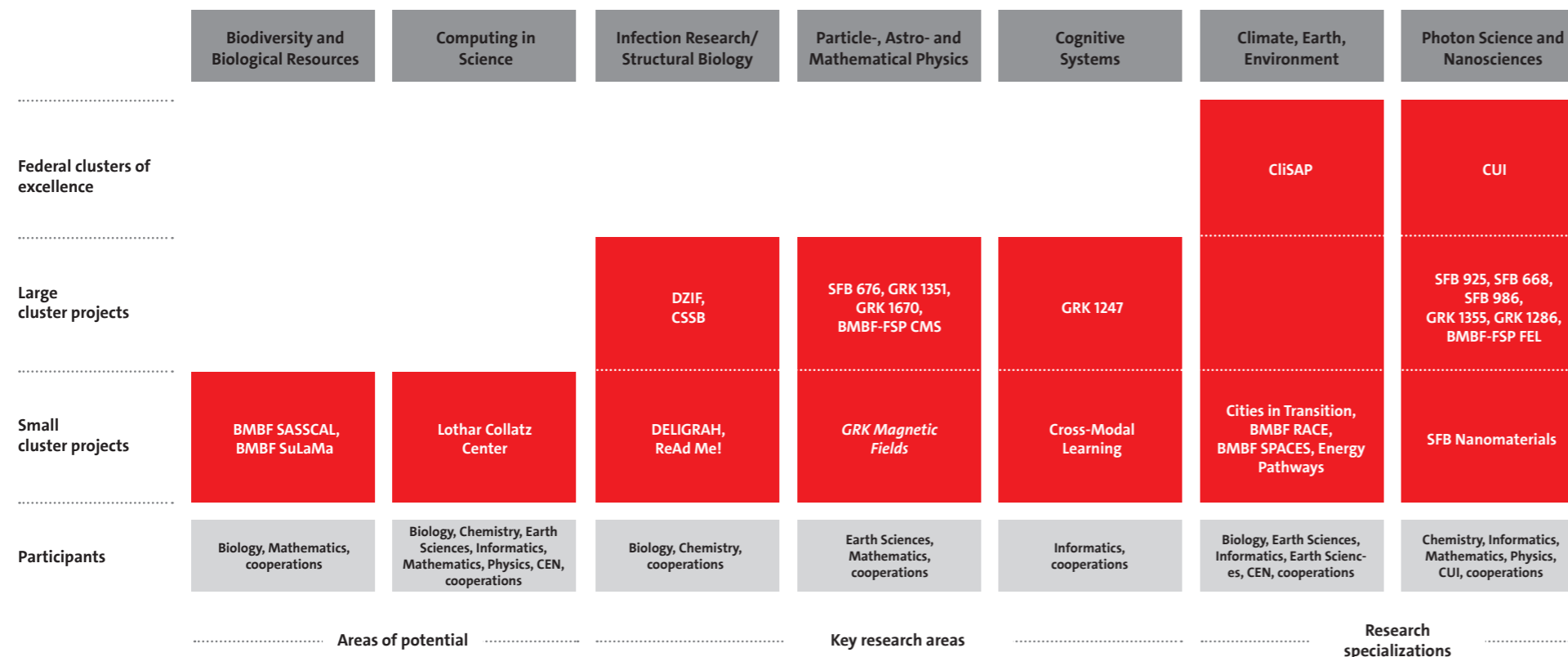
Each of these key research areas comprises a collaborative research center, three research training groups, and further research initiatives.

The two areas of potential are:

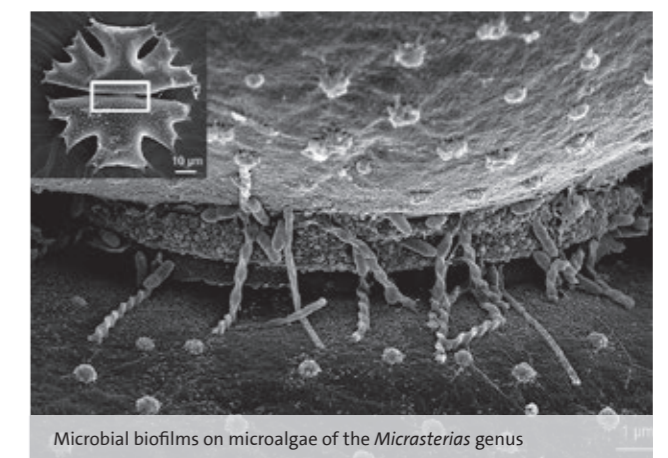
- Biodiversity and Biological Resources
- Computing in Science

In all areas, the Departments of Biology, Chemistry, Earth Sciences, Informatics, Mathematics and Physics in the MIN Faculty work closely with other faculties, e.g., the Faculty of Medicine and the Faculty of Business, Economics and Social Sciences. Cooperations also exist with leading external research institutions such as Deutsches Elektronen-Synchrotron (DESY), Bernhard Nocht Institute (BNITM), Heinrich Pette Institute Leibniz Institute for Experimental Virology (HPI), Max Planck Institutes (MPI-M, MPSD), Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research (HZG), and other national and international institutions.

This allows all faculty departments to develop their own research fields and to become involved in excellent research cluster programs.



Italics: upcoming projects



Microbial biofilms on microalgae of the *Micrasterias* genus

Image: Universität Hamburg/MIN/Streit

Clarification of the different types of projects and their funding

EI Excellence Initiatives

The Excellence Initiative was launched in 2005 as a structure-enhancing measure under the auspices of the German Research Foundation (DFG) and the German Council of Science and Humanities (Wissenschaftsrat). In view of the initiative's successful start, the federal and state governments resolved to fund the Excellence initiative beyond 2012 with a total of € 2.7 billion for a further five years.

SFB Collaborative research centers (SFB)

Collaborative research centers are long-term research clusters at higher educational institutions in which researchers from different institutions work in interdisciplinary teams at a high level of expertise. They are funded by the DFG for up to 12 years.

FSP Key research areas (FSP)

Key research areas are interdisciplinary research projects in subject areas proposed by the Federal Ministry of Education and Research (BMBF), which also funds the projects. Projects are funded for three to five years as well as for longer periods.

SPP Priority Programmes (SPP)

Priority Programmes are innovative research projects involving nationwide cooperations between researchers. They are funded by the DFG for up to six years.

SUF State and university funding

State and university funding is available for cooperative research clusters and graduate schools for up to three years. This funding supports the formation of scientific networks, financing of existing areas of potential, and development of scientific research strengths.

GRK Research training groups (GRK) and graduate schools

Research training groups are university institutions that qualify doctoral students in focused research programs. They are funded by the DFG for up to nine years. Funding for graduate schools is available from different sources (Office for Science, Research and Equal Opportunity and Universität Hamburg) for approx. three years to qualify outstanding doctoral students within an excellent and in part international research environment.

FOR Research groups (FOR)

Research groups require close cooperation among several outstanding scientists, who focus on a specific research topic for approximately six years.

MRC MIN research centers

MIN research centers were established from the successful syndicated excellence clusters (CUI and CliSAP). Furthermore, there are a number of other research centers at the MIN Faculty including also external research institutions.

RC Research cooperations

The MIN Faculty cultivates interdisciplinary cooperations with several external research institutions—notably, the Helmholtz Association, Leibniz Association, and Max Planck Society. Individual contracts have also been drawn up for numerous projects with industrial enterprises as

part of the Faculty's research and development work and to foster knowledge and technology transfer. The map of Hamburg (back page) displays the geographic locations of all sites and local facilities of the Universität Hamburg.



Photon Science and Nanosciences

EI Bottom up approach: cutting-edge research at the Hamburg Centre for Ultrafast Imaging (CUI)

The 2014 academic year ended with some exciting news for the Hamburg Centre for Ultrafast Imaging (CUI) interdisciplinary cluster: the awarding of a Gottfried Wilhelm Leibniz Prize to CUI researcher, Prof. Dr. Henry Chapman (Universität Hamburg, DESY). This prize recognizes outstanding personal research achievements and symbolizes the excellent natural science expertise that has evolved in Hamburg. CUI has also established itself as one of Universität Hamburg's central research facilities.

One reason for the cluster's success is the bottom-up approach that enables CUI to meet high international standards. For "the only criterion for cooperation is academic quality," says CUI spokesperson, Prof. Dr. Klaus Sengstock. This quality is also reflected in the high number of publications in renowned specialist journals such as *Science* and *Nature*.

Another important indicator of international recognition is the multitude of other prizes awarded to cluster scientists in the past two years.

These include the:

- Helene Lange Prize
- Charles Hard Townes Award
- Max Born Prize
- E. Bright Wilson Award for Spectroscopy from the American Chemical Society (ACS)

CUI scientists have been appointed Outstanding Referees, member of the Commission on International Freedom of Scientists, as well as into the Materials Research Society. Furthermore, they were elected Fellows of the American Physical Society, and named Outstanding Reviewers of the Optical Society of America. According to the publisher Thomson Reuters, CUI spokesperson Prof. Dr. Horst Weller is one of the most influential scientific minds worldwide. Six cluster members have also successfully secured funding in prestigious calls for proposals by the European Research Council (ERC).

At the same time, six professors from Germany and abroad have been appointed as new CUI professors over the past two years: Gabriel Bester and Arwen Pearson (both W3) in addition to Ulrike Fröhling, Holger Lange,

Henning Tidow, and Martin Trebbin (W1) complete the team of 49 leading scientists. All have spent many years researching at German and international universities, DESY, Max Planck institutes, the European Molecular Biology Lab, and the European XFEL GmbH.

CUI's Board of Directors has agreed upon an ambitious plan to significantly increase the proportion of female staff. CUI has established the Mildred Dresselhaus Guest Professorship Program to support two outstanding female scientists every year—one eminent senior and one promising junior researcher. The award includes personal prize money of €20,000 and €10,000 respectively and aims to attract leading international female researchers to Hamburg as role models.

The Hamburg Prize for Theoretical Physics awarded jointly every year by CUI and the Joachim Herz Foundation honors outstanding contributions to international research in the areas of atoms, molecules, and quantum optics as well as condensed matter with personal prize money of €40,000. The prize winners in 2013 and 2014 were Prof. Dr. Chris H. Greene (Purdue University) and Prof. Dr. Antoine Georges (Collège de France, École Polytechnique, University of Geneva) respectively.

One further goal of CUI is to support young researchers in general: a total of 54 doctoral students and 31 postdoctoral researchers pursue cutting-edge research in the graduate school. They organized a second winter school at the end of 2014. The program focused on overcoming subject boundaries and further enhancing CUI's interdisciplinary character.

The Light & Schools school laboratory has developed its concept further and now also caters to middle as well as to upper school students. The lab works with more than 20 schools in the Hamburg metropolitan region.



Former Science Senator Dr. Dorothee Stapelfeldt (left) and First Mayor Olaf Scholz (right) engage in a Beamwalk Battle. They are watched (left to right) by Universität Hamburg's Vice President Prof. Dr. Jetta Frost and CUI spokespersons Prof. Dr. Horst Weller and Prof. Dr. R. J. Dwayne Miller.

CUI has also set itself the task of regularly informing the general public. Approximately 5,000 people visited the Centre for Free-Electron Laser Science (CFEL) during the open house at the Bahrenfeld campus to learn more about the latest research activities. At the start of 2014, Hamburg's First Mayor, Olaf Scholz, visited the cluster. In the months thereafter, the Hamburg Chamber of Commerce visited CUI with a group of representatives from medium-sized companies and the Competence Centre for Optical Technologies held its Hanse-Photonik-Forum at the campus.

Direct observation of molecular dynamics

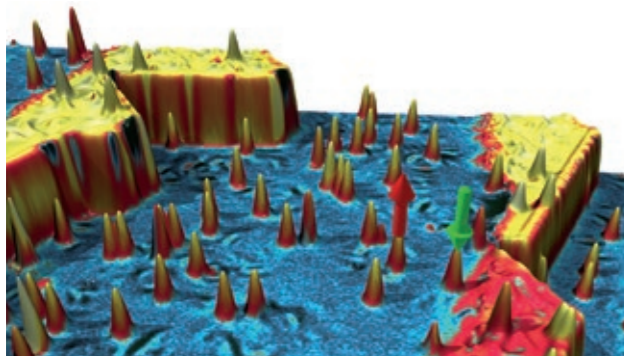
"Being able to observe atoms in action during physical, chemical, and biological processes is every scientist's dream," says CUI spokesperson, Prof. Dr. Dwayne Miller. A good two years after the project was launched on 1 December 2012, a great deal of new experiment apparatus and new analysis methods have been developed. The teams are hoping for decisive research successes in the direct observation of molecular dynamics in the coming months.

SFB Magnetism from Single Atoms to Nanostructure (SFB 668)

Spokesperson: Prof. Dr. Roland Wiesendanger

Funding period: 2014-2017

Since 2006, over 100 researchers from SFB 668 have studied fundamental aspects of static spin structures and the dynamic behavior of atoms and small-scale nanostructures on metallic and insulated surfaces. New technology such as spin-polarized scanning tunneling microscopy provides insight into magnetic structures and phenomena on the atomic scale.



The world's smallest stable ferromagnet: an artificially constructed magnetic cluster composed of just five iron atoms made using targeted atom manipulation and offering prolonged magnetic stability. The magnetic state of the smallest magnetic cluster was recorded by an atomically sharp magnetic sensing probe. Source: SFB 668.

The long-term aim is to accelerate magnetic data storage on electronic devices such as cell phones, digital cameras, and computers, and to enhance storage capabilities. Two major project areas, Spin Structures in Equilibrium and Transport and Dynamics, are investigated at Universität Hamburg and Christian-Albrechts-Universität in Kiel within the fields of applied, theoretical and experimental physics, and chemistry.

The research cluster has been granted € 9.5 million for the third funding period.

SFB Light Induced Dynamics and Control of Correlated Quantum Systems (SFB 925)

Spokesperson: Prof. Dr. Klaus Sengstock

Funding period: 2011-2015

This SFB focuses on the fields of atomic, molecular and quantum physics, condensed matter physics, and x-ray physics. The central aim is to gain basic understanding of the dynamics of correlated quantum systems on all length and time scales using light. The overarching goal is to be able to control these dynamics. Research is conducted within 18 networked research projects on theoretical and experimental physics. Worldwide, a total of 23 leading researchers and 56 employees are active in this field at Universität Hamburg, DESY, the Max Planck research group for structural dynamics, and the European XFEL GmbH. Research is divided into three project blocks:

- ultrafast dynamics and correlations in small quantum systems
- control and study of strong correlations and quantum phases in condensed matter
- correlations and quantum phases in quantum gases and model systems

SFB 925 has been granted a total of € 8.7 million in funding and will soon be evaluated with a view to extending funding for a second funding period.

RC Center for Free-Electron Laser Science (CFEL)

CFEL is a cooperation between Universität Hamburg, DESY, and the Max Planck Society. It was established in 2007 to make optimal use of the scientific opportunities offered by the next generation of light sources. The three partner institutions pool their expertise to investigate structural changes in atoms, molecules, condensed matter, melting, and biological systems and thus make a fundamental contribution to research into dynamic processes in all areas related to matter.

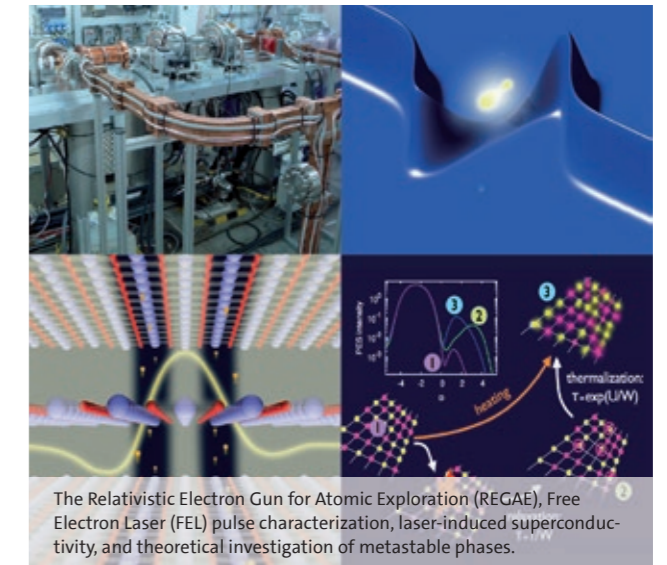
Since the founding of MPSD in 2013 (see below), CFEL has comprised a total of seven departments (3 at DESY, 2 at the MPI, 2 at Universität Hamburg), with around 330 employees working in the fields of physics, chemistry, and related disciplines. Of the 12 professors in the MIN Faculty, six conduct research within the Advanced Study Group (ASG), e.g., into accelerator physics, solar energy, and electron spectroscopy. CFEL is a permanent institution without its own funding; it is financed by the three partner institutions.

RC Max Planck Institute for the Structure and Dynamics of Matter (MPSD)

Managing Director: Prof. Dr. Andrea Cavalleri

Established in 2013, the MPSD is financed entirely by the Max Planck Society. Its approximately 140 employees (including scholarship holders) mainly with a background in physics work in three departments and six research groups.

The department led by Prof. Dr. Andrea Cavalleri uses laser beams of different wave lengths to investigate the collective properties of solid bodies and controls, and observes the behavior of atoms and electrons. The department led by Prof. Dr. R. J. Dwayne Miller focuses on the structure-function relationship of condensed matter. Femtosecond electron diffraction and multidimensional coherent spectroscopy of liquids and biological/molecular systems are used as measuring methods. The department led by Prof. Dr. Angel Rubio uses theoretical methods to investigate the electronic and structural properties of advanced materials, nanostructures, and biomolecules. This Max Planck Institute cooperates with CFEL, CUI, SFB 925, the Department of Physics of the MIN Faculty, DESY, and the UKE.



The Relativistic Electron Gun for Atomic Exploration (REGAE), Free Electron Laser (FEL) pulse characterization, laser-induced superconductivity, and theoretical investigation of metastable phases.

GRK International Max Planck Research School for Ultrafast Imaging and Structural Dynamics (IMPRS-UFAST).

Spokesperson: Prof. R. J. Dwayne Miller
Funding period: 2011-2016

Established in 2011, IMPRS-UFAST is an interdisciplinary, structured doctoral program in the field of ultra-intense light pulses for the observation of atomic motions. IMPRS-UFAST is led by Prof. Dr. R. J. Dwayne Miller from the Max Planck Institute for the Structure and Dynamics of Matter (MPI-MPSD). Further cooperation partners include the MIN Faculty, DESY, and the European XFEL GmbH. The approximately 50 national and international doctoral students currently involved are supported by 26 leading researchers from the fields of physics, chemistry, and biochemistry. The Max Planck Society has granted funding for the period from 2011 to 2016. IMPRS-UFAST will be evaluated in 2015, after which it is eligible to apply for funding for a further six years. Universität Hamburg and the MIN Faculty grant additional doctoral scholarships. IMPRS-UFAST is also a member of the MIN Graduate School.

