

## A good place to study and doing research



▶▶ [www.ovgu.de](http://www.ovgu.de)

Published by:  
Otto von Guericke University Magdeburg, Faculty of Natural Sciences  
Picture credits: if not otherwise specified:  
Archive of the University of Magdeburg and its faculties

Status: 03/2019

### MASTER OF SCIENCE: INTEGRATIVE NEUROSCIENCE

The Center for Behavioral Brain Sciences CBBS overarches the research activities of the neuroscience-oriented professorships and departments in the Faculty of Natural Sciences, the Faculty of Medicine, the Leibniz Institute for Neurobiology (LIN) and the German Center for Neurodegenerative Diseases (DZNE). The CBBS is one of the largest neuroscience research networks in Germany.

Teaching within the international Master program Integrative Neuroscience is provided by professors as well as lecturers from these renowned research institutes. The curriculum format is based on the model of US graduate schools. The English-language program recruits German and international scientists specializing in biology, biochemistry, biosystems technology, chemistry, physics, psychology, computer science, electrical engineering and human and veterinary medicine.

There are attractive professional fields for graduates in the following areas:

- basic research and teaching
- applied research, for example in the fields of medical technology or biotechnology
- science journalism
- science policy

The course, which is strongly research-oriented in terms of both theory and practice, comprises a broad spectrum of neuroscientific areas and technologies. The neurobiological principles of animal and human behavior, and in particular of learning and memory processes, are conveyed within the English-language curriculum.

Cooperation partners:

- Faculty of Medicine of the Otto von Guericke University Magdeburg
- German Center for Neurodegenerative Diseases (DZNE)
- Leibniz Institute for Neurobiology (LIN): molecular, cellular and systemic foundations of learning and memory
- Leibniz Science Campus
- Center for Neuroscientific Innovation and Technology ZENIT GmbH

### MASTER OF SCIENCE: MOLECULAR BIOSYSTEMS

The program Molecular Biosystems aims to generate a comprehensive understanding of complex biological processes, their dynamics and regulatory mechanisms at a system level. For this, complementary knowledge in biochemistry and molecular biology, as well as in system biology, regulation biology, bioinformatics and system theory is taught.

In the Molecular Biosystems program, the structure, function and dynamics of complex biological systems are investigated and quantitatively described, as well as the basics for the targeted modification of biological systems. Molecular and cellular mechanisms are particularly highlighted. In addition to experimental biology, this also requires the understanding and analysis of mathematical models of the underlying biological systems.

In the Molecular Biosystems Master program, teaching is centered on biology and natural sciences and, depending on the student's focus, emphasis is put on systems theory, biotechnological and molecular biology issues. Based on existing mathematical knowledge, the system theoretical knowledge is systematically expanded in order to find new routes to understand complex molecular biosystems. The four-semester program, which is largely interdisciplinary, is offered jointly by the Faculty of Natural Sciences and the Faculty of Process and Systems Engineering. In addition, the Faculty of Mathematics, the Faculty of Computer Science and the Faculty of Electrical Engineering and Information Technology are also involved in the program.

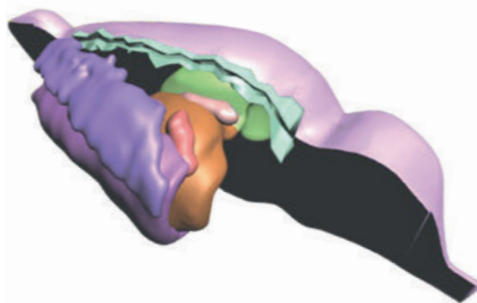


Illustration (Integrative Neuroscience)  
Three-dimensional reconstruction of a rat's brain from serial cuts with insight into cortical and limbic regions.

### PHYSICS AS A TEACHER TRAINING SUBJECT

At Otto von Guericke University Magdeburg teachers are trained to teach in general and vocational schools. There is no numerus clausus for enrollment. The teacher training program (in two subjects) leads via a 6-semester bachelor's and a subsequent 4-semester master's program to the degree of Master of Education (for secondary schools, grammar schools or vocational schools).

The Faculty of Natural Sciences offers physics as a subject in combination with mathematics or technology as well as vocational subjects. Once the master's degree program has been successfully completed, graduates meet the admission requirements for teaching practice.

