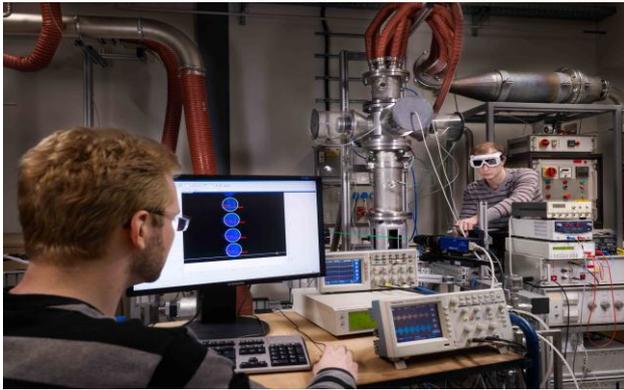


Promotion of Young Scientists

Additional Helmholtz Graduate and Research Schools for Structured Training of Ph. D. Students at KIT



Key competences and expert knowledge: Young scientists acquire both at the Helmholtz Graduate and Research Schools. (Photo: Hardy Müller)

In the next six years, the Helmholtz Association of National Research Centers will fund four Ph. D. programs at Karlsruhe Institute of Technology (KIT). Helmholtz Graduate and Research Schools combine interdisciplinary Ph. D. training in the fields of bioengineering, teratronics, i.e. the interface between electronics and photonics, earth and environment, and energy with the specific conveying of multidisciplinary competences.

Helmholtz Graduate Schools provide a “roof”, under which various disciplines find a home. They are characterized by a clearly structured qualification concept with various modules and extensive support. The Helmholtz Association is funding graduate schools with a maximum of EUR 400,000 per year for up to six years.

The **KIT BioInterfaces International Graduate School** is a joint institution of KIT and the University of Heidelberg. Control of living systems is a fundamental challenge for biomedicine, bioengineering, and synthetic biology. The Helmholtz BioInterface program is aimed at pooling expert knowledge from biology, chemistry, physics, materials sciences, information technology, and micro- and nanotechnologies and transferring it to biomedical applications and industry.

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Based on synergies of various disciplines, the researchers develop new technologies to obtain systematic knowledge about living systems. The curriculum consisting of three blocks additionally conveys major skills for joint research to the Ph. D. students. "We attach great importance to the combination of transdisciplinary training, on the one hand, and specific training, on the other. Conveying of soft skills and cross-disciplinary communication, mobility, and innovation are of high importance," explains the spokesman of the Graduate School, Professor Uwe Strähle from the KIT Institute of Toxicology and Genetics. "Due to this modular type of training, our Ph. D. students can adapt their studies flexibly to their individual skills and needs."

Helmholtz Research Schools promote a structured training of Ph. D. students, which focuses on trans- and multidisciplinary issues. Helmholtz Research Schools are offered to groups of up to 25 Ph. D. students. The Helmholtz Association is funding research schools with up to EUR 300,000 annually over a maximum of six years.

The Helmholtz **Teratronics** Research School is a joint training platform of numerous KIT institutes. "It is the answer to the increasing need of science and industry for a new generation of multidisciplinary researchers and developers with competences covering the complete electromagnetic spectrum, who will be able to face the challenges associated with future electronic-photon systems. These systems will be used in medical engineering, sensor and safety technology, communication as well as in the energy sector," explains the spokesman, Professor Jürg Leuthold, Head of the Institutes of Microstructure Technology and Photonics and Quantum Electronics of KIT. The challenge for the Ph. D. students lies in the development of components and systems operating at highest frequencies in the terahertz range to transmit and process data flows in the terabit range, i.e. the contents of a stack of folders of about 16 km height. For this purpose, the Ph. D. program combines fundamental physical principles of teratronic components and materials science methods for the fabrication of these components, engineering aspects of systems integration, application-specific aspects in medical engineering, and information technology. The young scientists are conveyed competences covering the complete electromagnetic spectrum. Moreover, further training in the areas of management and leadership and scientific teaching and presentation techniques will be offered to the Ph. D. students.

The Helmholtz Research School on **Mechanisms and Interactions of Climate Change in Mountain Regions** (MICMoR) concentrates on the investigation of interactions at the interfaces of the atmosphere, biosphere, pedosphere, and hydrosphere (A-B-PH) in mountain regions, i.e. at the contact points of climate, flora and fauna, water bodies, and soil. “In the seminars, our Ph. D. students can acquire the knowledge they need to be successful in international A-B-PH research,” says spokesman Professor Hans Peter Schmid from the KIT Campus Alpine (Institute of Meteorology and Climate Research, IMK-IFU, Garmisch-Partenkirchen). The infrastructure for MICMoR is provided by the TERENO (Terrestrial Environmental Observatories) project and in particular by the observatory in the Bavarian Alps and alpine foothills that is operated by KIT and the Helmholtz Center in Munich (HMGU). In summer schools and seminars, Ph. D. students acquire capabilities for A-B-PH research. Interdisciplinary mentoring programs conveying leadership qualities and team skills complement the scope of offers. In addition, a research forum will be established to provide both experienced and young scientists with a platform for scientific exchange and to promote expert know-how, experience, internationality, and interdisciplinarity. Apart from the KIT Campus Alpine (IMK-IFU), the Technical University of Munich, the Ludwig Maximilian University of Munich, and the University of Augsburg are involved in this research school. Associated partners are the University of Bayreuth, the University of Würzburg, DLR, and the Helmholtz Center Munich - German Research Center for Environmental Health.

The partners of the **Helmholtz Research School on Energy Scenarios – Construction, Evaluation, and Impacts** are KIT and the German Aerospace Center as well as the University of Stuttgart and the Fraunhofer Institute for Systems and Innovation Research (ISI). “The program is unique, because it promotes a systematic approach to cooperation in integrated scenario research and, at the same time, to structured Ph. D. training,” says spokesman Professor Armin Grunwald from the KIT Institute for Technology Assessment and Systems Analysis. “Highly qualified Ph. Ds. are given the opportunity to start successful careers in industry, science, or politics.” The research school is aimed at conveying to the Ph. D. students a comprehensive understanding of energy scenarios, including modeling, economic, and philosophic aspects. The program among others combines the generation and analysis of energy systems with their evaluation and the investigation of their impacts in energy policy and public debates.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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