GRK Functional Metal-Semiconductor Hybrid Systems (GRK 1286)

Spokesperson: Prof. Dr. Ulrich Merkt
Funding period: 2006-2015

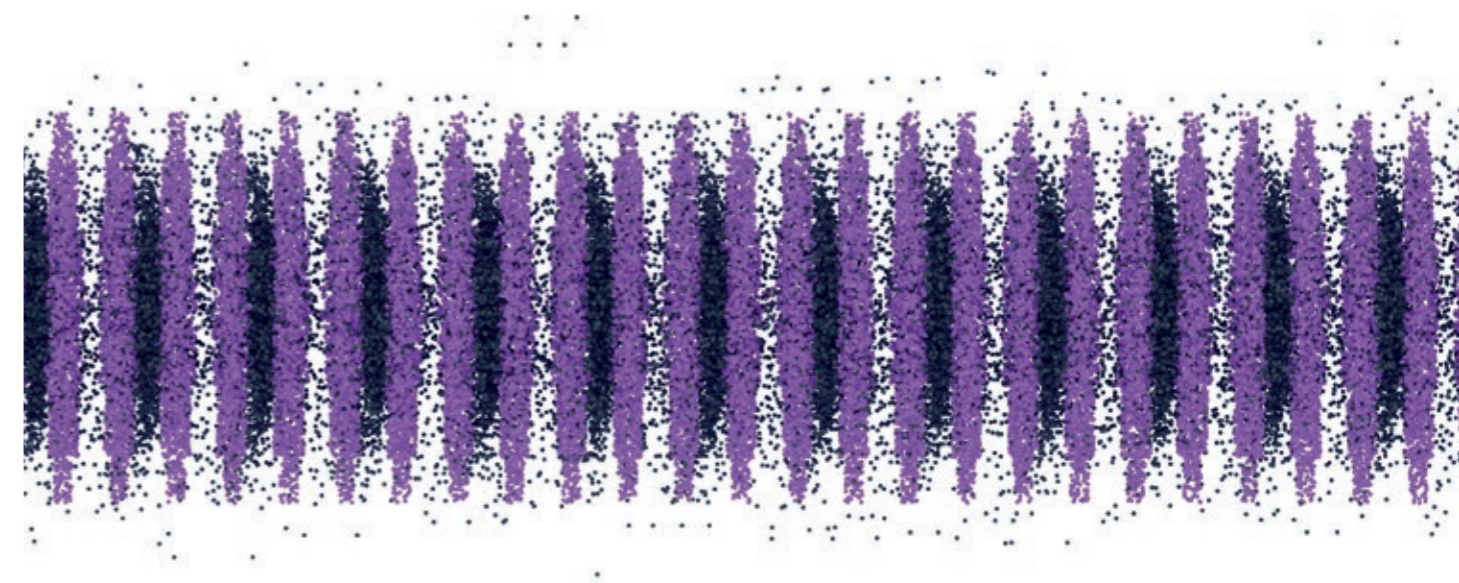
Research on the physical and technical properties of semiconductors with normal metals, superconductors, and ferromagnets by scientists from the fields of mathematics, physics, and informatics. New methods and efficient algorithms are used to simulate real systems in the quest to understand the physical and technical properties of semiconductor hybrid systems.

GRK Physics with New Advanced Coherent Radiation Sources (GRK 1355)

Spokesperson: Prof. Dr. Klaus Sengstock
Funding period: 2006-2015

Physicists from the fields of laser physics, quantum optics, x-ray physics, accelerator physics, and ultra-short pulse physics work together on modern radiation sources (cooperation between Universität Hamburg and DESY). The network with external research institutes provides graduates with access to outstanding research opportunities.

Electrons (grey) sandwiched by corpuscles of light (purple) produce more and more free-electron laser radiation.



Source: Dirk Rathje (Artistic Rendering), Guangyao Feng (Simulation), © nc-sa

SPP Nanostructured Thermoelectric Materials: Theory, Model Systems and Controlled Synthesis (SPP 1386)

Spokesperson: Prof. Dr. Kornelius Nielsch
Funding period: 2009–2015

This Priority Programme focuses on using thermoelectric nanostructured materials to develop new systems, which will generate power from heat far more efficiently. A total of 36 working groups are involved in the 18 national cluster projects on aspects of physics, nanotechnology and microsystem technology, measurement and energy technology, and material sciences. In addition to a national training program for graduates, summer schools impart knowledge on thermoelectric materials and their possible applications.

FSP Free-Electron Laser (FLASH): Materials with High-Brilliance, Ultrashort Pulses (FSP 302)

Spokesperson: Prof. Dr. Markus Drescher
Funding period: 2013–2016

The BMBF cluster of 19 projects at German universities and research institutes develops innovative instrumentation for experiments with intense soft- and hard x-ray radiation of the Free-Electron Laser (FLASH) and the European XFEL. A free-electron laser resolves extremely small space- and timescales of objects. It is a microscope with the ability of observing processes on an atomic level, in real time.

Electronic state of an ultralong-range Rydberg D-state molecule: By applying a magnetic offset field and high resolution spectroscopy, the individual rovibrational molecular states were successfully resolved and compared with the theoretical calculations of a CUI working group. Illustration: Peter Schmelcher. (Krupp *et al.*, Phys. Rev. Lett. 112, 143008 (2014))

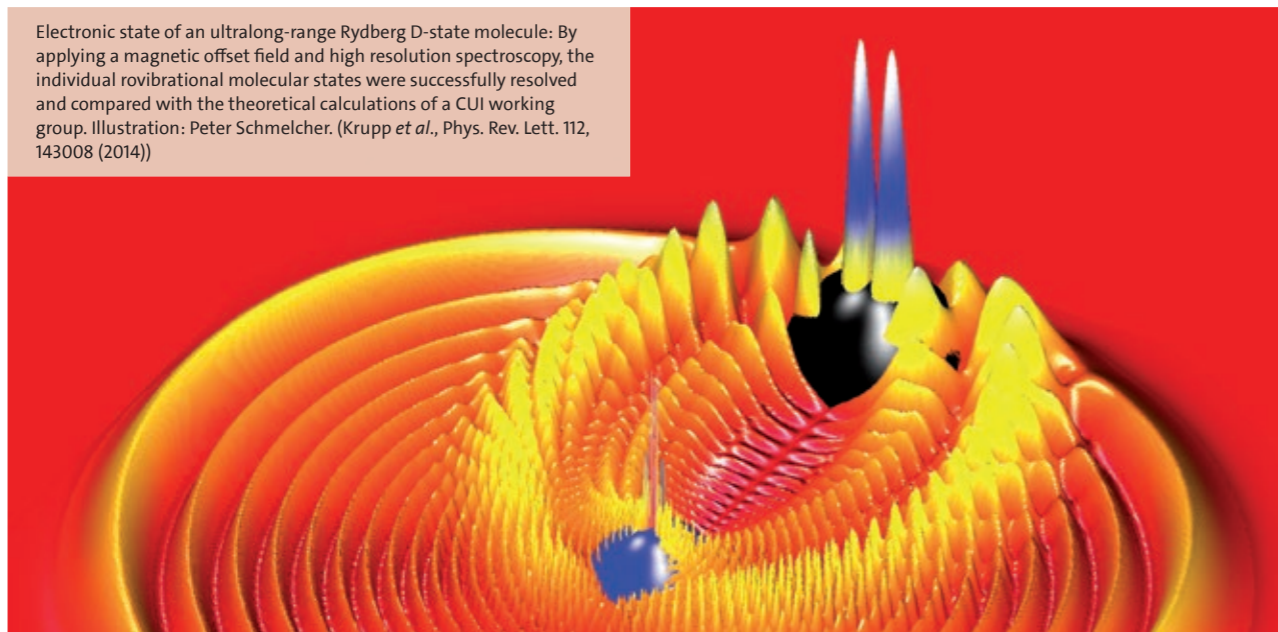


Image left: © Universität Hamburg/MIN/Schmelcher

Climate, Earth, Environment

EI Monitoring climate change: Integrated Climate System Analysis and Prediction (CliSAP)

Can the world's oceans reduce climate change as carbon sinks and heat reservoirs? Why is intensive land use changing our climate? What improves our global and regional climate model? And how will economies and societies react to climate change? Researchers at the CliSAP cluster of excellence investigate both natural and man-made climatic changes in three working groups and develop authentic simulations of future scenarios. CliSAP thus makes a decisive contribution to understanding global climate dynamics and variability, regional manifestations of climate change, and associated social dynamics. Seven newly-established young researcher groups have been consolidated through a transparent evaluation process at Universität Hamburg.

Building bridges to strong partners

Global changes in the climate system raise questions requiring an interdisciplinary approach: scientists from the fields of meteorology, oceanography, geophysics, geography, and ecology work closely with social

scientists, economists, media experts, and peace researchers. This bridge between the natural and social sciences has been further reinforced by election of a new team of spokespeople. Sociologist Anita Engels is the current chair; her deputies are oceanographer Detlef Stammer and soil scientist Eva-Maria Pfeiffer.

In addition to Universität Hamburg, the Max Planck Institute for Meteorology (MPI), Helmholtz-Zentrum Geesthacht, Centre for Materials and Coastal Research (HZG), and German Climate Computing Center (DKRZ) are involved in the cluster. The DFG funds the cluster within the scope of the Excellence Initiative of the German federal and state governments.

Connecting knowledge worldwide

Climate researchers cooperate closely across national borders to regularly evaluate the global risks of anthropogenic climate change. The research conducted at CliSAP plays an integral role in this. In 2013/14, the Intergovernmental Panel on Climate Change (IPCC) presented a

compendium of scientific knowledge and open questions in its fifth assessment report. CliSAP scientists were invited to contribute expertise to all three IPCC working groups. The cluster contributed a total of seven lead authors and 13 participating authors. CliSAP also attracts countless national and international guests: climate researchers from around the globe attended the more than 20 workshops organized by CliSAP. Moreover, a total of 18 scientists visited Hamburg as guest researchers.

Expeditions on land and water

CliSAP not only uses mathematical models but also conducts field research to gain further knowledge. The cluster supports countless expeditions: on land, CliSAP scientists research material flows in the Siberian permafrost. Research ships gather crucial data on the Arctic sea ice and ecosystems such as the North and Baltic Seas. Field research in and around Syria investigates the relationship between climate hotspots and violent conflicts.

International and interdisciplinary: the SICSS Graduate School

The School of Integrated Climate System Sciences (SICSS) trains the next generation of interdisciplinary climate experts. It offers a two-year master's program and a three-year doctoral program. An excellent gender balance and an international orientation are just two characteristics of this outstanding institution. English is the language of instruction. Seventy percent of Master's students and 40 percent of doctoral students are foreign. Almost

The nucleus of the KlimaCampus Hamburg

The Hamburg metropolitan region is a versatile and internationally unique climate research location. CliSAP has made a decisive contribution to the establishment of the KlimaCampus Hamburg in which 12 universities and external partners are currently involved. Within the cluster, the network supports prominent community activities such as the weekly KlimaCampus Colloquium seminar series and the 2014 Climate Science Day, which was opened by the First Mayor of Hamburg, Olaf Scholz.

30 countries are represented. In 2013/14, 20 master's degrees and 44 doctorates were awarded.

Scientific communication – online and in person

CliSAP has had a modern website since summer 2014. To cater to an international audience, the information is provided in both German and English on the upper levels and in English on the lower levels. The cluster joined forces with the DFG to present itself at the annual conventions of the European Earth Sciences Union (EGU, Vienna) and American Geophysical Union (AGU, San Francisco). The interactive "Ocean & Climate" application (multi-touch table) was developed for exhibitions. It formed part of the exhibition aboard the new SONNE research vessel during its coastal tour. The ship drew 6,300 visitors during the Open Ship Days in Hamburg.

Permafrost research: CliSAP expedition to the Siberian Lena River Delta



Image left: Universität Hamburg/CEN

MRC Center for Earth System Research and Sustainability (Centrum für Erdsystemforschung und Nachhaltigkeit, CEN)

CEN represents research on the earth system and sustainability at Universität Hamburg. It brings together expertise in the fields of biogeochemistry, soil science, geography, geology, geophysics, marine biology, meteorology, oceanography, economics, and social sciences. As such, CEN links the natural and social sciences in research, teaching, and the promotion of young researchers. CEN has published research findings, project information, and news on its website since the end of 2013.

CEN leads CliSAP into the future

CEN was established in the MIN Faculty in 2011. It is responsible for developing the University's contribution to the CliSAP cluster of excellence for climate research beyond 2017 and has already compiled interdisciplinary work packages. This has helped to secure several job positions at CliSAP. CEN strives to further cooperations between CliSAP and external partners. The research center is a member of the KlimaCampus Hamburg network for which the CliSAP cluster of excellence provided the impetus.

Eight core issues

How do the ocean, atmosphere, biosphere, and geosphere influence one another? What impact do environmental risks and climate change have on marine and terrestrial ecosystems? How will our growing appetite for energy and use of resources shape our society and environment? CEN considers these and other questions on the

earth system and sustainability within eight core areas: climate change and variability, geophysical fluid dynamics, ocean circulation and sea level changes, element cycling in the earth system, marine ecosystem services and management, urban areas within global change, energy landscapes, and climate change and society.



Cluster projects and funding

Interdisciplinary working groups at CEN have secured project funding from different sources. The state-funded "Cities in Transition" project focuses on climate change and health. The BMBF-funded "CarboPerm" project is a Russian-German collaboration on the carbon cycle in permafrost regions. DFG research unit 1740 analyzes the Atlantic freshwater cycle. The DFG has also approved the "SeaLevel" Priority Program led by CEN. The "Fidelity and Uncertainty in Climate Data records from Earth Observations" (FIDUCEO) project funded by the Horizon 2020 Framework Program of the European Union uses datasets from weather satellites.

Image: Universität Hamburg/CEN

GRK International Max Planck Research School for Earth System Modeling (IMPRS-ESM)

Spokesperson: Prof. Dr. Jochem Marotzke

Funding period: 2002-2017

The IMPRS-ESM is a multidisciplinary English-language doctoral program that has been offered jointly by the Max Planck Institute for Meteorology (MPI-M) and Universität Hamburg since 2002. Universität Hamburg's MIN and WiSo Faculties participate in the project. Prof. Dr. Jochem Marotzke (MPI-M) is spokesperson of the IMPRS-ESM and Prof. Dr. Uwe Schneider (Research Unit for Sustainability and Global Change, MIN Faculty) is his deputy. Approximately 50 doctoral students are currently working on and with earth system models and their components to improve our understanding of processes and dynamics on land, in the atmosphere and the ocean, as well as of human impact on the earth system.

FOR A New Approach toward Improved Estimates of Atlantic Ocean Freshwater Budgets and Transports as Part of the Global Hydrological Cycle (FOR 1740)

Spokesperson: Prof. Dr. Detlef Stammer

Funding period: 2013–2016

This DFG research unit considers the role of surface freshwater fluxes in changes observed in the salt content of the upper Atlantic Ocean. Scientists from the fields of oceanography and meteorology in Hamburg, Kiel, and Bremen as well as at the German National Meteorological Service (DWD) cooperate to investigate climate-relevant issues.

SUF State research cluster— Cities in Transition: Developing a Multi-Sector Urban Development Impact Model (UrbMod)

Spokespersons: Prof. Dr. Heinke Schlünzen,
Prof. Dr. Jürgen Oßenbrügge

Funding period: 2015-2017

Guiding perspectives for forward-looking urban development arise from challenges posed by climate change and the increase in extreme weather events, CO₂ emission reduction goals, and attempts to maintain and enhance the quality of life and health of the population. Both synergies and conflicts exist between these two poles. Taking Hamburg as an example, a wide-reaching multi-sectorial impact model is to be developed to map optimal approaches to urban development in order to be applied universally. The aim of the model is to improve the well-being of city dwellers, as defined by health-related values such as air quality, temperature, mobility behavior, and socioeconomic structure.

Within the scope of the Hamburg state research funding, three of the six cooperative research alliances and one of the four research training groups at Universität Hamburg will be based within the MIN Faculty as of 2015. State research funding is granted for a period of three years. Every year, around € 400,000 is made available for each research alliance and around € 300,000 for each research training group.

Cognitive Systems

GRK Cross-Modal Interaction in Natural and Artificial Cognitive Systems (CINACS, International GRK 1247)

Spokesperson: Prof. Dr. Jianwei Zhang
Funding period: 2006-2015

This international research training group is a cooperation between Universität Hamburg and Tsinghua University in Beijing (China) in the fields of cognitive science, human science, and robotics. The fusing of biological and engineering approaches with robotics aims to explore the potential for technical and clinical applications. The cluster project provides competitive international postgraduate training.

SUF State research cluster – Cross-Modal Learning: Adaptivity, Prediction and Interaction (CROSS)

Spokespersons: Prof. Dr. Jianwei Zhang,
Prof. Dr. Stefan Wermter
Funding period: 2015-2017

This state-funded research cluster is preparing an international collaborative research center between Universität Hamburg, the University Medical Center Hamburg-Eppendorf (UKE), three leading universities in China (Tsinghua, Beijing Normal, and Peking University) as well as the Chinese Academy of Sciences. Researchers from the fields of artificial intelligence, neuroscience, and psychology are focusing on cross-modal learning. The aim is to better understand the neural, cognitive, and computational aspects of cross-modal learning and develop new enhanced cross-model computer systems.