Information on the teacher training program:  
[www.ovgu.de/Lehramt.html](http://www.ovgu.de/Lehramt.html)

### APPLICATIONS AND ADMISSION REQUIREMENTS

#### ACADEMIC REQUIREMENTS

##### Bachelor's Physics/Psychology

General higher education entrance qualification

##### Master's Physics/Psychology

Relevant Bachelor's degree in Physics/Psychology

##### Master's in Integrative Neuroscience

Relevant Bachelor's degree in Physics, Biology, Medicine, Mathematics or others

##### Master's in Molecular Biosystems

Relevant Bachelor's degree in Biology, Biochemistry, Molecular Biology, Molecular Biotechnology or a closely related subject area

#### APPLICATIONS

##### Application deadline

Application deadline for winter semester is 15th July  
Application deadline for summer semester is 15th January  
(for exceptions visit: [www.fnw.ovgu.de](http://www.fnw.ovgu.de))

##### Bachelor's degree and Master's degree in Psychology

(local admissions restrictions)

##### Master's degree in Integrative Neuroscience

(local admissions restrictions);  
application period: 01 January- 15 March

Submit applications to  
[www.uni-assist.de](http://www.uni-assist.de)

[www.ovgu.de/international.html](http://www.ovgu.de/international.html)

##### Contacts

Faculty of Natural Science  
Otto von Guericke University Magdeburg  
PO BOX 4120  
39106 Magdeburg

### FACULTY OF NATURAL SCIENCES



For further information for accommodation

[www.ovgu.de/en/orga.html](http://www.ovgu.de/en/orga.html)

## Faculty of Natural Sciences



[www.fnw.ovgu.de](http://www.fnw.ovgu.de) ▶▶

In terms of research and teaching, Otto von Guericke University Magdeburg (OVGU) focuses on engineering and the natural sciences, economics and business, plus medicine. In each case mathematics reliably provides the essential foundations. The university, which was established in 1993, also believes that the humanities provide an essential complement for meeting the challenges of today's knowledge based society.

Around 14,000 students, including over 3,000 international students, are enrolled in over 100 programs across the nine faculties. As a dynamic and cosmopolitan university, OVGU offers state-of-the-art facilities, excellent student support and a practical, hands-on education. The university's main areas of research and knowledge transfer are interdisciplinary in nature and strengthened by the neighboring non-university research institutes.

**KEY RESEARCH AREAS**

- Dynamic Systems and Biosystems Technology
- Neurosciences

**KEY KNOWLEDGE TRANSFER AREAS**

- Automotive
- Digital Engineering
- Renewable Energies
- Medical Technology
- Fluidized Bed Technology

**OTTO VON GUERICKE (1602-1686)**

The University of Magdeburg owes its name to the founder of experimental physics and vacuum technology, Otto von Guericke. He lived from 1602 to 1686 and, along with Emperor Otto I and the Baroque composer, Georg Philipp Telemann, is among the most famous personalities to originate from the state capital of Saxony-Anhalt. His interest in scientific connection and methods, and his commitment to the common good are examples that the university community strives to follow.

The term natural sciences covers those sciences dedicated to researching the phenomena of animate and inanimate nature. In our highly-engineered world, a multitude of innovations for technical and societal developments grow out of the natural sciences. As with the engineering disciplines, social science disciplines are making increasing use of natural scientific methods.

The Faculty of Natural Sciences offers interdisciplinary programs with scientific, technical and neuroscientific components. In cooperation with other faculties, the subject of physics can be studied as a minor subject as part of our teacher training program.

**The following academic degrees can be obtained**

- Bachelor of Science/Master of Science: Physics
- Bachelor of Science/Master of Science: Psychology
- Master of Science: Integrative Neuroscience
- Master of Science: Molecular Biosystems
- Dr. rer. nat./Dr. rer. nat. habil.

In addition to interdisciplinary education, the scientific work in the Faculty of Natural Sciences is closely interlinked with the engineering, computer science, medical and neuroscientific research activities of other faculties and institutes.

**Focal areas of research in the Faculty of Natural Sciences**

- Semiconductor nanostructures for micro- and optoelectronics
- Wide band gap semiconductors for optoelectronics and sensor technology
- Epitaxial growth and characterization of layers for components
- Adaptive materials
- Non-linearity and disorder in complex systems
- Physics of soft matter
- Cognitive neuroscience
- Clinical neuropsychology
- General and biological psychology
- Biomedical magnetic resonance (7 Tesla MRT)
- Cortical mapping of cognitive processes
- Functional imaging of cognitive and motivational behavioral performance
- Behavioral and developmental neurobiology

- Systemic and molecular neurobiology of learning and memory processes
- Systems biology
- Molecular mechanisms and regulation of signal transduction

**INSTITUTES**

- Institute of Biology
- Institute of Physics
- Institute of Psychology

**NON-UNIVERSITY COOPERATION PARTNERS IN MAGDEBURG**

- Leibniz Institute for Neurobiology (LIN)
- Fraunhofer Institute for Factory Operation and Automation (IFF)
- Max Planck Institute for the Dynamics of Complex Technical Systems (MPI)

*Image below (Physics)  
Research into modern LED light sources*



Physics is often considered to be the most fundamental of all the natural sciences; at least many representatives of this discipline take this as a fact. With the quotation from Goethe's Faust, "so that I may perceive what-ever holds the world together in its inmost folds" as their motto, physicists study how matter is composed and which forces act between its building blocks.

