

## Max Planck Schools – a joint initiative between German Universities and German Research Organizations

The German scientific system has gained in competitiveness but is lacking centres of attraction with an international radiance. While in countries such as the United Kingdom and the United States excellence is concentrated in research strongholds such as Oxford or Harvard, the best researchers in Germany are often widely scattered: they work throughout the country at various universities or non-university research establishments. The aim of the Max Planck Schools is to bundle the excellence distributed throughout Germany and thus attract the internationally sought-after new generation to the German scientific system. In addition, outstanding scientists from all over Germany collaborate in pioneering topics in the humanities, social, natural and life sciences.

In many political negotiations and intensive discussions with cooperating partners, the Max Planck Society has sharpened and adapted this concept. The German Federal Ministry of Education and Research (BMBF) signalled its support in September 2017. A selection committee chaired by the Presidents of the Max Planck Society, Martin Stratmann, and the German Rectors' Conference, Horst Hippler, selected the three pilot schools from eight proposals with a broad range of topics. Three representatives each from the universities, the Max Planck Society and the other non-university research establishments – Fraunhofer-Gesellschaft, Leibniz Association and Helmholtz Association – discussed the proposals. Eventually, the commission agreed on the three pilot schools.

The three pilot schools address pioneering research fields. Their interdisciplinary problems are reflected in the diversity of disciplines of the participating scientists. A typical school can accept around 20 to 30 students annually. Ideally, in a direct track following the bachelor's degree, students should be led through a multi-disciplinary and multi-location master's degree at a university.

### **MAX PLANCK SCHOOL OF COGNITION**

Cognition research covers topics from disciplines as diverse as psychology, physics, computer science, philosophy, biology and neurology. In addition, this is a rapidly developing research field, which explains why scientists with access to the methods and approaches of the various disciplines are in high demand. The research focuses on questions such as: Which cognitive processes are tied to language and which allow better understanding of other people? What are the genetic mechanisms that contribute to individual differences in cognition? How are different forms of learning and decision-making organized in living beings and how could they be realized in artificial intelligent systems?

### **MAX PLANCK MATTER TO LIFE SCHOOL**

What, exactly, is life? Can lifelike processes, functions and objects be simulated and recreated in the laboratory? The aim of the Max Planck School is to discover how these processes can be described quantitatively and how their rou-



tines can be predicted. Research into the fundamental principles of life will not only greatly influence fields of research such as biophysics, synthetic biology, systems chemistry or bioinformatics, but will also demand ethical, social and philosophical reflection on our basic definitions of life. Questions of responsibility, autonomy and law, as well as addressing definitions of lifelike systems, will therefore also form part of the curriculum.

### MAX PLANCK SCHOOL OF PHOTONICS

Photonics is a key scientific discipline with the purpose of controlling light even better than is now the case, while exploiting its properties to develop non-contact sensors, energy and information carriers. Accordingly, photonics includes a number of sub-disciplines that investigate numerous key questions: Can innovative imaging techniques help diagnose and treat diseases and infections, non-invasively and in real-time? How can optical and electronic nanosystems be coupled to make computer systems more powerful and energy efficient? Can laser-assisted 3D printing be developed to such an extent that products in different industries can be produced using fewer resources and tailored to individual needs? Can optical processes help to make Internet communications more secure against eavesdropping?

The BMBF supports the activities of the universities with a total of 45 million euros; the Max Planck Society is also investing up to 25 million euros over a period of five years. After a preparatory phase, the international announcement and call for students to the schools will follow in autumn 2018; the first year will begin in 2019. Currently, 21 universities and 31 non-academic research establishments are participating in the Max Planck Schools.