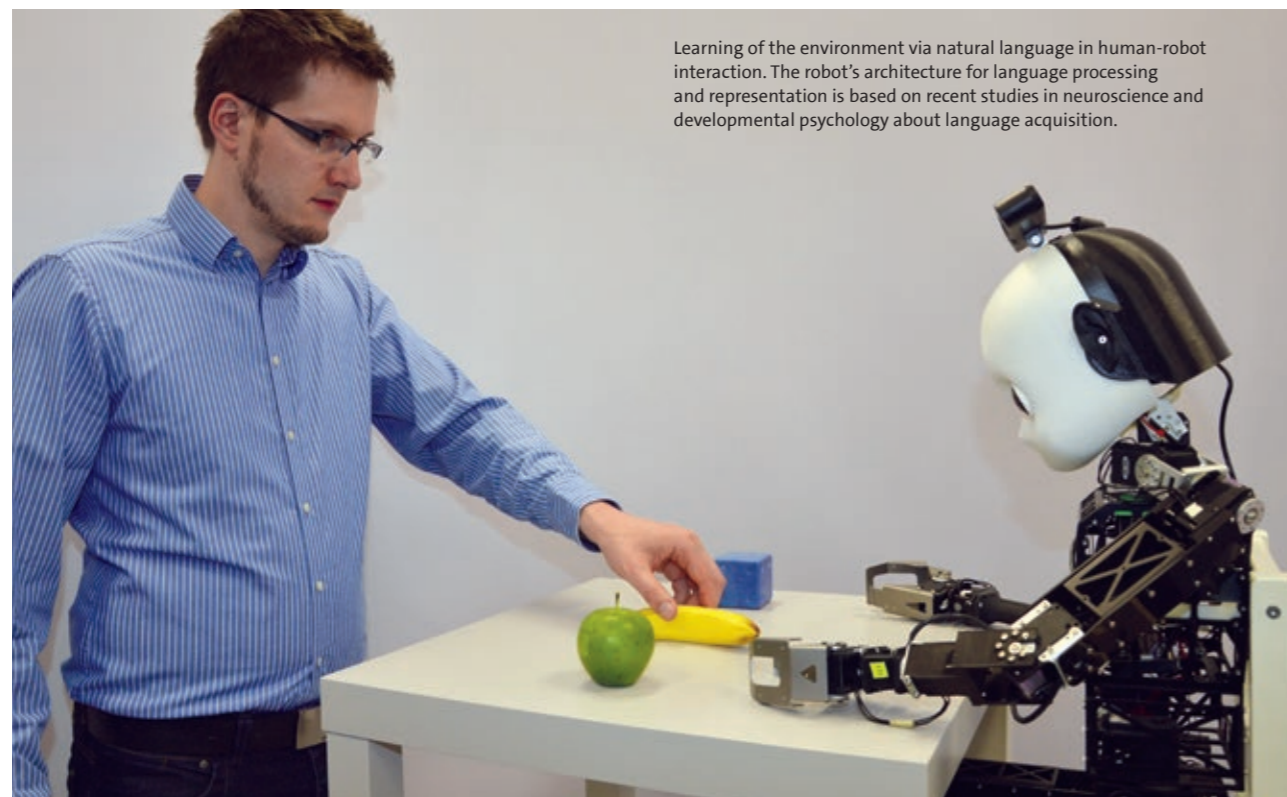


Image: www.knowledge-technology.info

Particle Physics, Astrophysics and Mathematical Physics

SFB Particles, Strings and the Early Universe: The Structure of Matter and Space-Time (SFB 676)

Spokesperson: Prof. Dr. Jan Louis
Funding period: 2014-2018

In SFB 676, a total of 200 researchers from the fields of physics, astrophysics, and mathematics work together at the interface of string theory, particle physics, and cosmology. The cooperation project between Universität Hamburg and DESY was launched back in 2006. The interdisciplinary research project transcends the traditional boundaries between these disciplines, enabling a variety of projects, e.g., experiments to learn more about the constituents of dark matter at the LHC at CERN. Doctoral students are offered an international graduate program within this key research area.

The project has been granted € 8.4 million by the DFG for the third funding period.

FSP FSP 102 CMS – Elementary Particle Physics with the CMS experiment

Spokespersons: Prof. Dr. Erika Garutti,
Prof. Dr. Johannes Haller,
Prof. Dr. Peter Schleper
Funding period: 2012-2015

The BMBF's FSP 102 Compact Muon Solenoid (CMS) experiment focuses on research into proton-proton collisions under the highest possible mass energy. The compact muon solenoid detector can be used to trace the particles produced in high-energy collisions. The existence of the Higgs boson could be confirmed during experiments at CERN on the Large Hadron Collider (LHC).

GRK Extrasolar Planets and their Host Stars (GRK 1351)

Spokesperson: Prof. Dr. Jürgen Schmitt
Funding period: 2007-2015

A joint project between Universität Hamburg (Hamburg Observatory), University of Göttingen, and Max Planck Institute for Solar System Research. Doctoral and young postdoctoral students are introduced to the interaction between extrasolar planets and their host stars in addition to their evolution and characteristics.

Mathematics Inspired by String Theory and Quantum Field Theory (GRK 1670)

Spokespersons: Prof. Dr. Bernd Siebert,
Prof. Dr. Christoph Schweigert
Funding period: 2011-2015

The Departments of Mathematics and Theoretical Physics in the MIN Faculty and the DESY theory group provide a structured doctoral program for the mathematical investigation of string and quantum field theories allowing for the study and analysis of their physical sources.

SUF Astroparticle Physics with Multiple Messengers

Spokesperson: Prof. Dr. Günter Sigl
Funding period: 2011-2014

This is a research project for doctoral student exchange between Universität Hamburg, the Astroparticles and Cosmology Laboratory (APC) in Paris (France), and the Department of Physics at the University of Oxford (UK).

Infection Research/Structural Biology

RC

Center for Structural Systems Biology (CSSB)

Funding period: since 2011

The national Center for Structural Systems Biology (CSSB) opened on the Bahrenfeld campus in 2013. It hosts infection researchers who have worked together since 2014 to hunt down minuscule pathogens and their molecular interactions.

In January 2011, the federal and state agreement on construction of the CSSB was signed at the DESY campus in Hamburg. The CSSB brings together partners from different universities and research institutes in Hamburg, Lower Saxony, Schleswig-Holstein, and North Rhine-Westphalia, and pools their expertise in the disciplines of biology, chemistry, physics, and medicine. "This manifold combination of investigation methods cannot be found anywhere else in the world," says CSSB Deputy Director Prof. Dr. Chris Meier.

State-of-the-art technology including the PETRA III high-brilliance synchrotron radiation source, cryo-electron microscopy, and FLASH and the European XFEL GmbH (under construction) free-electron lasers is used at the CSSB to analyze molecular building blocks and the regulation of biological systems. Among other things, findings from this research serve to identify points of attack for new active ingredients from the interactions between pathogens and their hosts.



RC

German Center for Infection Research (Deutsches Zentrum für Infektionsforschung, DZIF)

The interaction of scientists from different disciplines provides important impetus for the German Center for Infection Research (DZIF) established in 2012. The BMBF-funded center has seven sites in Germany, with the Hamburg cluster focusing on "Emerging Infections."

The basic research conducted at the CSSB provides staff at the DZIF with immediate insights that can be applied directly. This "translation" means new medicines can be developed for sudden epidemics.

A total of four professors from the MIN Faculty are involved in the CSSB. In 2015, a new professor will be appointed for medical chemistry.

Image: HPI/M. Holthaus

SUF

State research cluster – Regulatory Adenine Nucleotides on Membrane Surfaces (ReAd Me!)

Spokespersons:

Prof. Dr. Andreas Guse, Prof. Dr. Chris Meier

Funding period: 2015-2017

An organism's cells must perceive and correctly react to continuous signals from their surroundings. Chemical messenger substances – in this case, adenine nucleotides (AN) – can be released from the cell or converted into specific new products in reaction to an incoming signal. These messenger substances then diffuse to their receptors on the cell surface or in the cell, thereby transmitting the signal. The aim of researchers from the fields of chemistry, cell biology, and immunology at Universität Hamburg and the University Medical Center Hamburg-Eppendorf (UKE) is to measure the local volumes of these messenger substances and to manipulate their specific effects. Overall, the project aims at improving the understanding of these messenger substances and, in the long term, at conceiving new strategies for the treatment of diseases.

SUF

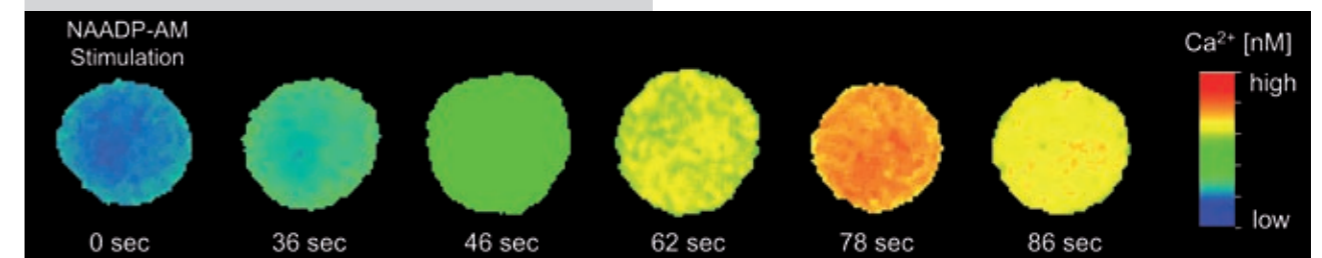
State research training group – Degradation for Life Graduate School Hamburg (DELIGRAH)

Spokesperson: Prof. Dr. Julia Kehr

Funding period: 2015-2017

In most organisms, the death of single cells and degradation of cellular components are the condition for successful development. DELIGRAH takes an interdisciplinary approach to bring together working groups researching the life-enhancing degradation of biomolecules. This partnership between Universität Hamburg and the Heinrich Pette Institute enables doctoral students access to outstanding training with a focus on bioimaging, protein biochemistry, and structural biology.

Change to the free cytosolic calcium concentration in human T-lymphocytes following stimulation with a common membrane derivate of the messenger substance NAADP.



Copyright: Universität Hamburg/MED/Guse

SUF **Small graduate group – Structural Biology of Interaction Modules under Stress (SIMOS)**

Spokesperson: Prof. Dr. Stefan Hoth

Funding period: 2012-2016

The SIMOS small graduate group established in 2012 brings together the expertise of the Departments of Biology and Chemistry in molecular and biochemical methods to visualize the reaction of plants to complex stress scenarios, e.g., fungus infestation.

Stem cross section of a two-year-old noble fir (*Abies procera*). The cross section has a diameter of 1,000 micrometers (1 mm) and was cut with a sliding microtome. This device allows for the slicing of stem cross sections of 10 micrometers in thickness.

Staining with astra-blue enables clear differentiation between the living cells in the stem's outer ring and the lignified cells at the core, which have been stained brown with safranin. The outer ring stained blue comprises cells that transport nutrients and water. The wood biology department at the Center for Wood Sciences researches these processes in trees.

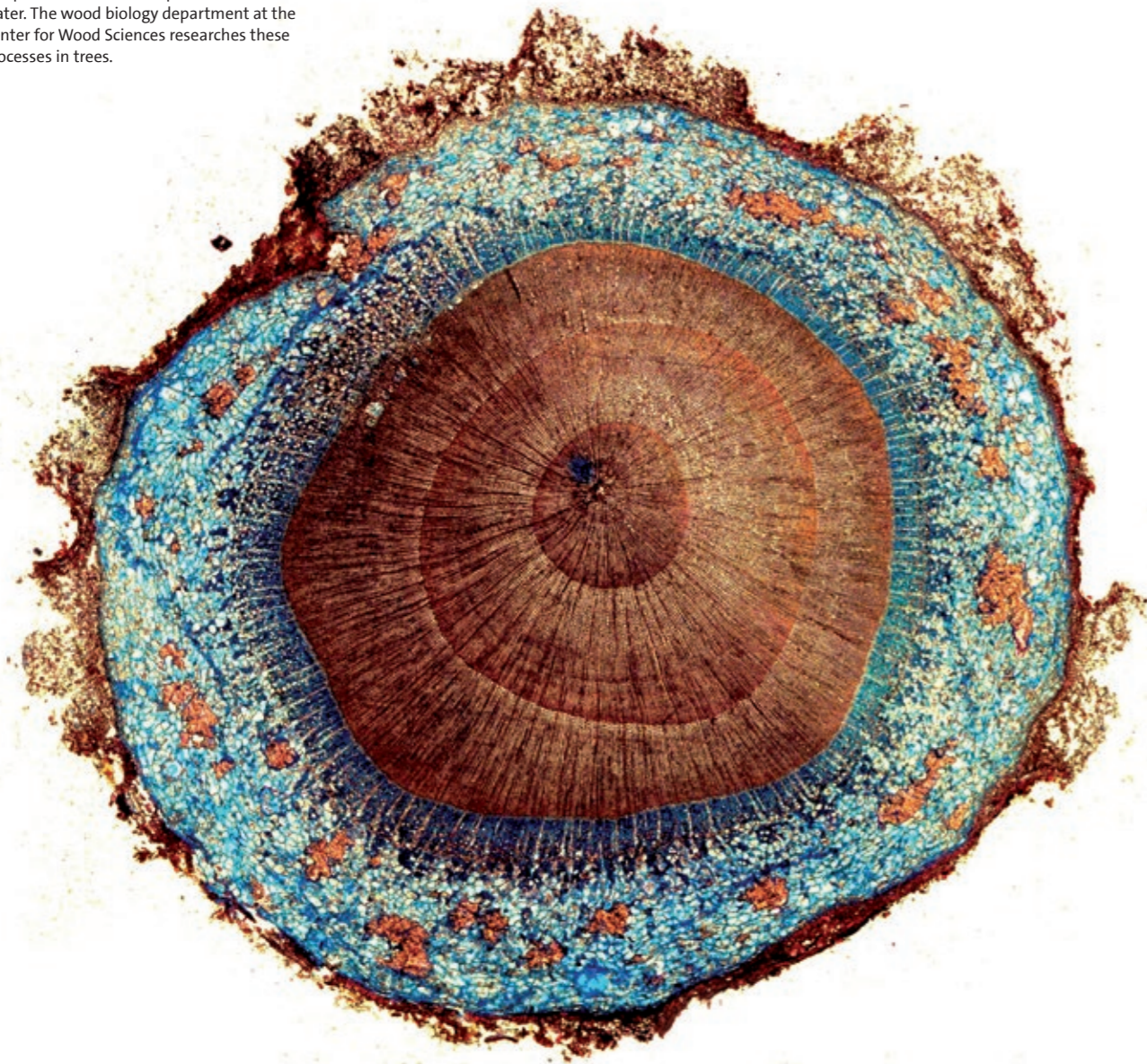


Image: Universität Hamburg/MIN/Schuetze

Computing in Science

GRK **Structural Inference in Statistics: Adaptation and Efficiency (FOR 1735)**

Spokesperson: Prof. Dr. Holger Drees

Funding period: 2012-2015

New statistical methods are being developed to optimally utilize structures underlying large data volumes in the cooperation between the Departments of Informatics and Mathematics at Universität Hamburg and Humboldt University Berlin. The aim of this DFG research unit is to significantly improve the statistical analysis of complex models and to apply these models in manifold areas.

SUF **Lothar Collatz School for Computing in Science**

Spokesperson: Prof. Dr. Michael Hinze

Funding period: 2012-2014

The Lothar Collatz School for Computing in Science promotes interdisciplinary training and research at the interface between mathematics, informatics, and simulation-based knowledge.

Biodiversity and Biological Resources

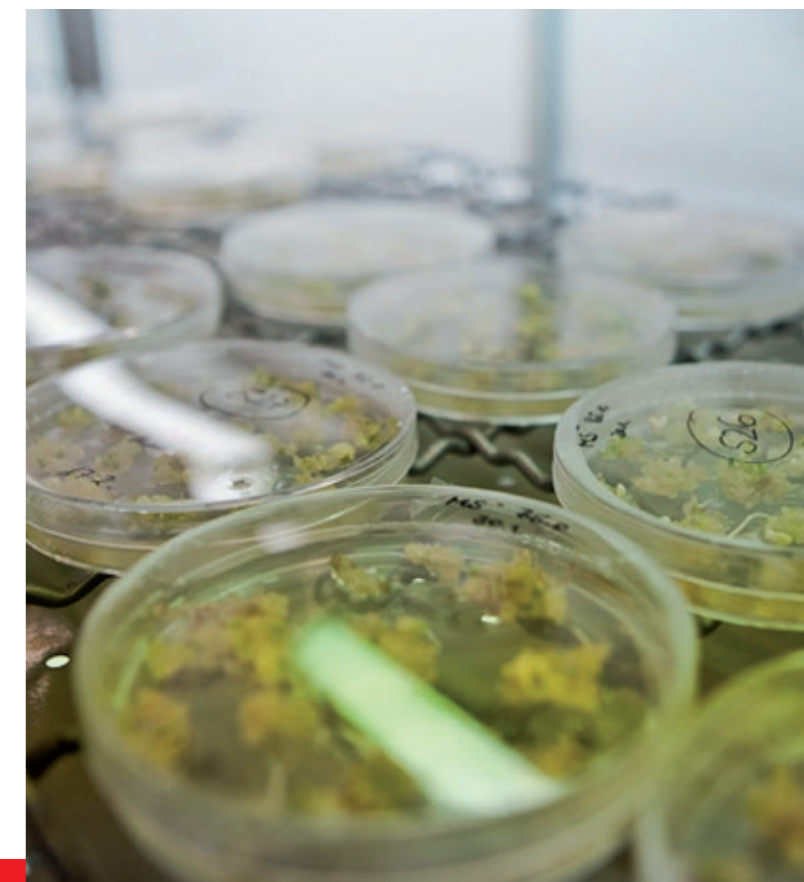
GRK **Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL)**

Spokesperson: Prof. Dr. Norbert Jürgens

Funding period: 2010-2017

This BMBF-funded network for research into the biodiversity, evolution, and ecology of plants, classic taxonomy, molecular systematics, vegetation ecology, and the patterns of plant diversity is a joint initiative between Angola, Botswana, Namibia, South Africa, Zambia, and Germany. The project aims to help mitigate the effects of climate change on land management and water resources in southern Africa through research, capacity building, and regional advice, including information and product service.

Image: Universität Hamburg/MIN/Bischoff



Diverse Research Areas

SFB

Participation in SFB 986 Made-to-Measure Multiscale Material Systems – M³

Spokesperson: Prof. Dr. Gerold Schneider
(Hamburg University of Technology)
Funding period: 2012-2016
Researchers from SFB 986 are developing entirely new materials and components in a cooperation between Universität Hamburg, Hamburg University of Technology (TUHH), and Helmholtz-Zentrum Geesthacht, Center for Materials and Coastal Research (HZG). The MIN Faculty is involved in three projects within the TUHH-led SFB—under the leadership of Prof. Dr. Horst Weller and Dr. Tobias Vossmeier from the Institute of Physical Chemistry and Prof. Dr. Kornelius Nielsch from the Institute of Applied Physics. SFB 986 has been granted almost € 9 million in funding.

SFB

Participation in SFB 950 Manuscript Cultures in Asia, Africa and Europe

Spokesperson: Prof. Dr. Michael Friedrich
Funding period: 2011-2015
This SFB conducts basic research into Asian, African, and European manuscript cultures. The great variety of fields and disciplines as well as the large number of cultures under investigation aim to overcome unreflected truisms. The Department of Informatics within the MIN Faculty is involved in a project on image processing methods to determine visual manuscript and character features under the auspices of Prof. em. Ph. Dr. Bernd Neumann. SFB 950 has been granted almost € 10 million in funding.

SUF

Graduate School – Key Technologies for Sustainable Energy Systems in Smart Grids

Spokesperson: Prof. Dr. Peter Burger
Funding period: 2012-2014
The aim of this multidisciplinary graduate school is to research and develop key technologies for new energy storage systems.