Physicists are considered to be generalists in the natural sciences. Chemistry, experimentation and theory, philosophical questions, materials science, computer science, biology and biomedicine - concepts and methods from physics can be found everywhere. Accordingly, the curriculum is broadly diversified. The applications and thus the professional job opportunities of the graduates in academia and industry are manifold.

Increasing numbers of attractive professional fields emerge outside the traditional fields of physics. These include software development, banking or information processing, corporate consulting, patenting and publishing, and environmental protection.

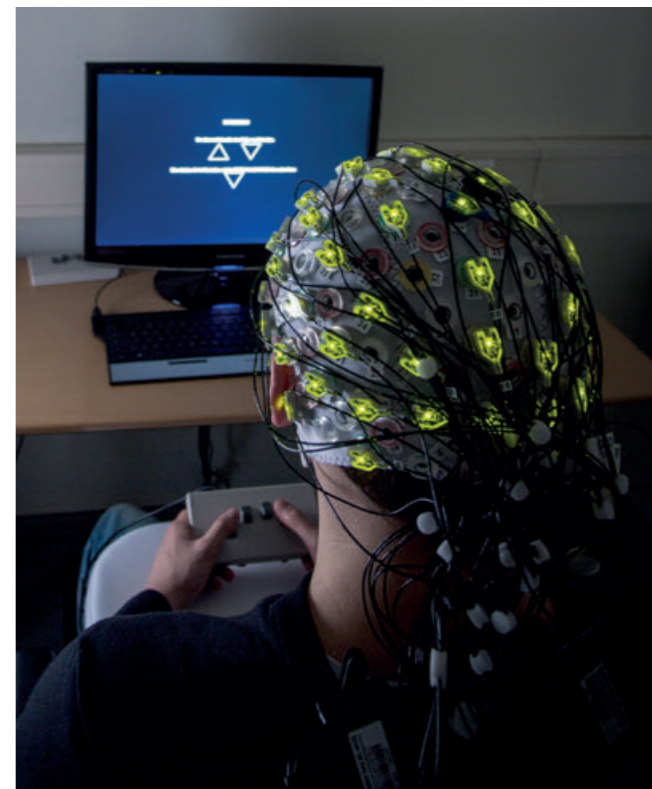
New, exciting and future-oriented areas are, e.g., telecommunications, renewable energies, energy conservation, the solar industry and medical technology. Long term research focuses have been established in the fields of new materials/semiconductors, Collaborative Research Center (SFB 787-nano-photonic), or the Forschungscampus STIMULATE (medical technology for image-guided interventions). The institute operates an epitaxy laboratory for the production of semiconductor nanostructures using metal organic vapour phase epitaxy (MOVPE) and a modern microstructure center for sample characterization through spatially resolved structural and optical methods. These include spatially resolved x-ray diffractometry, transmission and electron microscopy and cathodoluminescence.

In Magdeburg, the Bachelor/Master degree in Physics is offered. The six semester Bachelor's degree includes experimental physics with a laboratory course, mathematics and theoretical physics as well as elective courses such as chemistry, computer science, materials science or engineering mechanics. The Bachelor's degree completes with the

bachelor's thesis. In the four-semester master's program, the student can specialize according to his interests, for example in one of the following fields: semiconductor physics, biophysics, statistical physics. The possibility for interdisciplinary curriculum (medical technology, computer science, neuroscience) is given.

Students are encouraged to extend their personal curriculum according to the catalog of elective and optional courses. The ability to work independently in a specific area is confirmed with the master's thesis. The study completes with the master's thesis including defense.

*Image below (Psychology)  
EEG monitoring in the neuroscience laboratory  
© Center for Behavioural Brain Sciences, OVGU Magdeburg  
Photo: D. Mahler*



We offer a Bachelor's and a Master's program in Psychology. Thus students acquire a first degree after six semesters, the Bachelor of Science.

Within this Bachelor program students acquire expertise in the different areas of psychology, and in particular psychological methodology including statistical methods, neurobiological principles of psychological processes, general psychology, social psychology, clinical psychology, neuropsychology, differential psychology, pedagogic psychology and occupational, industrial and organizational psychology.

Students may then consolidate their knowledge in a four semester Master program. In this part of their studies, which concludes with a master's thesis, they have the opportunity to specialize and expand their expertise in areas, such as clinical neuroscience, cognitive neuroscience or human-technology interaction/environmental psychology. The close connection with neuroscience, a cross-faculty research focus with two collaborative research centers, provides unique opportunities for students, including access to image-guided and neurophysiological methods (magnetic resonance imaging, magneto- and electroencephalography) within their master's thesis. Humanities and social science aspects are addressed in the focus area Human-Technology-Interaction.

A University outpatient psychology ward that is currently being established will provide the students with even more direct insights into clinical psychology and research into psychological disorders.

Graduates in Psychology have access to numerous professional job opportunities in the field of clinical care and counseling, as well as in industry and research.

**More information**  
www.ipsy.ovgu.de