MSc/PhD/MD-PhD Neuroscience Program
at the University of Göttingen

International Max Planck Research School
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Letter from the President

The international Master’s / PhD Programs Molecular Biology and Neurosciences were established by the Georg August University Göttingen, together with the Max Planck Society for the Advancement of Science, in the year 2000 to attract excellent students from all over the world and provide them with an outstanding, research-oriented graduate program. Both programs are taught in English by internationally renowned scientists and offer a high level of services and individual support.

Several hundred students from all over the world apply for the 20 study places available in each of the programs every year. Both programs have introduced and combined elements of international recruitment, competitive admission procedures, advanced curricula, research training, social integration programs, extracurricular support and evaluation procedures into successful working structures. They have achieved excellent recommendations in several external evaluations and have been awarded the 2004 prize for excellent support services for foreign students by the German Federal Foreign Office. For the newly established Georg August University School of Science (GAUSS) and other graduate schools in Göttingen, the Molecular Biology and Neuroscience Programs are considered exemplary and serve as best practice models.

In October 2006, the two programs were awarded the label “Top 10 International Master's Degree Courses made in Germany” by the „Stifterverband für die Deutsche Wissenschaft” and the German Academic Exchange Service (DAAD) in a national contest, in which 121 Master’s programs of 77 universities participated. The Göttingen Molecular Biology and Neuroscience programs were the only Master’s programs in the natural sciences and medicine which received this award. Both programs are members of the Göttingen Graduate School for Neurosciences and Molecular Biosciences (GGNB), which was successful in the recent Excellence Initiative by the German Federal and State Governments to promote science and research at German universities.

Five Göttingen University faculties, three Göttingen Max Planck Institutes as well as the German Primate Center participate in the programs. International guest lecturers are also involved. The Max Planck Society contributes through its newly established International Max Planck Research Schools. Both programs keep close contact with the relevant industries to further enhance the chances of the graduates for a successful professional career.

I would very much like to thank all scientific bodies and institutions for their committed support in establishing these international programs and, last but not least, the German Academic Exchange Service (DAAD), the Lower Saxony Ministry of Science and Culture, and the various generous donors.

The Georg August University of Göttingen is proud of its long-standing international experience the two attractive and innovative programs have already become an integral part of. The university will continue to support these programs within the setting of Göttingen’s lively urban, cultural, and social life, in itself a prerequisite for creative teaching and research.

Prof. Dr. Kurt von Figura
(President of the Georg August University Göttingen)
Letter from the Max Planck Society

The mission of the Max Planck Society is to conduct basic research in science and humanities at the highest level. More than 80 Max Planck Institutes are located on scientific campuses across Germany, most of them close to universities.

Scientific ties between Max Planck Institutes and universities are traditionally strong. In 1998, during the 50th year celebration of the Max Planck Society in Göttingen, the Max Planck Society, together with the Hochschulrektorenkonferenz, launched the International Max Planck Research Schools as a new joint program to further intensify cooperation.

The goals of the International Max Planck Research Schools are

- to attract excellent students from all around the world to intensive Ph.D. training programs in Germany, preparing them for careers in science,
- to integrate Max Planck scientists in top-level scientific training of junior scientists,
- to intensify the ties to the universities owing to the participation of internationally renowned Max Planck scientists in joint teaching activities, and
- to strengthen international relationships by providing individual support to each student and by exposing foreign students to German culture and the German language.

By now, 56 International Max Planck Research Schools have been established involving more than 70 Max Planck Institutes, 50 German universities with 72 participating faculties and more than 15 universities abroad. About 2200 PhD students from 100 countries are presently enrolled. Approximately 1500 PhD students have graduated to date from an International Max Planck Research School.

Since their foundation in the year 2000, the Göttingen International Max Planck Research Schools in Molecular Biology and Neurosciences have met with extraordinary success. Every year, the programs receive hundreds of applications, with the quality of the students consistently being very high. Most students graduated so far have moved on to postdoctoral positions, many at prestigious international institutions. In the past years, the Göttingen Schools received unanimous acclaim during external evaluations and won national awards. For instance they are the only Life Science Programs within Germany that were selected for the “Top Ten International Master’s Degree Courses 2006”. The Schools have also re-shaped the local scientific community, strengthening the ties between the participating institutions, and initiated new scientific collaborations that augment the international reputation of Göttingen as a center of scientific excellence. Furthermore, the Schools served as role models and founding members of the Göttingen Graduate School for Neurosciences and Molecular Biosciences, thus being instrumental for the success of the University in the German Excellence Initiative. We hope that in the years to come the students of the International Max Planck Research Schools will be successful in their professional careers. We also hope that they will remember their training period in Göttingen as an exciting and stimulating phase in their lives.