RC

Partnership for Innovation, Education and Research (PIER)

Managing Director: Dr. Christian Salzmann
In February 2011, DESY and Universität Hamburg established the Partnership for Innovation, Education and Research (PIER) to further develop their long-standing cooperation. PIER focuses on four pioneering research areas:

- particle and astroparticle physics
- nanosciences
- photon science
- infection research and structural biology

DESY and the MIN Faculty have already cooperated successfully in all four areas. The PIER Idea Fund is a central component for furthering research. The PIER Helmholtz Graduate School (PHGS), which is being funded for a period of six years, provides intensive graduate training. Since 2013, the Joachim Herz Foundation has granted five doctoral scholarships per year.

Selected external funding

The MIN faculty is the largest recipient of third party funding at the Universität Hamburg. A selection of newly acquired and extended external funding in 2013/14 for which the funding sum exceeds € 1 million over the entire project period is detailed below.

Research topic	Spokesperson(s)	Institution(s)	Current funding period	Total funding (EUR million)	Funding source
CUI	Prof. Dr. D. Miller	CUI, DESY	2012–2017	25.0	DFG
ClISAP	Prof. Dr. M. Claußen	CEN, MPI-Met	2012–2017	24.5	DFG
SFB 668	Prof. Dr. R. Wiesendanger	Physics, INF	2014–2017	9.5	DFG
SFB 925	Prof. Dr. K. Sengstock	Physics, ILP	2011–2015	8.7	DFG
SFB 676	Prof. Dr. J. Louis	Physics, ITP	2014–2018	8.4	DFG
GRK 1286	Prof. Dr. U. Merkt	Physics, INF	2006–2015	4.9	DFG
GRK 1355	Prof. Dr. K. Sengstock	Physics, ILP	2011–2015	3.6	DFG
GRK 1670	Prof. Dr. Bernd Siebert, Prof. Dr. Christoph Schweigert	Physics, Algebra and Mathematical Physics	2011–2015	3.5	DFG
Intl. GRK 1247—CINACS	Prof. Dr. J. Zhang	Informatics, TAMS	2006–2015	2.9	DFG
GRK 1351	Prof. Dr. J. Schmitt	Physics, Hamburg Observatory	2007–2015	2.7	DFG
SASSCAL II+III	Prof. Dr. N. Jürgens	Biology, Biocenter Klein Flottbek	2012–2017	20.4	BMBF
TFO	Prof. Dr. N. Jürgens	Biology, Biocenter Klein Flottbek	2010–2015	4.4	BMBF
SuLaMa	Prof. Dr. J. Ganzhorn	Biology, Biocenter Grindel, Zoological Museum	2011–2015	3.7	BMBF
FSP 102 CMS	Prof. Dr. P. Schleper	Physics, IEP	2012–2015	3.7	BMBF
GLYCONIC	Dr. U. Rabausch	Biology, Biocenter Klein Flottbek	2014–2017	3.0	BMBF
Development and Test: SFX (XFEL)	Prof. Dr. H. N. Chapman	Physics, CFEL	2013–2016	3.0	BMBF

Research topic	Spokesperson(s)	Institution(s)	Current funding period	Total funding (EUR million)	Funding source
FSP 302—FLASH	Prof. Dr. M. Drescher	Physics, IEP	2013–2016	2.7	BMBF
WTZ South Africa—SPACES	Prof. Dr. K.-C. Emeis	Earth Sciences, Institut für Biogeochemie und Meereschemie (IfBM), Institute of Oceanography (IfM)	2012–2015	1.5	BMBF
RACE	Prof. Dr. D. Stammer	Earth Sciences, IfM	2012–2015	1.3	BMBF
QUANTUS	Prof. Dr. K. Sengstock	Physics, ILP	2011–2015	1.3	BMWi
ThessaPor	Prof. Dr. M. Fröba	Chemistry, Institut für Anorganische und Angewandte Chemie (IACH)	2012–2017	1.3	BMBF
SOPRAN III	Prof. Dr. I. Hense, Prof. Dr. F. Ament	Earth Sciences, IfM	2013–2016	1.1	BMBF
Other BMBF projects acquired and extended in 2013/14		69 projects from all MIN departments: Biology, Chemistry, Earth Sciences, Informatics, Mathematics, and Physics		25.3	BMBF
UrbMod	Prof. Dr. H. Schlünzen, Prof. Dr. Jürgen Oßenbrügge	Earth Sciences	2015–2017	1.2	State research funding
Cross-Modal Learning	Prof. Dr. J. Zhang, Prof. Dr. Stefan Wermter	Informatics	2015–2017	1.2	State research funding
ReAd Me!	Prof. Dr. A. Guse, Prof. Dr. Chris Meier	UKE, Chemistry	2015–2017	1.2	State research funding

Research prizes

Congratulations!

ERC grants*

ERC Starting Grant for work on experimental realization of model systems with ultracold atoms in which quantum mechanical phenomena can be observed directly using a high-resolution microscope. Prof. Dr. Henning Moritz (Department of Physics) has been granted € 1.2 million in funding for five years.

ERC Consolidator Grant for the investigation of the properties, structure, and dynamics of complex molecules and biological systems. Prof. Dr. Jochen Küpper (Department of Physics) has been granted € 2 million in funding.

ERC Advanced Grant for the study of fundamental aspects of superconductivity at high temperatures with the visionary aim of developing new materials for loss-free power transport at room temperature. Prof. Dr. Roland Wiesendanger (Department of Physics) has been granted more than € 2 million in funding for five years.

ERC Synergy Grant for the Frontiers in Attosecond X-Ray Science: Imaging and Spectroscopy (AXSIS) project. Prof. Dr. Franz Kärtner and Prof. Dr. Henry Chapman (CFEL, DESY, and Universität Hamburg), Dr. Ralph Aßmann (DESY), and Prof. Dr. Petra Fromme (Arizona State University) have been granted a total of € 14 million in funding for six years.

Best of luck with your research!

Emmy Noether junior research groups

An Emmy Noether junior research group on fourth generation high-brightness electron beam shaping and light source applications led by Prof. Dr. Bernhard Hidding (Department of Physics) has been granted more than € 800,000 in funding.

An Emmy Noether junior research group on how reaction dynamics influence chemical transformations of short-lived intermediates led by Dr. Julia Rehbein (Department of Chemistry) has been granted more than € 1 million in funding.

An Emmy Noether junior research group investigating the structure and regulation of different proteins led by Prof. Dr. Henning Tidow (Department of Chemistry) has been granted more than € 1.25 million in funding.

An Emmy Noether junior research group on atomic-scale spin-engineering and the dynamics of novel nano-magnets led by Dr. Alexander Ako Khajetoorians from the research team headed by Prof. Roland Wiesendanger (Department of Physics) has been granted € 1.8 million in funding.

* The European Research Council (ERC) was established by the European Commission to advance basic research by funding cutting-edge research and scientific excellence without any thematic constraints. Source: <http://www.euburo.de/erc.htm>

MIN doctoral degree regulations for enhanced quality, measurability and transparency

Uniform and transparent procedures are necessary to safeguard and measure the quality of doctoral studies.

The doctoral degree regulations introduced in April 2011 across the entire MIN Faculty form the basis of these for the over 1,400 doctoral students completing a doctorate, a quarter of whom are foreign (as at February 2015). These standardized doctoral degree regulations replace the individual regulations of the six MIN departments and cover many aspects of a new doctoral culture:

- Beside classic individual supervision, provisions have been made for co-supervisors and supervisor panels.
- Supervision agreements and workplace confirmations are obligatory, thereby improving the quality of supervision.
- Doctoral admissions are limited in time so that doctoral studies can be better planned and supervision times optimized.

The MIN doctoral degree regulations take the aims of internationalization and supporting young researchers into special account:

- All important information and forms for doctoral students are available in English.
- Improved networking between the MIN Faculty – and external research institutions has led to the signing of cooperation agreements for joint dissertation supervision.

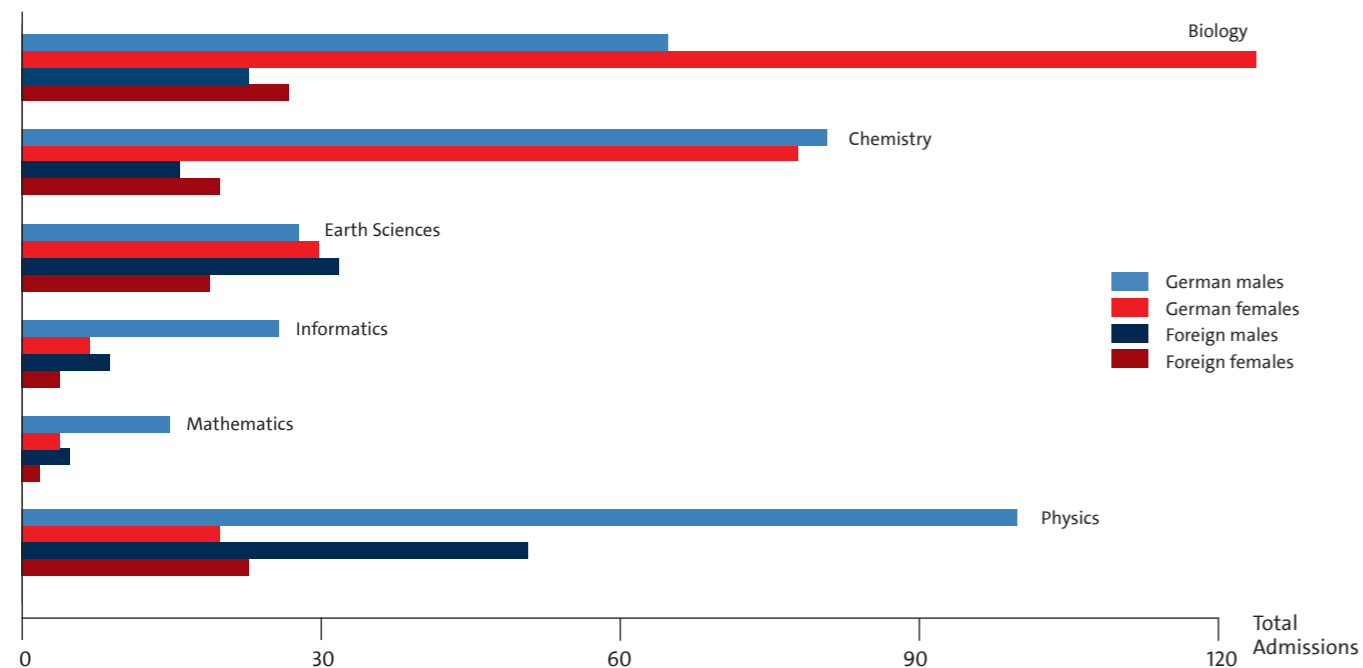
The bilingual web-based IT system, Docata, is used to complete the new administrative tasks arising from the MIN doctoral degree regulations without any additional personnel costs for the departments. Since February 2012,

students have been able to apply for admission online. The examination boards and MIN administration can use and evaluate the data directly. Docata also forms the basis for the doctoral committee's reports.

In the winter semester 2014/15, the MIN Faculty began differentiating between individual and structured doctoral programs, as required for the federal statistics. Doctoral students belonging to a research training group, graduate school, or other structured doctoral program have been enrolled accordingly ever since.

Doctoral students at the MIN Faculty—MIN doctoral degree regulations

Departmental admissions by gender and nationality (January 2013–December 2014)

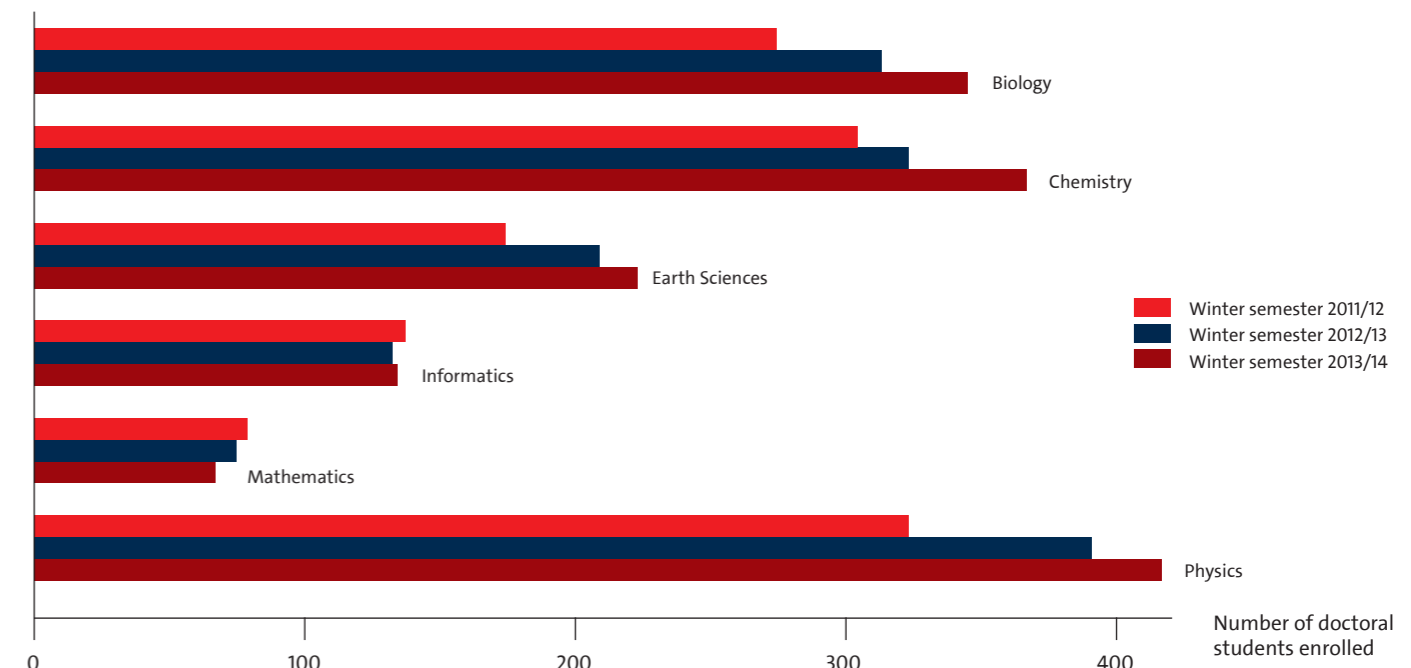


Source: MIN Docata, Office of the Dean

MIN Faculty doctoral students—all doctoral degree regulations

Enrollments by department

Winter semester 2011/12–winter semester 2013/14



Source: PLIS Universität Hamburg

MIN Graduate School

Individual doctorate or structured doctoral program? Which produces the best young researchers? In our Faculty, the answer is clear: both have their advantages and should continue to be offered. The MIN Graduate School supports students in both types of programs with:

- new offers to facilitate the scientific work within doctoral projects and improved information for all faculty doctoral students;
- networking and support for existing graduate schools and research training groups.

Additional offers for doctoral students

The results of a survey on key skills courses sent to more than 900 doctoral students helped the MIN Graduate School plan further courses. In cooperation with countless thematic graduate schools, the MIN Graduate School developed a platform to make the most important information and course offers available to doctoral students in one central location.

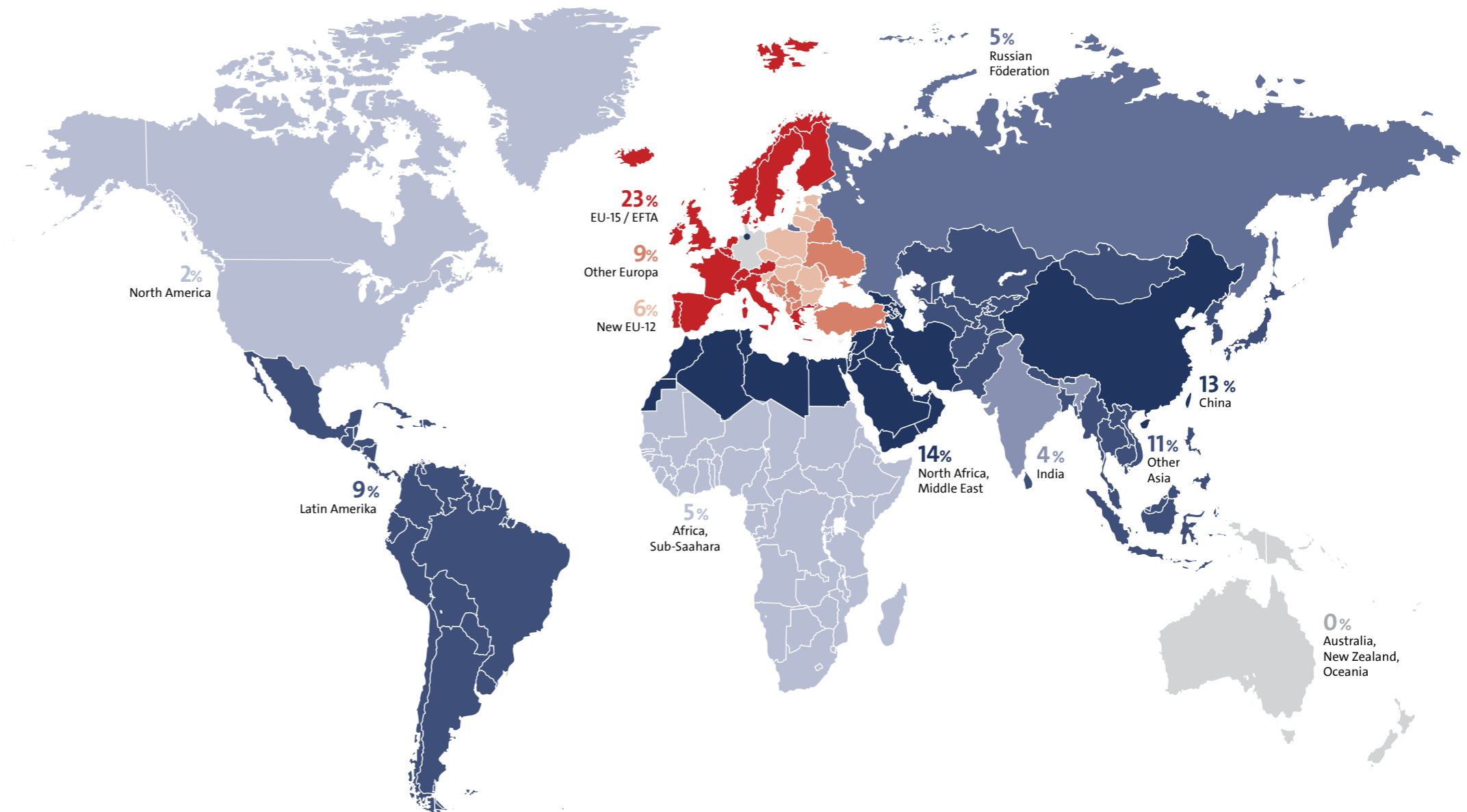
New members of the MIN Graduate School

Currently six graduate schools (BNITM, CUI, HPI, IMPRS-UFast, LCGS, and PHGS) joined the MIN graduate school. These exchange expertise use an internal IT system for optimized organization, and are involved in the MIN doctoral program. Not only externally-funded graduate schools but also initiatives (e.g., on the institute or department level) are welcome to join the MIN Graduate School.

www.min.uni-hamburg.de/en/min-graduiertenschule

Regions of origin of the 375 international doctoral students

Last updated: December 2014



The MIN Graduate School receives DAAD funding from the International Promovieren in Deutschland—for all (IPID4all) program. The following will be offered from 2015:

- additional courses and events on key skills
- funding for doctoral mobility
- additional offers for our 400 foreign doctoral students

MIN studies in Hamburg becoming more attractive

In the past two years, the number of new students has continued to rise. Almost all undergraduate degree programs were filled. Indeed, in many degree programs, more students were accepted than places were available.



Over 1,800 students began an undergraduate degree in 2014

High demand

Due to the high demand for places at the MIN Faculty in Hamburg in addition to the urgent need for MIN graduates, the MIN Faculty resolved to admit 300 additional students in 2013-2015. It received additional funding for these students within the scope of the Higher Education Pact 2020. Two years ago, this figure seemed extremely high. It has meanwhile become clear, however, that the agreed number of additional students was actually exceeded in both 2013 and 2014. In 2013, 1,852 students began an undergraduate degree in the MIN Faculty. In 2014, this figure even rose to 1,859. With a total of 1,721 places in 2014, this corresponds to an admission rate of 108%. In line with the Target and Performance Agreement reached between the Hamburg Office of Science and Research and Universität Hamburg, the number of places in bachelor's programs offered by the MIN Faculty will be reduced. The shortage of places is expected to become more acute as a consequence.

High level of qualification

Demand for admission to master's degree programs rose particularly sharply. As expected, almost all bachelor's graduates of the MIN Faculty went on to complete a master's degree. Following a pronounced increase in the number of new students beginning a bachelor's program in recent years, large contingents are now completing their bachelor's degree every year and beginning a master's degree. Implementation of the Structure and Development Plan (STEP) had reduced the total number of admissions to master's degree programs by 60. At the same time, the number of new students increased by 17% to 859 in the past two years since 2012. Master's degree program are now 94% full (compared to 81% in 2012).

Outstanding service

The academic offices support students and teachers in everyday university life and help organize studies. Good service can contribute decisively to a smooth academic experience.

An external evaluation confirmed the high quality of service offered by our academic offices.

Universitätskolleg—new opportunities for academic orientation

The aim of the MIN sub-projects offered by the BMBF-funded Universitätskolleg is to facilitate the start of studies. The **Teaching Lab** relieves and supports teachers, allowing them to try out new teaching concepts, gain experience, and document, discuss, and transfer what they learn. Developed in cooperation with MIN students, the **Study and Media Competence Online (SuMO)** project imparts study and media skills through web-based training. The **MIN Check** project, in which prospective students can complete self-assessments to learn more about specific program offers, is being developed in collaboration with the MIN departments. The Universitätskolleg also organizes a whole series of school projects.

Teaching Lab

Many teaching projects were offered in 2013/14 to facilitate the start of studies. All departments in the Faculty ran projects lasting six to 15 months. Five further projects will begin in the summer semester 2015. Every year until at least 2016, more than €250,000 will be made available to teachers. Teaching Lab funding not only enables ongoing innovations in teaching; it also allows for new ideas and wide-ranging changes from the outset. The Teaching Lab Coordination Coordinator and the MIN Faculty's E-Learning Office help ensure successful implementation of the applicants' innovative ideas. Both students and teachers rated the Teaching Lab projects funded in the first few years as a success overall. New teaching methods were developed and

established that not only boost students' learning progress but also tangibly improve the quality of classes for teachers. To ensure lasting improvement of teaching in the orientation phase, attempts are being made (and have in part already been successful) to transfer the concepts developed to other classes and thus provide further impetus for the existing discussion on "good" teaching within the departments and at Faculty level.

SuMO – Study and Media Competence Online

To allow students to actively participate in the project, an online course was offered in the summer semester 2014 and its potential evaluated. Preliminary content (wikis, video presentations, etc.) and learning modules on media skills and e-learning are available on the

Universitätskolleg publication, Volume 6: The Teaching Lab.

Funding teaching innovations in the orientation phase. Project progress after two years.

Twelve articles in which teachers from the Departments of Biology, Chemistry, Earth Sciences, Informatics, Mathematics, and Physics receiving funding within the Teaching Lab explain their teaching concepts and experiences with implementation from the core.

Available online at www.universitaetskolleg.uni-hamburg.de/publikationen/uk-schriften-006.pdf [March 2015]



project website at www.sumo.uni-hamburg.de. Beside optimizing websites and wikis for mobile devices, the project also aims to develop new formats that appeal to young students (YouTube, animations, green screen technology), that can be used in the future.

MIN Check

So far, an informatics MIN Check module has been developed and rolled out at different university contact points. Prospective students

can determine their suitability for a degree program, compare it with their interests, and better assess their choice of degree program. MIN Check modules for biology and physics are currently being developed and will also comprise video interviews, a quiz, and an expectation checklist. Development and implementation incl. documentation and final report will take until the end of the project period.



www.min-check.uni-hamburg.de

E-learning in the MIN Faculty

The digitalization of teaching can promote active and self-determined learning and thus make a valuable contribution to handling student diversity. The MIN Faculty uses the CommSy and OLAT e-learning platforms in various ways. In 2014, an average of 4,334 users were active in OLAT at Universität Hamburg and a total of 18,978 active users registered on CommSy. In the MIN-CommSy, an average of 1,464 users were active in around 50 work rooms during this period.

Lecture recordings were once again extremely popular in 2014. The high demand is reflected in the increase in visitors to the Lecture2Go portal (189,050 in 2011; 312,216 in 2012; 386,363 in 2013; 406,835 in 2014). In the winter semester 2013/14, the students surveyed also gave very positive feedback on the recordings.

The e-learning activities have also been shaped by the Universitätskolleg projects. Focus areas included digital scripts, online self-assessments, clickers, and videos preparing students for lab internships and field trips.

The decision to study

“Because the subject interests me” was the reason most frequently given for choosing a degree program at the MIN Faculty. Almost 90 percent of the 1,200 first-year MIN students asked stated that interest in the subject motivated them to choose a particular degree subject. For almost half, this interest was also decisive in their choice of degree program. The next main reasons—“Because the degree subject corresponds with my skills and interests” and “Because I enjoyed the subject at school”—stated by almost 30 percent of respondents as decisive yielded similar results.

In contrast, pragmatic reasons (“Favorable opportunities on the labor market”—seven percent) and recommendations from others (“Because my parents advised me to” and “Because my teachers advised me to”—less than one percent) play a subordinate role.

Selected school projects

- “Light and Schools” physics lab
- “Bridges to Science: Student Chemistry Lab”
- Courses during the school breaks: informatics taster courses, physics FORSCHUNG school holiday course, chemistry school holiday course, Computing in Science open day
- NaT and mint:pink initiatives
- Mathematics Day and Girls Go Math

For details of further courses for schoolchildren, please see www.min.uni-hamburg.de/min-schulportal.html.

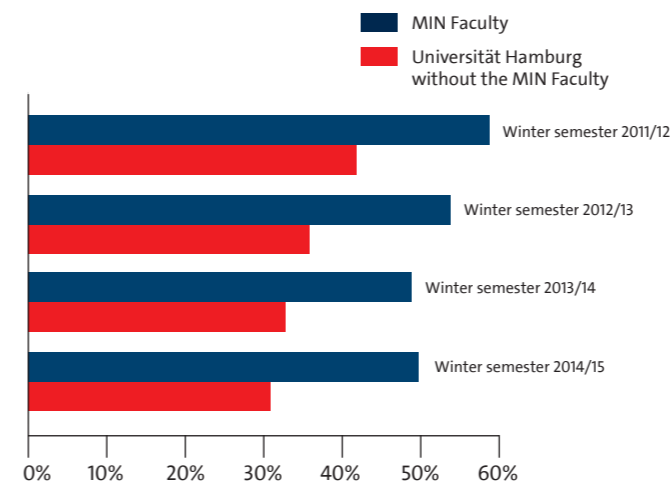
The findings of the MIN survey of new students conducted in the 2013/14 winter semester depicted a student body primarily driven by their interests, who developed an interest in the natural sciences relatively early, and came to university directly from school due to this interest. As expected, there was a discernible correlation between the advanced courses and subject profiles taken at school and the subject subsequently selected.

Correlation between the advanced courses taken in school and the degree subject selected

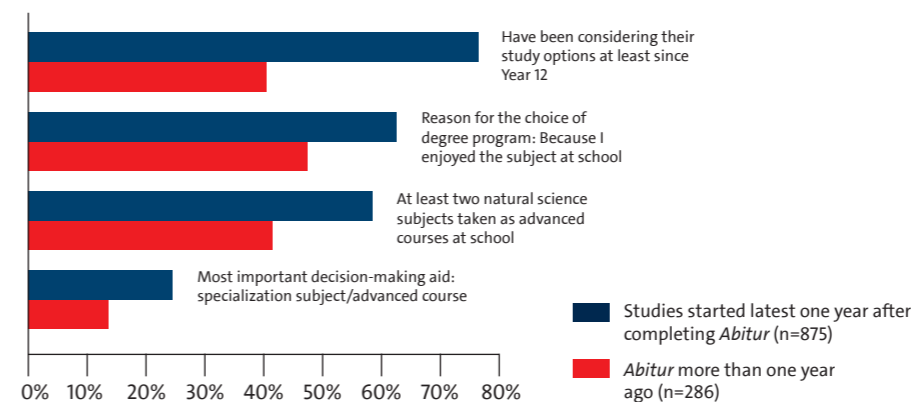
Advanced course/ degree subject	Biology advanced course	Chemistry advanced course	Geography advanced course	Informatics advanced course	Mathematics advanced course	Physics advanced course
Biology	62.7%	11.9%	17.8%	0.8%	26.3%	6.8%
Chemistry	49.8%	39.6%	16.2%	1.2%	57.5%	18.3%
Earth Sciences	38.0%	13.4%	32.4%	2.7%	42.3%	14.0%
Informatics	30.4%	18.9%	13.9%	14.5%	64.7%	33.8%
Mathematics	22.7%	14.9%	9.9%	5.8%	73.6%	32.0%
Physics	31.9%	30.7%	10.2%	5.3%	73.4%	48.1%
MIN total in 2013	38.8%	23.5%	16.8%	5.7%	57.8%	26.5%

The close link between school and university subjects is not merely an expression of an underlying interest; it also reflects a concrete influence on the choice of degree program. Almost three quarters of new students stated that they used their specialization subjects and advanced courses in school to obtain information or to help them choose their degree program. School subjects do not only play a decisive role in absolute frequency; in conjunction with subject advising in the academic offices and departmental websites, upper school courses also receive the highest rating with regard to usefulness as a source of information.

Studies started directly after finishing secondary school



Decision to study by time



Source: 2013/14 MIN survey of new students

To ensure a successful start to their MIN studies at Universität Hamburg, students are able to identify and fill any gaps in their mathematics skills with the OMB+ online math course. www.ombplus.de

The influence of school subjects on the choice of degree program is greater the shorter the period of time between finishing school and starting university. In light of the comparatively high proportion of school leavers who begin their university studies immediately after completing their *Abitur*, this link is particularly significant for the MIN Faculty. Selected differences between students who start their MIN degree program at the latest one year after completing their *Abitur* are illustrated in graph below.

The findings underline the importance of arousing school pupils' interest in the natural sciences early on. Against this backdrop, the MIN Faculty has been committed to supporting cooperation with the schools and the transition from school to university for a number of years now. Every year, more than 1,400 school students visit the MIN Faculty.

International profile

During the report period, a document on the MIN Faculty's international character was prepared outlining developments from the winter semester 2011/12 to the winter semester 2014/15 (winter semester 2014/15 for doctoral students). The MIN Faculty therefore has up-to-date data with which to improve international activities in the fields of research, studies, and teaching, and form the basis for empirical benchmarks. Data is collected at regular intervals in the interests of (quality) enhancement.

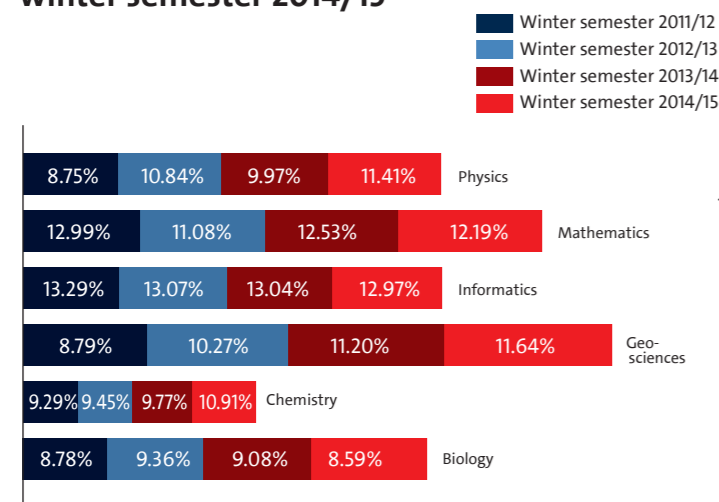
Proportion of international students

The proportion of international students in the MIN Faculty has risen slowly but steadily since 2011. In the winter semester 2014/15,

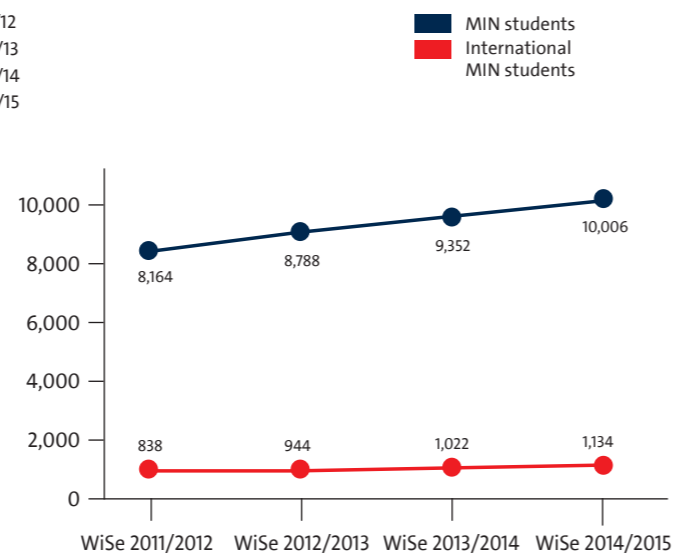
In the document, a distinction is made between two indicators to measure internationality: "international students" and "foreign educated students." "International students" are foreign nationals. "foreign educated students" are foreign nationals who acquired their higher education entrance qualifications outside Germany.

a total of 10,006 students were studying in the MIN Faculty. Of these, 1,134 (11 percent) were foreign nationals.

Proportion of international students by department Winter semester 2011/12–winter semester 2014/15



Number of students Winter semester 2011/12–winter semester 2014/15



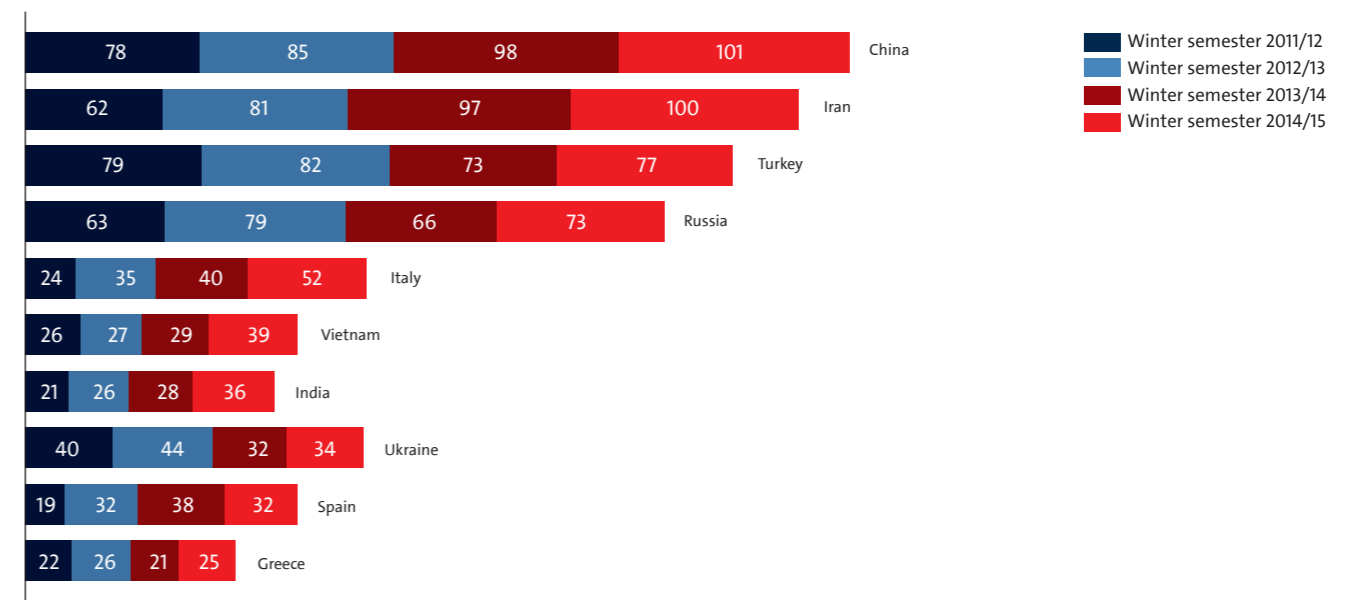
Source: Official student statistics evaluated on 26 March 2015; all degrees; incl. doctoral students; incl. individuals on academic leave; incl. second degrees to comprehensively include master's students

TOP TEN countries of origin among international MIN students

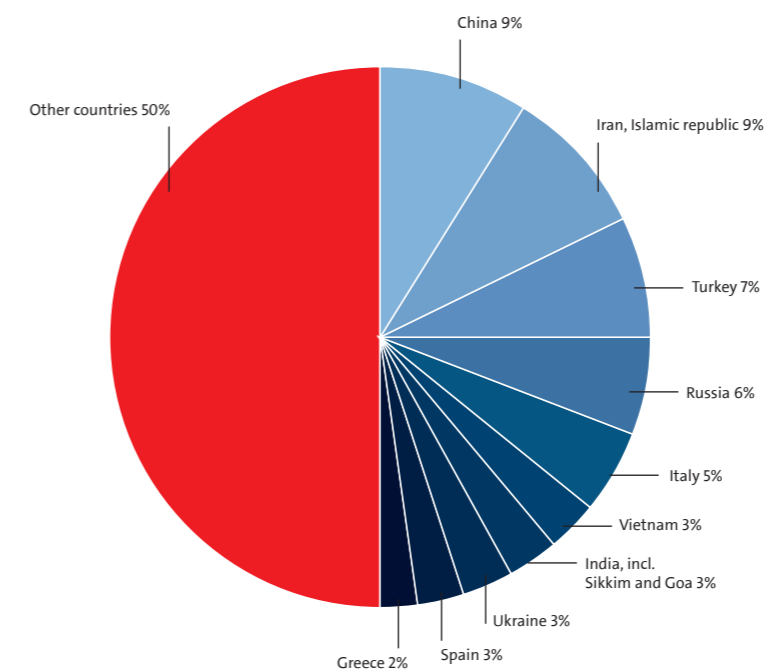
Of the 1,134 international students from 130 countries enrolled in the winter semester 2014/15, the largest groups were from

China (101) and Iran (100), with each comprising around 9 percent of all international MIN students. They were followed by Turkey with around 7 percent (77) and Russia with 6 percent (73).

TOP TEN countries of origin among international students



Countries of origin among international students in the winter semester 2014/15 (%)



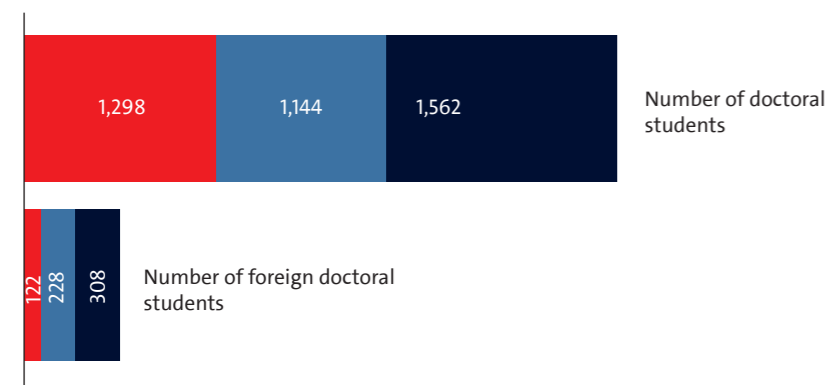
Source: Official student statistics evaluated on 26 March 2015; all degrees; incl. doctoral students; incl. individuals on academic leave; incl. second degrees to comprehensively include master's students

Number of foreign educated doctoral students according to the new doctoral degree regulations (BA-PromO)

In the winter semester 2013/14, 308 of the 1,562 doctoral students at the MIN Faculty were foreign educated. The quota of foreign educated doctoral students rose from 9.4 percent in the winter semester 2011/12 to 19.72 percent in the winter semester 2013/14.



Number of foreign educated doctoral students



Results of a survey of MIN students with study-related stays abroad

In spring 2014, the Office of the Dean conducted an online survey of MIN students with stays abroad experience. The report reflects the international experience of the around 200 respondents and their assessment of the

organization and contents of their studies abroad. Insights could also be gained into shortcomings in the organization of foreign mobility. By identifying these shortcomings, the quality of foreign mobility service can be improved and more students encouraged to spend time abroad.

Memoranda of Understanding

Around 20 Memoranda of Understanding for research programs as well as student, doctoral student, and/or scientist exchanges with

international, non-European universities and non-university institutions were concluded in 2014 within the scope of expansion of the international cooperation networks.



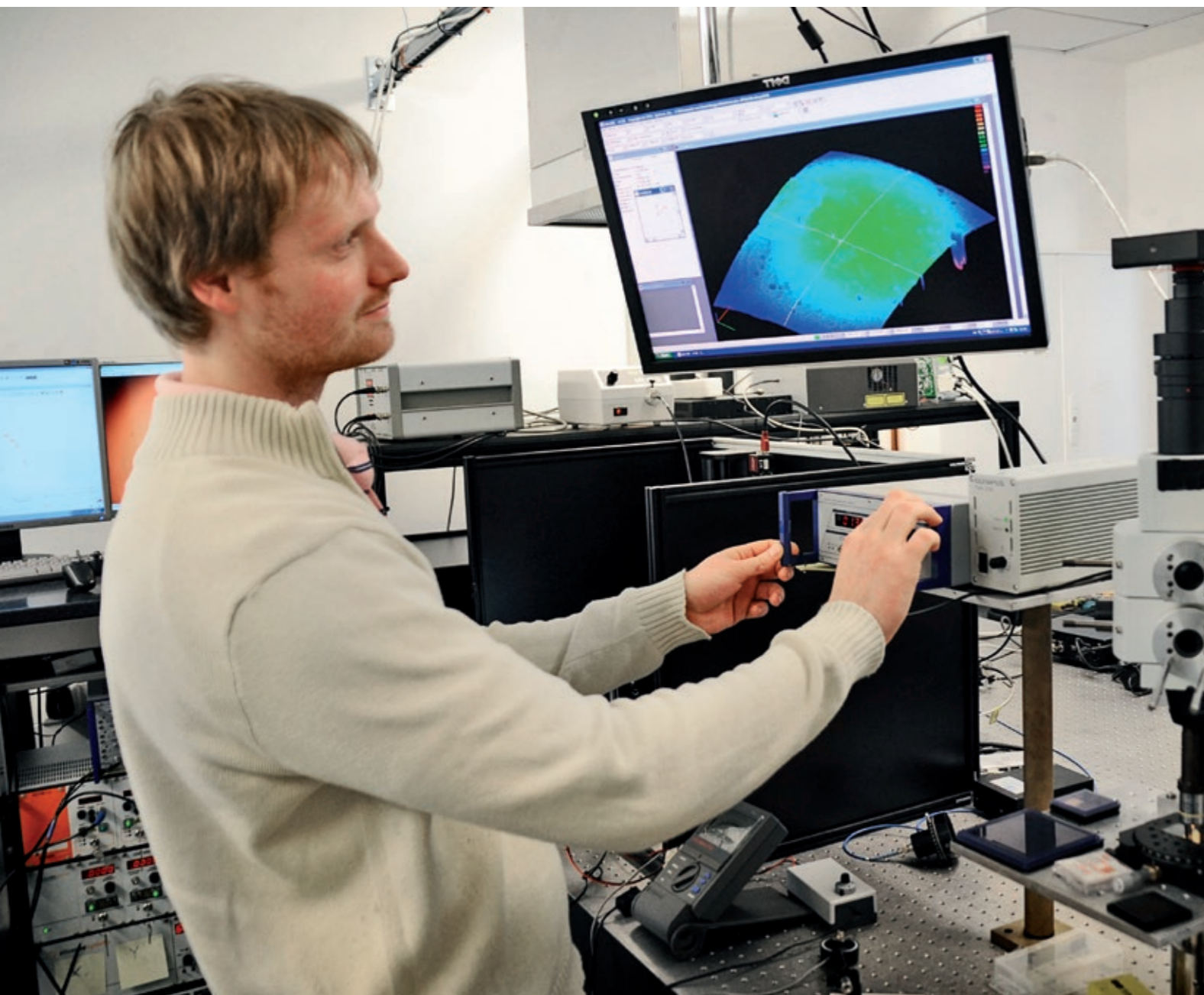
DAAD Exemplary Accreditation 2013 award

The Department of Biology's academic office was awarded second place in the Exemplary Accreditation 2013 competition of the German Academic Exchange Service (DAAD). The prize money of €7,500 will be used to further develop the accreditation system and student mobility. The academic office is now able to use the official DAAD label of "Exemplary Accreditation 2013."

People – the driving force in science

The primary aim of our appointment strategy is to acquire the best researchers and university teachers for Universität Hamburg. We are delighted to be able to welcome 24 new colleagues to our team: in 2013/14, six female and 18 male newly-appointed professors began teaching and researching at the MIN Faculty. This also includes colleagues of the CUI cluster

of excellence and the CSSB cooperation project, allowing this research to continue “at full steam.” The 2015 Leibniz Prize awarded to CUI member Prof. Dr. Henry Chapman honors the outstanding personal achievements of a Hamburg scientist. We are delighted that Mr. Chapman conducts research at our attractive research location.



W2 and W3 appointed professors (alphabetical)

Appointee, Department

Focus

Date employment commenced

Welcome!



Arutyunov, Prof. Dr. Gleb, Physics

W3 Quantum Field Theory / Mathematical Physics

Since 1 October 2014 · Tel: +49 40 8998-2228 · gleb.arutyunov@desy.de

Key research areas: quantum field theories, string theory, and integrable models



Bester, Prof. Dr. Gabriel, CUI

W3 Chemistry of Nanoscopic Systems (Theory)

Since 1 February 2014 · Tel: +49 40 42838-5893 · gabriel.bester@chemie.uni-hamburg.de

Key research areas: development of numerical methods for atomic modeling of nanoscale systems, use of methods to calculate optical properties, among other aspects



Bühler, Prof. Dr. Stefan, Earth Sciences

W3 Applied Meteorology

Since 1 September 2013 · Tel: +49 40 42838-8124 · stefan.buehler@uni-hamburg.de

Key research areas: water vapor and clouds in the climate system, satellite remote sensing, radiative transfer modeling



Gilberger, Prof. Dr. Tim, CSSB/BNI

W3 cellular Biology of Human Parasites

Since 1 July 2014 · Tel: +49 40 42818-486/422 · gilberger@bnitm.de

Key research areas: How can the *Plasmodium falciparum* malaria parasite invade a human's red blood cells? Genetics, cell and system biology methods are used to investigate the molecular basis for the invasion and “kidnapping” of the erythrocyte by the parasites.



Glaubrecht, Prof. Dr. Matthias, Biology

W3 Zoology with a focus on Animal Biodiversity, head of the Zoological Museum

Since 1 October 2014 · Tel: +49 40 42838-2275 · matthias.glaubrecht@uni-hamburg.de

Key research areas: evolutionary systematics using morphological and molecular phylogeny; specifically, the model system of tropical freshwater snails – What are species and how do new species develop? historical biogeography; history of science, in particular the development of evolution theory, biohistory and collection history.

Appointee, Department

Focus

Date employment commenced

**Ignatova, Prof. Dr. Zoya, Chemistry**

W3 Biochemistry/Molecular Biology—focus on RNA Biochemistry
 Since 1 October 2014 · zoya.ignatova@chemie.uni-hamburg.de

Key research areas: gene expression and protein biosynthesis; molecular mechanisms underlying neurodegenerative diseases and other diseases caused by mutations, e.g., cystic fibrosis

**Kaleschke, Prof. Dr. Lars, CLISAP**

W2 Satellite Remote Sensing of Sea Ice
 Since 1 April 2013 · Tel: +49 40 42838-6518 · lars.kaleschke@uni-hamburg.de

Key research areas: sea ice observation and prediction, Arctic and permafrost, ice-ocean-atmosphere interactions, radiation transfer and remote sensing methods, satellite sensors

**Kehr, Prof. Dr. Julia, Biology**

W2 Molecular Plant Genetics
 Since 1 January 2013 · Tel: +49 40 42816-312 · julia.kehr@uni-hamburg.de

Key research areas: systemic signaling in higher plants under stress conditions; RNAs, proteins, and ribonucleoprotein complexes serving as signaling substances

**Krause, Prof. Dr. Andreas, Biology**

W2 Mechanical Wood Technology
 Since 1 June 2013 · Tel: +49 40 73962-623 · andreas.krause@uni-hamburg.de

Key research areas: materials science of lignocellulose, thermoplastic wood composites, physics of wood and wood materials, process technology for the material usage of renewable materials

**Pearson, Prof. Dr. Arwen, CUI**

W3 Biophysics (Experimental)
 Since 1 May 2014 · Tel: +49 40 8998-6650 · arwen.pearson@cfel.de

Key research areas: time-resolved crystallography and small-angle X-ray scattering (SAXS) Mechanistic enzymology; virus capsid structure, assembly, and disassembly; complementary spectroscopy for structural biology

**Reumann, Prof. Dr. Sigrun, Biology**

W3 Structural Infection Biology of Plants
 Since 1 September 2014 · Tel: +49 40 42816-743 · sigrun.reumann@uni-hamburg.de

Key research areas: plant biochemistry, molecular mechanisms of plant innate immunity, cell organelle functions in abiotic stress tolerance, peroxisome biogenesis and degradation

**Schnabel, Prof. Dr. Roman, Physics**

W3 Experimental Physics – in the field of non-linear quantum optics
 Since 1 September 2014 · Tel: +49 40 42838-5102 · roman.schnabel@physnet.uni-hamburg.de

Key research areas: laser with squeezed and limited quantum uncertainty, gravitational wave detection, optical metrology at the quantum limit, optomechanics, quantum cryptography

**Schnittger, Prof. Dr. Arp, Biology**

W3 Developmental Biology of Plants
 Since 1 January 2014 · Tel: +49 40 42816-502 · arp.schnittger@uni-hamburg.de

Key research areas: control of mitotic cell division and growth in plants also under stress conditions, control of meiosis and recombination and their applications in biotechnology and cultivation

**Schroer, Prof. Dr. Christian, Physics/DESY**

W3 X-Ray Nanoscience and X-Ray Optics
 Since 17 June 2014 · Tel: +49 40 8998-2503 · christian.schroer@desy.de

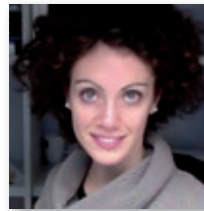
Key research areas: X-ray microscopy and X-ray optics: high-resolution, three-dimensional imaging of physical and chemical processes with synchrotron radiation sources and X-ray free-electron lasers

**Steinicke, Prof. Dr. Frank, Informatics**

W3 Informatics (Human-Computer Interaction)
 Since 1 April 2014 · Tel: +49 40 42883-2439 · steinicke@informatik.uni-hamburg.de

Key research areas: human-computer interaction, interactive media, natural user interfaces, perception-based illusion techniques, virtual reality, and 3D interaction

The following researchers began working at Universität Hamburg as junior professors in 2013/14 (alphabetical)



Bonafede, Prof. Dr. Annalisa, Physics

W1 Radio Astronomy
Since 1 June 2014 · Tel: +49 40 42838-8536 · annalisa.bonafede@hs.uni-hamburg.de

Key research areas: radio observations: interferometric techniques, particle acceleration, and magnetic fields in galaxy clusters



Cordellier, Prof. Dr. Mathilde, Biology

W1 Population Genetics
Since 1 April 2014 · Tel: +49 40 42838-3933 · mathilde.cordellier@uni-hamburg.de

Key research areas: molecular ecology, transcriptomics analyses, decoding of the relationship between gene expression and life history traits, local adaptation in freshwater ecosystems, comparative genomics



Frühling, Prof. Dr. Ulrike, CUI

W1 Ultrafast Quantum Physics with Engineered Light Fields
Since 1 November 2013 · Tel: +49 40 8998-6611 · ulrike.fruehling@desy.de

Key research areas: investigation of ultrafast atomic and molecular physics in the femtosecond range using ultrashort extreme ultraviolet pulses and intense far infrared light pulses



Kirchmair, Prof. Dr. Johannes, Informatics

W1 Applied Bioinformatics
Since 1 September 2014 · Tel: +49 40 42838-7303 · kirchmair@zbh.uni-hamburg.de

Key research areas: development and application of computational methods for lead identification and optimization Focus: prediction of pharmacokinetic properties and virtual screening



Lange, Prof. Dr. Holger, CUI

W1 Investigation of Ultrafast Electronic Processes of Nanoscopic Systems with Femtosecond Laser Spectroscopy
Since 1 November 2013 · Tel: +49 40 42838-9181 · holger.lange@chemie.uni-hamburg.de

Key research areas: optic spectroscopy of nanostructures: investigation of energy and charge transfer in hybrid nanostructures using time-resolved techniques paired with methods development



Mascotto, Prof. Dr. Simone, Chemistry

W1 Inorganic Chemistry
Since 1 April 2014 · Tel: +49 40 42838-4254 · simone.mascotto@chemie.uni-hamburg.de

Key research areas: synthesis of complex porous metal oxides, investigation of the structure of porous solids using neutron and X-ray scattering, solid state electrochemistry, gas physisorption



Tidow, Prof. Dr. Henning, CUI

W1 Structural Biology of Membrane-Bound Proteins
Since 1 March 2014 · Tel: +49 40 42838-8984 · henning.tidow@chemie.uni-hamburg.de

Key research areas: membrane protein structural biology, calcium transport, protein crystallography, electron microscopy, small-angle X-ray scattering (SAXS), time-resolved studies



Trebbin, Prof. Dr. Martin, CUI

W1 Ultrafast Structure Determination in Liquids
Since 1 October 2014 · Tel: +49 40 8998-2613 · martin.trebbin@uni-hamburg.de

Key research areas: physical chemistry, microfluidics and modern X-ray scattering methods; we study the nucleation and growth of nanoparticles and the dynamics of complex systems (colloids, proteins).



Walter, Dr. Wim, Biology

W1 Molecular Plant Physiology
Since 1 April 2014 · Tel: +49 40 42816-323 · wim.walter@uni-hamburg.de

Key research areas: in vitro and in vivo determination of the biophysical and physiological properties of motor proteins; A combination of microscopy, cell biology and genetics methods are applied.

Successful retention negotiations

2013

Iske, Prof. Dr. Armin, Mathematics

W3 Mathematics—focus on the numerics of approximation

2014

Schacht, Prof. Dr. Mathias, Mathematics

W2 Discrete Mathematics

Peck, Prof. Dr. Myron, Biology

W2 Biological Oceanography

Brune, Prof. Dr. Wolfram, Chemistry/HPI

W3 Virology and Immunology

Congratulations!

Junior professors who received positive evaluations

2013

Boels, Prof. Dr. Rutger, Physics

Theoretical Physics with a Focus on String Theory and the Theory of Fundamental Interactions

Diekhof, Prof. Dr. Esther, Biology

Human Biology

Mathey, Prof. Dr. Ludwig, Physics

Theoretical Physics

Mirizzi, Prof. Dr. Alessandro, Physics

Astrophysics—focus on theoretical astrophysics

Perner, Prof. Dr. Mirjam, Biology

Molecular Biology of Microbial Consortia

Rentmeister, Prof. Dr. Andrea, Chemistry

Biochemistry—focus on RNA biochemistry

Schäfer, Prof. Dr. Mike, CliSAP/WiSo Faculty

Media Constructions of Climate Change

2014

Goertsches, Prof. Dr. Oliver, Mathematics

Mathematics—focus on differential geometry

Schwabe, Prof. Dr. Tobias, Chemistry/ZBH

Theoretical Chemistry

Wollner, Prof. Dr. Winnifried, Mathematics

Mathematics—focus on differential equations and optimization environment”

Reiher, Prof. Dr. Christian, Mathematics

Discrete Mathematics

Sander, Prof. Dr. Christian Oliver, Physics

Experimental Particle Physics—focus on dark matter in accelerators

Thank you!

Emeriti

2013

Fredenhagen, Prof. Dr. Klaus, C4 Theoretical Physics

1 August 1990-31 March 2013, Department of Physics

Huber, Prof. Dr. Günter, C4 Laser Physics

8 December 1975-31 March 2013, Department of Physics

Lieberei, Prof. Dr. Reinhard, C4 Crop Biology, Applied Botany

1 April 1989-30 September 2013, Department of Biology

Heuer, Prof. Dr. Rolf-Dieter, C4 Experimental Physics (DESY/CERN)

1 August 1998-30 September 2013, Department of Physics

2014

Christiansen-Much, Prof. Dr. Kerrin, C2 Population Biology

1 April 1994-31 March 2014, Department of Biology

Broekaert, Prof. Dr. Jose, C4 Analytical Chemistry of Heterogeneous Systems

1 April 2002–31 March 2014, Department of Chemistry

Page, Prof. Dr. Bernd, C3 Modeling and Simulation

15 May 1984–31 March 2014, Department of Informatics

Wienand, Prof. Dr. Udo, C4 Applied Molecular Biology of Plants

1 June 1992–31 March 2014, Department of Biology

Duchstein, Prof. Dr. Hans-Jürgen, C3 Toxicology and Pharmacology

1 April 1996–30 September 2014, Department of Chemistry

External appointments accepted**Rentmeister, Prof. Dr. Andrea, Chemistry**

Westfälische Wilhelms-Universität Münster, W2 Cells in Motion (cluster of excellence)

Goertsches, Prof. Dr. Oliver, Mathematics

Ludwig-Maximilians-University Munich, W2 Pure Mathematics

Awarded the academic title of “Professor”

The following academic staff at Universität Hamburg and other research institutes have been given the academic title “Professor”. The University may award the academic distinction “Professor” to those who have achieved outstanding performance (according to §17 HmbHG).

2013

Röhlsberger, Prof. Dr. Ralf, Physics on 10 September 2013

2014

Schmidt-Rhaesa, Prof. Dr. Andreas, Biology on 22 May 2014

Schneider, Prof. Dr. Uwe, Earth Sciences on 9 January 2014

Thiel, Prof. Dr. Ralf, Biology on 10 January 2014

Tenured positions**2013****Hartmann, Prof. Dr. Jens**

W2 Chemistry of Natural Aqueous Solutions (CliSAP)

Hense, Prof. Dr. Inga

W2 Advancement of Coupled Climate Ocean Ecosystem Models (CliSAP)

Schacht, Heisenberg Professor Dr. Mathias

W2 Discrete Mathematics (Department of Mathematics) received a positive DFG evaluation.

2014**Scheffran, Prof. Dr. Jürgen**

W2 Climate Change and Security (CliSAP)

Behrens, Dr. Jörn

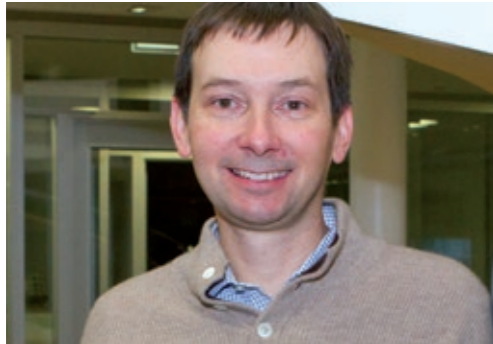
W2 Numerical Methods in the Earth Sciences (CliSAP)

Change in status**2014****Prof. Dr. Wilfried Wurth, Experimental Physics—focus on spectroscopy and diffraction using synchrotron radiation**

(Institute of Experimental Physics, Department of Physics) was appointed as scientific head of the free-electron laser FLASH as part of a joint professorship at DESY and Universität Hamburg.

Congratulations!

Awards and prizes



Henry Chapman awarded the Leibniz Prize 2015

Prof. Dr. Henry Chapman (Department of Physics) has been awarded a prestigious Gottfried Wilhelm Leibniz Prize 2015. With prize money totaling € 2.5 million, it is the highest monetary research award in Germany. The head of the Coherent Imaging Division at the CFEL was awarded the prize for his outstanding accomplishments in the field of X-ray physics and biological physics.

Walid Maalej wins the Microsoft Research Award

A junior professor in the Department of Informatics, Prof. Dr. Walid Maalej, was conferred the Microsoft Research Award of the Software Engineering Innovation Foundation (SEIF) in 2014. He received US \$ 40.000 in prize money for his project "STIMME: Systematic Analysis of User Reviews and Usage Data for Windows Mobile Apps."

Prof. Dr. Günter Huber (Department of Physics) was honored with the **Charles Hard Townes Award 2013**. He accepted the award for his research into laser crystals and their applications in laser systems at the annual meeting of the Optical Society of America (OSA).

Prof. Dr. Alexander Lichtenstein (Department of Physics) was awarded the **Max Born Prize** "for his outstanding contributions to the theory of magnetism and electronic correlations in real materials." The prize money of € 3.000 was conferred in fall 2014.

Prof. Dr. Walid Maalej (junior professor in the Department of Mathematics) was honored by the "Academics" online portal as Young Researcher of the Year 2013. The € 5.000 in prize money was handed over during a ceremony held in Frankfurt/Main on 24 March 2013.

On 24 September 2014, Prof. Dr. Walid Maalej and Dr. Dominik Hermann (Department of Informatics) were named **Junior Fellows of 2014** by the German Informatics Society (Gesellschaft für Informatik e.V.) during the annual INFORMATIK 2014 convention in Stuttgart and honored as leading personalities who stand out for their special contributions to science.

Prof. Dr. R. J. Dwayne Miller (CUI) was awarded the **E. Bright Wilson Award 2014** in spectroscopy by the American Chemical Society (ACS). This award recognizes outstanding accomplishments in fundamental or applied spectroscopy in chemistry. Professor Miller was honored "for the development of femtosecond electron diffraction and coherent spectroscopic methods for the direct observation and control of chemical dynamics at the atomic level."

On 17 December 2014, Prof. Dr. Detlef Stammer (CISAP) was named an **AGU Fellow** by the American Geophysical Union (AGU). He received this honor for his exceptional contributions to earth science research and remote sensing.

Prof. Dr. Roland Wiesendanger (Department of Physics) was awarded the **Heinrich Rohrer Grand Medal**. Conferred for the first time in 2014, this award recognizes outstanding research achievements in the field of nanosciences.

Hamburg Teaching Prize 2012. In July 2013, Prof. Dr. Kai Jensen (Department of Biology) was conferred a total of € 10,000 in prize money for his outstanding and innovative teaching.

Hamburg Teaching Prize 2013. In July 2014, Prof. Dr. Julia Kehr (Department of Biology) received the prize for her blended learning teaching style and the inclusion of topical content and Massive Open Online Course (MOOC) elements in her teaching.

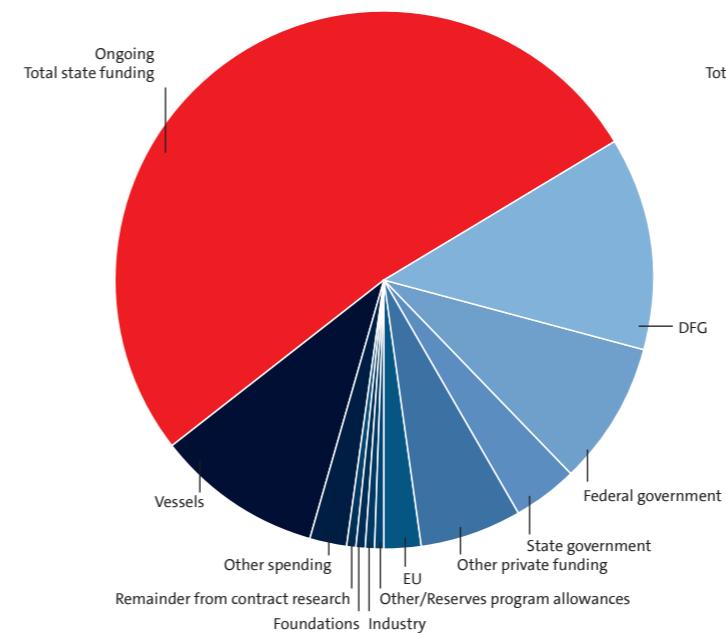
Hamburg Teaching Prize 2013. In July 2014, Prof. Dr. Henning Moritz (Department of Physics) received € 10,000 for his interactive and appealing teaching style.

Varied financing of the MIN Faculty

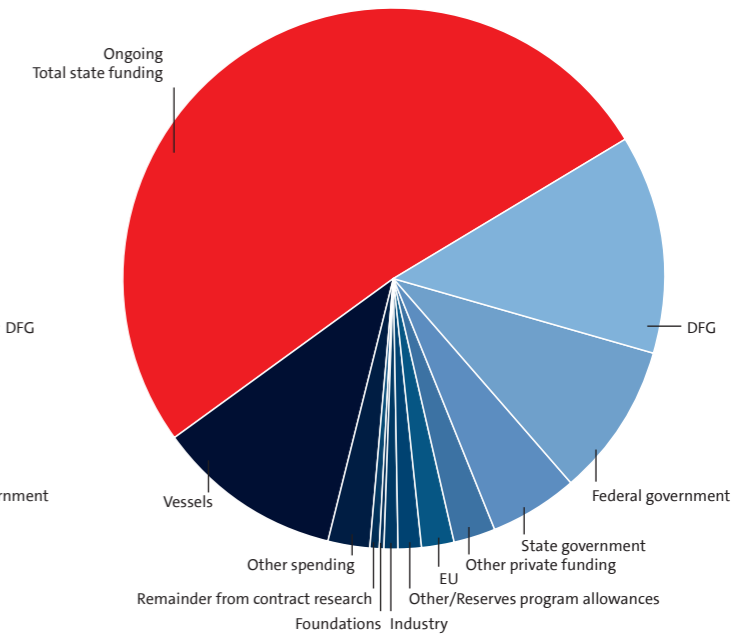
Beside the state funding allocated annually, the MIN Faculty receives additional funding from a range of different sources for its university activities. The lion's share originates from the German Research Foundation (DFG), the German Federal Ministry of Education and Research (BMBF), the European Union (EU), other private funders, and state funding projects.

In 2014, the MIN Faculty's spending totaled € 190.5 million. This comprises € 97.8 million in funding from the state and € 92.7 million in funding from other sources. The five largest sources for third party funding in 2013/14 were the DFG, the federal government, state government, other private funding and the EU.

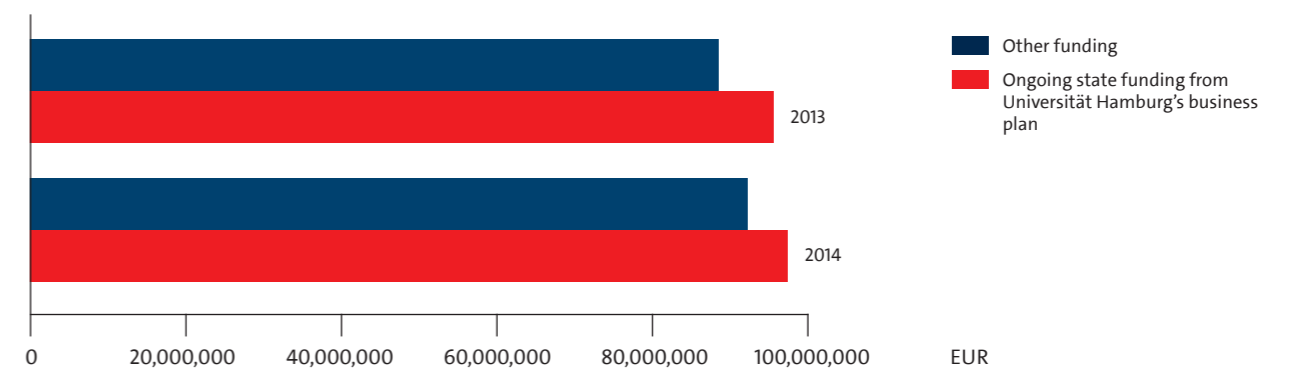
Spending in 2013



Spending in 2014



Spending of ongoing state funding and other funding in 2013–2014



To enable the best possible overview of the MIN Faculty's expenses in 2013/14, spending from all financing sources has been included in the annual report.

* Annual allocation from the FHH ** Funding from the DFG, BMBF, EU, industry, state funding, other income, faculty resources, and private funding bodies. This expanded definition underlines the funding diversity and is oriented to the recommendations of the German Council of Science and Humanities (Wissenschaftsrat).



Equal Opportunity

The MIN Faculty continues to base all structural and personnel decisions on the DFG's Research-Oriented Standards on Gender Equality.

The MIN Faculty was the first faculty at Universität Hamburg to update its equal opportunity policy. In the new MIN Equal Opportunity Plan for Scientific Personnel

2014-2018, an average of fifty percent women on all qualification levels (from students to professors) is defined as a key Faculty aim. What is known as a "cascade model" should provide orientation until this is achieved. In order to meet this ambitious aim, measures for all qualification levels have been updated or partially revised.

Girls' Day 2014 in the Light & Schools physics lab



Academic search procedure—increasing the proportion of female professors

During the reporting period, a total of seven women were appointed as professors to the MIN Faculty. The proportion of academic search procedures ending in the appointment of a woman thus increased significantly compared to the previous year (from 15.8 percent in 2011/12 to 25 percent in 2013/14). The appointment of a total of four women to W3 full professors positions is particularly pleasing.

The academic search procedure analysis launched in 2011 has been continued with a particular view to equal opportunity. At 20 percent, the proportion of female applicants is low from the outset. It is therefore all the more pleasing that significantly more women are being offered appointments. The faculty

must uphold its aim of increasing the proportion of female applicants. Female professors' participation in the academic search procedure was also evaluated for the first time. The evaluation revealed that female colleagues cooperate in search committees twice as often than their male counterparts. Despite this extreme pressure, the MIN Faculty always strives to adhere to the legal quota of 40 percent gender participation in all committees.

The first MIN Equal Opportunity Report featuring detailed accounts of the equal opportunity situation and related work was prepared in December 2014.

www.min.uni-hamburg.de/ueber-die-fakultaet-gleichstellung/pdf/gleichstellungsberichtmin2014.pdf

Proportion of women in academic searches (2011–2014)

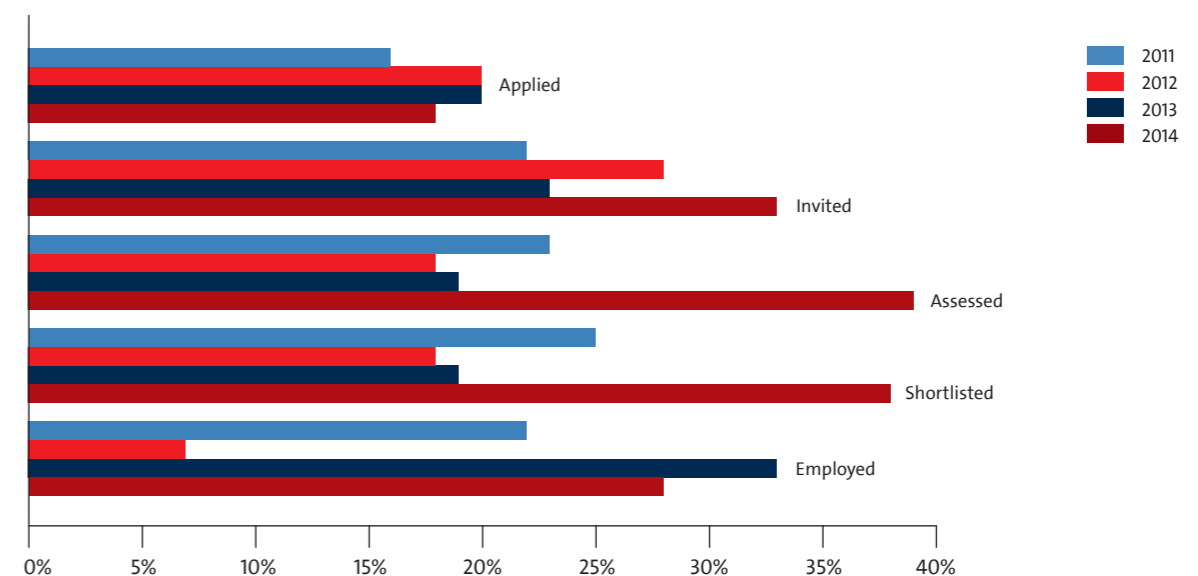


Image: Universität Hamburg/MIN/Light & Schools/Schirok

Measures for female students and researchers

The MIN Faculty has run the Anna Logica program for the advancement of women since 2009. In the reporting period, 22 seminars were offered for almost 250 women. In cooperation with other participants, seminars in English have been added to the program. A new focus was established in 2014 to support women in their career selection by offering different training courses (e.g., certification as a SCRUM Master). Three seminars also specifically targeted female first-year students, allowing them to obtain useful key skills at the start of their studies and to develop their networks. In fall 2014, an English-language seminar on women and management conceived specifically for female postdoctoral students was held for the first time. The four modules were offered in conjunction with the Faculty of Medicine and the CUI cluster of excellence.

The MIN Faculty also takes part in the Hamburg-wide **Pro Exzellenzia** networking and training support program. A total of 22 women (incl. six postdoctoral students) received €320,000 in funding for more than 200 scholarship months. The cooperation with the **UNICA initiative to promote future female leaders** was continued. In 2013/14, almost 50 female graduates applied to the mentoring program to identify and support young female leaders starting their academic

or business career. Nine women from the MIN Faculty were selected for individual funding in the two mentoring rounds. At the same time, a growing number of female academics are requesting English-language mentoring. To meet this demand, the Faculty has developed a mentoring program for the Bahrenfeld campus in cooperation with CUI, SFB 676, SFB 925, PIER, and DESY. The first contingent will begin the program in spring 2015.

Attracting female students

The MIN Faculty continues to participate in the **Girls' and Boys' Days** to great success. In 2014, over 300 children (including 30 boys) participated in more than 30 events. The number of female students has increased steadily. A report on the Faculty's extensive endeavors can be viewed online: www.min.uni-hamburg.de/ueber-die-fakultaet/gleichstellung/pdf/girlsundboysday2014.pdf The **Girls Go Math** mathematics day for upper-school female students is held every spring. Since 2013, the Faculty has also been involved in the Hamburg-wide **mint:pink** program, which encourages middle-school students to choose a natural sciences focus in upper school: The Light & Schools physics school laboratory gets to the bottom of the "pink is not a color" issue and the Institute for Inorganic and Applied Chemistry investigated the uses of crystals for energy storage.



Reconciling work and family

In addition to well-established childcare and individual funding, the English-language information and discussion series on reconciling family and top-class research was launched during the reporting period. Three events have been held so far.

Through the Faculty's efforts, junior professor Prof. Dr. Mirjam Perner from the Department of Biology received funding from the Freundeskreis Zonta-Club Hamburg-Alster e. V. to support the reconciliation of family life and career in academia. Besides recognition and support from the Zonta-Club, Dr. Perner will receive €400 every month for one year.

In October 2013, the MIN Faculty council resolved to improve family friendliness by scheduling meetings from 12:30 p.m. to 4:30 p.m. in future. In 2014, the school holidays in Hamburg were taken into account for the first time in scheduling matters. This should set an example for other committees.

Further structure-enhancing measures

Countless individual measures could be supported with the funds for structure-enhancing measures (Strukturschaffende Maßnahmen zur Gleichstellung, StruMaG) foreseen in the MIN Equal Opportunity Plan. A total of almost 100 individual applications have been received since 2009. Of these, approx. 80% have been approved. A total of over €1 million has been allocated.

The CUI and ClISAP clusters of excellence are increasingly introducing their own equal opportunity measures, e.g., the Mildred Dresselhouse Guest Professorship Program (CUI) and the Career-Oriented Mentoring (COM) program (ClISAP).

On 19 June 2014, the MIN Faculty's Equal Opportunity Representative organized an information and exchange event entitled "Sexual harassment—what's that? There's nothing like that here, is there? And if there is?" for the first time for advisors, responsible individuals, and interested parties from the entire University that proved extremely popular.

Investments in the future

With the decision to modernize and expand Universität Hamburg's Eimsbüttel campus, the framework has been set for further development of the MIN Faculty on Bundesstrasse. This decision became apparent in 2013/14 as the site next to the Geomatikum was prepared for the construction of a new building. The University's climate researchers and geoscientists will in future find the optimal research conditions here.

In the near future, the decisions reached in the past two years regarding the MIN-Forum and Informatics buildings on the other side of Bundesstrasse will also become apparent. The Department of Informatics and central facilities such as the student cafeteria and library will be based here.

Campus Bundesstrasse

In the coming years, two major construction projects will be completed at the Bundesstrasse campus to offer MIN Faculty scientists, students, and employees optimal working conditions in a central location.

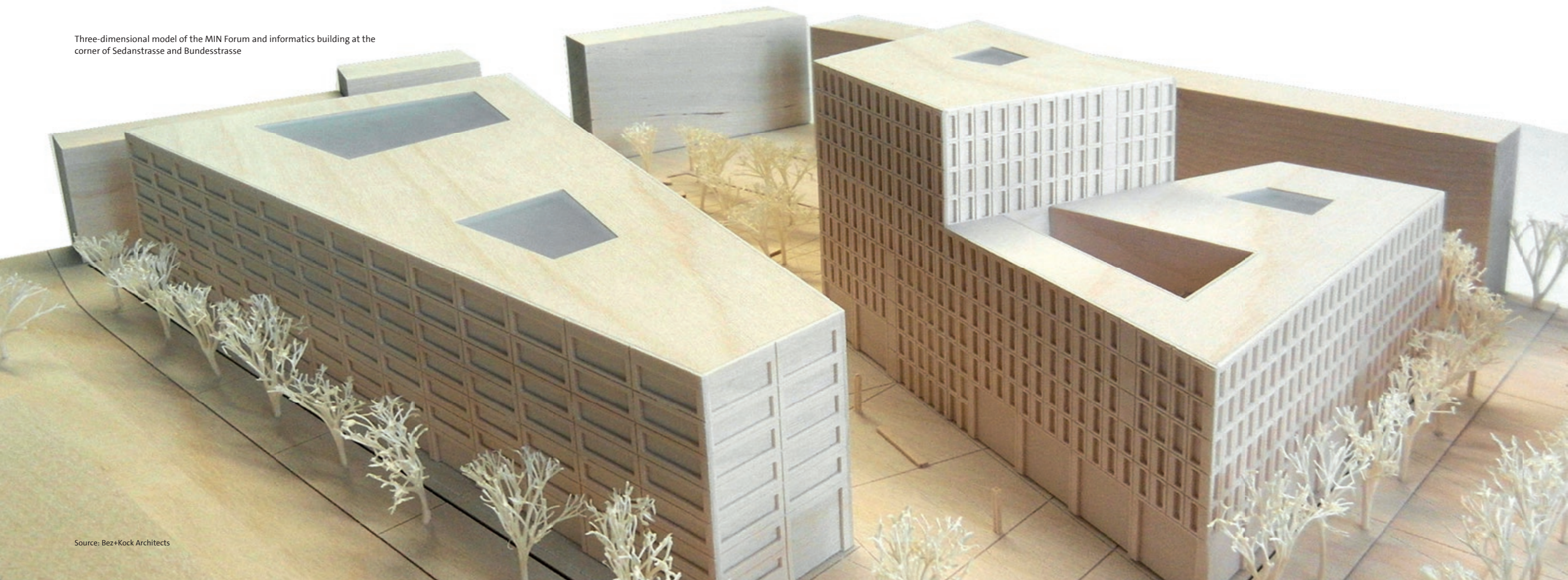
The new building next to the Geomatikum

will provide climate researchers and geoscientists the best working conditions for their research in a central location. Following approval by the Hamburg parliament for construction of the new building next to the Geomatikum in September 2014, the first construction phase could be realized at the start of 2015. The new building is due to be completed in two to three years' time.

MIN-Forum and Informatics buildings

at the corner of Sedanstrasse and Bundesstrasse will house central facilities such as the student cafeteria, library, and lecture halls. In future, the Department of Informatics will also be based at the Bundesstrasse campus. In June 2013, the expert committee selected the winning design. The proposal was particularly impressive with regard to multi-functionality, economy of planning, facade design, and visual impact in public space. At the start of 2015, preliminary planning was completed and design planning began.

Three-dimensional model of the MIN Forum and informatics building at the corner of Sedanstrasse and Bundesstrasse



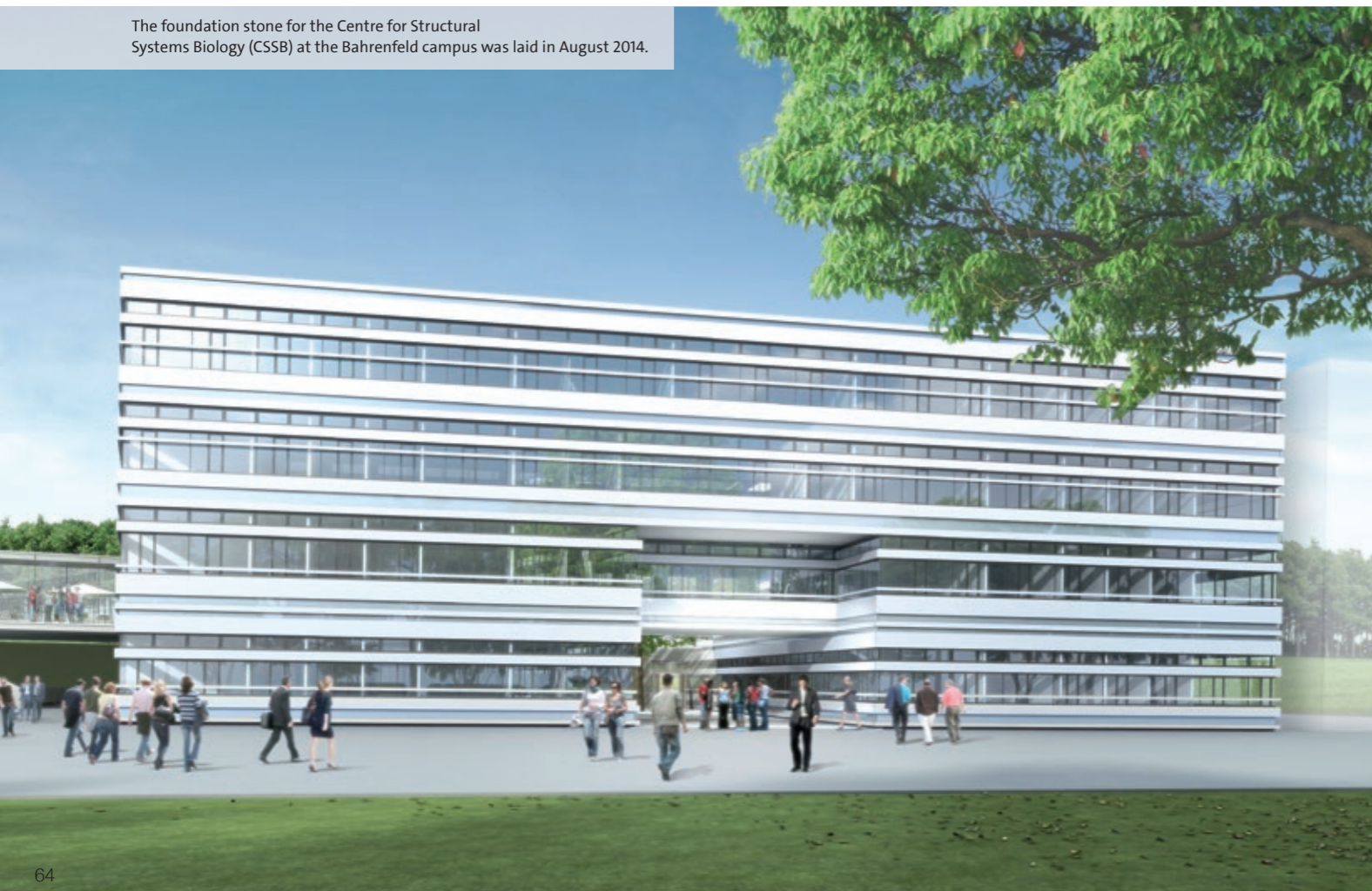
Campus Bahrenfeld

Construction work at the Bahrenfeld campus also proceeds apace, and the political decision to develop Hamburg further as an international location for structure research is beginning to bear fruit. With their innovative ideas and initiatives in the field of structure research, countless MIN scientists—in part in collaboration with external researchers—have contributed to the positive evaluation of applications. Thus, important milestones could be achieved in the planned CHyN and CSSB buildings, and further plans for construction measures are underway. A total of more than €400 million is being invested in new buildings with a usable floor space of around 50,000 square meters.

Following completion of the Center for Optical Quantum Technologies (Zentrum für Optische Quantentechnologien, ZOQ) in 2011 and the Center for Free-Electron Laser Science (CFEL) in 2012, a number of important milestones for further construction projects could be achieved in the past two years. In the future, various construction projects will establish an excellent infrastructure, highlighting just how beneficial the existing cooperation between scientists at Universität Hamburg and external partners are.

Nanostructures and their applications will in future be investigated at the **Center for Hybrid Nanostructures (CHyN)**. Knowledge applicable in the fields of medicine, chemistry, biology, and physics will be gained here and used to develop modern methods of treatment.

The foundation stone for the Centre for Structural Systems Biology (CSSB) at the Bahrenfeld campus was laid in August 2014.



The ground-breaking ceremony for the Center for Hybrid Nanostructures (CHyN) took place in December 2014.



In September 2014, Hamburg's parliament approved the construction budget for the CHyN, securing the financing for this unique research building. The ground-breaking ceremony for the building was held in December 2014 and work is currently under way on the building shell. The building is due to be completed in 2017.

Scientists working at the **Centre for Structural Systems Biology (CSSB)** are devoted to the application of structural and molecular biology methods and imaging techniques in the fields of infection biology and medicine. They strive to better understand the interaction between pathogens and their hosts. This knowledge is essential for the development of treatment methods to combat bacterial and viral pathogens. Researchers from three universities and six research institutes will work together

within a joint initiative. After the building's construction was approved in 2011 within the scope of the agreement between the federal and state government, the ground-breaking ceremony took place in September 2013. The foundation stone was laid in August 2014. The scientists are due to move into the building in 2017.

The CUI cluster of excellence and research center is to become the Hamburg Advanced Research Centre for Bioorganic Chemistry (HARBOR). The building will offer scientists working in the fields of physics, chemistry, (molecular) biology, and biomedicine the optimal working conditions to develop methodological bases for time-resolved experimental and numerical-theoretical investigations into reactions and processes in chemistry, biochemistry, and molecular biology.

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List of abbreviations (selected terms)

APC	Laboratoire AstroParticule et Cosmologie (Astroparticles and Cosmology Laboratory)	LEXI	Landesexzellenzinitiative (State Excellence Initiative)
AVS	American Vacuum Society	LFF	Landesforschungsförderung (state research funding)
AWI	Alfred Wegener Institute for Polar and Marine Research	LHC	Large Hadron Collider
BMBF	Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research)	MIN	Mathematics, Informatics and Natural Sciences
BNITM	Bernhard-Nocht-Institut für Tropenmedizin (Bernhard Nocht Institute for Tropical Medicine)	MIN GS	MIN Graduate School
BSH	Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency)	MPI-M	Max Planck Institute for Meteorology
C-REM	C-Chemistry for Resource and Energy Management	MPSD	Max Planck Institute for the Structure and Dynamics of Matter
CAN	Centrum für Angewandte Nanotechnologie GmbH (Center for Applied Nanotechnology)	NAME	Nanotechnology in Medicine
CEN	Centrum für Erdsystemforschung und Nachhaltigkeit (Center for Earth System Research and Sustainability)	NaT	(Initiative für) Naturwissenschaft und Technik ((Initiative for) Natural Science and Technology)
CERN	Conseil Européen pour la Recherche Nucléaire (European Organization for Nuclear Research)	OLAT	"Online Learning and Training" open-source learning management system
CFEL	Center for Free-Electron Laser Science	PHGS	PIER Helmholtz Graduate School
CHyN	Center for Hybrid Nanostructures	PIER	Partnership for Innovation, Education and Research
CINACS	Cross-modal Interaction in Natural and Artificial Cognitive Systems	Prof.	Professor
CIISAP	Integrated Climate System Analysis and Prediction	QUANTUS	QUANTengase unter Schwerelosigkeit (Quantum Gases in Microgravity)
CMS	Compact Muon Solenoid	ReAd Me!	Regulatory Adenine Nucleotides on Membrane Surfaces
CommSy	Web-based community system to support networked project work	RACE	Regional Atlantic Circulation and Global Change
CSC	Climate Service Center	RASSCAL	Southern Africa Science Service Centre
CSSB	Centrum für strukturelle Systembiologie (Centre for Structural Systems Biology)	SDI	Hamburg School for Structure and Dynamics in Infection
CUI	The Hamburg Centre for Ultrafast Imaging	SFB	Sonderforschungsbereich (collaborative research center)
DAAD	Deutscher Akademischer Austauschdienst (German Academic Exchange Service)	SFB 668	Magnetism from the Single Atom to the Nanostructure
DESY	Deutsches Elektronen-Synchrotron	SFB 676	Particles, Strings, and the Early Universe: the Structure of Matter and Space-Time
DELIGRAH	Degradation for Life Graduate School Hamburg	SFB 925	Light-Induced Dynamics and Control of Correlated Quantum Systems
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)	SFB 986	Tailor-Made Multi-Scale Material Systems—M ³
DKRZ	Deutsches Klimarechenzentrum (German Climate Computing Center)	SFB 950	Manuscript Cultures in Asia, Africa, and Europe
Dr.	Doctor (title)	SICSS	School of Integrated Climate System Sciences
DWD	Deutscher Wetterdienst (German National Meteorological Service)	SIMOS	Structural Biology of Interaction Modules under Stress small graduate group
DZIF	Deutsches Zentrum für Infektionsforschung (German Center for Infection Research)	SuSe	Summer semester
EMBL Hamburg	European Molecular Biology Laboratory	SOPRAN III	Surface Ocean Processes in the Anthropocene
ERC	European Research Council	SPP	Schwerpunktprogramm (Priority Program)
ESTRADE	Estuary and Wetland Research Graduate School Hamburg	SPP 1158	Antarctic Research with Comparative Investigations in Glaciated Areas of the Arctic, Diet of Deep-Sea Macrobenthic Isopods and Polychaetes
FB	Fachbereich (department)	SPP 1386	Nanostructured Thermolectric Materials: Theory, Model Systems, and Controlled Synthesis
FOR	Forschergruppe (research group)	StiNE	Universität Hamburg's study and information network that allows students, tutors, and administrative staff to organize everyday university life.
GRK	Graduiertenkolleg (research training group)	SuLaMa	Sustainable Land Management in South-Western Madagascar
GRK 1247	Cross-Modal Interaction in Natural and Artificial Cognitive Systems	SWS	Semesterwochenstunden (credit hours). One credit hour equates to 45 minutes of teaching or study per week during a semester lecture period.
GRK 1286	Functional Metal-Semiconductor Hybrid Systems	Tel	Telephone number
GRK 1351	Extrasolar Planets and their Host Stars	ThessaPor	Optimization of the Thermochemical Storage Density of Solar Energy using Composite Materials made from Salt Hydrate and Hierarchical Porous Host Materials
GRK 1355	Physics with New Advanced Coherent Radiation Sources	TI Holz	Thünen-Institut für Holzforschung (Thünen Institute of Wood Research)
GRK 1670	Mathematics Inspired by Spring Theory and Quantum Field Theory	TUHH	Hamburg University of Technology
GRK SIMOS	Structural Biology of Interaction Modules under Stress	TVP	Technical support, library staff, administrative personnel
GLYCONIC	Natural Polyphenol Glycosides	UrbMod	Cities in Transition: Development of a Multi-Sectorial Urban Development
HARBOR	Hamburg Advanced Research Centre for Bioorganic Chemistry	Impact Model	
HCU	HafenCity University Hamburg	UKE	University Medical Center Hamburg-Eppendorf
HmbHG	Hamburg Higher Education Act	VGP	(Personnel) appointment plan
HPI	Heinrich Pette Institute	VSA	Full-time study equivalent
HRK	Hochschulrektorenkonferenz (German Rectors' Conference)	VZÄ	Full-time equivalent
HSU	Helmut Schmidt University of the Federal Armed Forces	W2, W3	Different pay grades for university teachers
HZI	Helmholtz-Zentrum für Infektionsforschung (Helmholtz Centre for Infection Research)	Wiki	Short for "WikiWiki" —Hawaiian for "quick." A wiki is an online tool to create (hyper)text.
HZG	Helmholtz-Zentrum Geesthacht, Centre for Materials and Coastal Research	WiSe	Winter semester
IMPRS-ESM	International Max Planck Research School for Earth System Modeling	WiSo Faculty	Faculty of Business, Economics and Social Sciences
IMPRS-UFAST	International Max Planck Research School for Ultrafast Imaging and Structural Dynamics	XFEEL	The European X-Ray Laser Project
IOW	Leibniz Institute for Ostseeforschung Warnemünde (Leibniz Institute for Baltic Sea Research)	ZMAW	Zentrum für Marine und Atmosphärische Wissenschaften (Center for Marine and Atmospheric Sciences)
LCGS	Lothar Collatz School for Computing in Science	ZMNH	Zentrum für Molekulare Neurobiologie (Center for Molecular Neurobiology)
		ZOQ	Zentrum für Optische Quantentechnologien (Center for Optical Quantum Technologies)

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Title image Section of Universität Hamburg's logo, formed of 21 magnetic iron atoms on a copper surface (research group led by Prof. Dr. Roland Wiesendanger, Department of Physics)

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