Peter Gruss
President
Max Planck Society

Erwin Neher
Dean of the IMPRS
Neurosciences
Overview

This yearbook is intended to provide information on the International MSc/PhD/MD-PhD Neuroscience Program in Göttingen, Germany, which was established in 2000. In addition to general information on the program, the yearbook introduces the current year's students, the faculty members, the program committee, and the coordination team.

The program is a member of the Göttingen Graduate School for Neurosciences and Molecular Biosciences (GGNB), which is funded by the Excellence Initiative of the German Federal and State Governments. It is offered by the University of Göttingen, the Max Planck Institute for Biophysical Chemistry (MPIbpc), the Max Planck Institute for Experimental Medicine (MPIem), the Max Planck Institute for Dynamics and Self-Organization (MPIds), the German Primate Center (DPZ), and the European Neuroscience Institute (ENI). Further to their active participation in the Neuroscience Program, the above-mentioned partners closely cooperate in the DFG Research Center for Molecular Physiology of the Brain (CMPB), the Göttingen Center for Molecular Biosciences (GZMB), the Center for Systems Neuroscience (ZNV), in several collaborative research centers (Sonderforschungsbereiche, SFB) and in interdisciplinary doctoral programs (Graduiertenkollegs, GK).

The International MSc/PhD/MD-PhD Neuroscience Program qualifies students for professional work in the neurosciences. The program is open to students from Germany and from abroad, who hold a Bachelor's degree (or equivalent) in the biosciences, medicine, psychology, physics, or related fields. All courses are held in English. Scholarships are available. The academic year starts in October and is preceded by a three week orientation program. Applications may be submitted until January 15 of the year of enrollment. To ensure a high standard of individual training, the number of participants is limited to 20 students per year.

All students initially participate in one year of intensive course work. This first segment of the program comprises lectures, tutorials, seminars, methods courses, and independent, individually supervised research projects (laboratory rotations). The traditional German structure of academic semesters is not followed. The condensed schedule allows students to accumulate 90 credits (ECTS) within one year, which would normally require three semesters.

Subsequently, two separate segments are offered:

- **PhD Program**: Good to excellent results after the first year qualify for direct admission to a three-year doctoral project in one of the participating research groups. The Master's thesis requirement is waived in this case. After successful defense of a doctoral thesis, the degree Doctor of Philosophy (Ph.D.) or the equivalent title Doctor rerum naturalium (Dr. rer. nat.) is conferred. Students who finished medical school can apply for an MD-Ph.D. title.

- **MSc Program**: Alternatively, students may conclude the program with a Master's thesis, based on six months of experimental scientific research. The degree Master of Science (MSc) is awarded upon successful completion of the Master's thesis.

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**Diagram Description**

- **Entry (B.Sc.)**
  - Intensive Course Program 1 Y
  - Master's Thesis 0.5 Y
  - M.Sc.
  - Doctoral Program (Thesis & Courses) 3 Y
  - Ph.D. / Dr. rer. nat. or MD-Ph.D.

**Examinations**

- Year 0
  - Entrance (B.Sc.)
- Year 1
  - Intensive Course Program
- Year 2
  - Master's Thesis
- Year 3
  - Doctoral Program (Thesis & Courses)
- Year 4
  - Thesis Defense
Funding of the Program

The Neuroscience Program thanks the following institutions and funding initiatives, who contributed to the success of the Neuroscience Program:

**DAAD**
German Academic Exchange Service (DAAD), Bonn, Germany, [http://www.daad.de](http://www.daad.de)

*International Degree Programs - Auslandsorientierte Studiengänge (AS)*

**IPP**  made in Germany
International Postgraduate Programs – Internationale Promotionsprogramme (IPP)

**Max Planck Society for the Advancement of Science**, Munich, Germany, [http://www.mpg.de](http://www.mpg.de)

*International Max Planck Research Schools*

**Ministry of Lower Saxony for Science and Culture**, Hannover, Germany, [http://www.mwk.niedersachsen.de/home/](http://www.mwk.niedersachsen.de/home/)

*Innovationsoffensive*

*Doctoral Programs - Promotionsprogramme*

**Stifterverband für die Deutsche Wissenschaft**, Essen, Germany, [http://www.stifterverband.org](http://www.stifterverband.org)

**Exzellenzstiftung zur Förderung der Max-Planck-Gesellschaft**, Munich, Germany, [http://www.exzellenzstiftung.de](http://www.exzellenzstiftung.de)

**Gemeinnützige Hertie-Stiftung**, Frankfurt am Main, Germany, [http://www.ghst.de](http://www.ghst.de)
Donors
The Neuroscience Program thanks the following companies for their donations, which were used to financially support students during the first year of studies:

Bayer AG, Leverkusen, Germany
Carl Zeiss Lichtmikroskopie, Göttingen, Germany
Degussa AG, Düsseldorf, Germany
DeveloGen AG, Göttingen, Germany
Heka Elektronik GmbH, Lambrecht / Pfalz, Germany
Hellma GmbH & Co. KG, Müllheim / Baden, Germany
KWS Saat AG, Einbeck, Germany
Leica Microsystems GmbH, Bensheim, Germany
Luigs & Neumann, Ratingen, Germany
Olympus Europa Holding GmbH, Hamburg, Germany
Roche Diagnostics GmbH, Penzberg, Germany
Sartorius stedim AG, Göttingen, Germany
Solvay Pharmaceuticals, Hannover, Germany
Springer Verlag, Heidelberg, Germany
Vossius & Partner, München, Germany
Intensive Course Program (First Year)

Throughout the first year, current topics in the neurosciences are covered by
- lectures
- tutorials
- methods courses
- laboratory rotations
- seminars

Lectures and Tutorials

A comprehensive lecture series is organized into a sequence of 4-6 week units. The following topics are taught on an advanced level throughout the first year (36 weeks, 4 hours per week):

A. Neuroanatomy
B. Physiology and Basic Statistics
C. Modelling, Autonomous Nervous System, Pharmacology
D. Molecular Biology, Development, and Neurogenetics
E. Sensory and Motor Systems
F. Clinical Neurosciences and Higher Brain Functions
G. Specialization Seminars and Tutorials

Each lecture is accompanied by a tutorial session, where students meet with a tutor in small groups. Tutorials involve exercises, review of lecture material, and discussion of related topics.
Methods Courses

During the first months of the Neuroscience Program, students participate in a series of methods courses to introduce them to principles and practical aspects of basic scientific techniques and the handling of model organisms. The practical courses and tutorials comprise the following topics:

I Neuroanatomy
- comparative development of the vertebrate brain
- cytology and ultrastructure of the human brain
- functional neuroanatomy of sensory and motor systems
- immunocytochemical techniques
- single neuron staining and recording
- invertebrate model systems

II Physiology and Basic Statistics
- introduction to medical statistics
- electrophysiological techniques
- membrane physiology / synaptic transmission
- FLIM / Ca-imaging / FCS techniques
- sensory and behavioral physiology

III Modelling, Autonomous Nervous System, Pharmacology
- neuronal modelling
- behavioral analysis
- neuroendocrinology / neuropharmacology
- protein separation techniques

IV Molecular Biology, Development, and Neurogenetics
- cell culture methods
- methods in molecular biology

Laboratory Rotations

Starting in January, every student carries out three independent research projects (laboratory rotations) in participating laboratories. Each project is individually supervised and involves seven weeks of experimental work, followed by one week for data analysis and presentation. For each project, a report must be completed in the format of a scientific publication. The laboratory rotations must cover at least two different subjects.
Seminars

Seminars start in March. The class meets weekly for two hours to discuss two or three student presentations. The presentations are research reports based on work from the laboratory rotations.

Examinations

After the first year of intensive training, all students take one written and two oral Master’s examinations. The Master’s examinations explore the students’ theoretical background in topics covered by lectures and tutorials. All candidates are examined both in the field of anatomy and physiology in two separate oral exams.

PhD Program

Students who have passed the Master’s examinations with good or excellent results qualify for direct admission to a three-year doctoral project in one of the participating research groups without being required to complete a Master’s thesis first.

The PhD program emphasizes independent research on the part of the students. Doctoral students select three faculty members as their doctoral thesis committee which closely monitors progress and advises students in their research project. Laboratory work is accompanied by seminars and lecture series, a wide variety of advanced methods courses, training in scientific writing and oral presentation skills, courses in intercultural communication, bioethics and research ethics, elective courses, and participation in international conferences or workshops.

At the end of the PhD training program, a doctoral thesis is submitted either in the traditional format, or as a collection of scientific publications in internationally recognized journals along with a general introduction and a discussion of the results. The degree Ph.D. or, alternatively, Dr. rer. nat. will be awarded after the successful defense of the doctoral thesis. Having fulfilled all PhD degree requirements, medical students may apply for the degree of an MD-Ph.D. at the Medical Faculty.
Master’s Program

After the first year of intensive training, students may conclude the program with a six-month thesis project, leading to a Master of Science degree. The thesis project involves experimental work under the supervision of faculty members of the Neuroscience Program. Students have the opportunity to conduct their Master’s thesis project at a research institution abroad.

Orientation, Language Courses, Social Activities

A three-week orientation prior to the program provides assistance and advice for managing day-to-day life, including arrangements for bank account, health insurance, residence permit, housing, and enrollment. Students have the opportunity to meet faculty members and visit laboratories of the participating institutions. In addition, the orientation program informs students about computing and library facilities, the city and university of Göttingen, sports facilities, and cultural events.

An intensive basic language course in German is offered in cooperation with the Lektorat Deutsch als Fremdsprache to facilitate the start in Göttingen. Additional language courses and social activities accompany the program.

Application, Selection, and Admission 2009

Applicants must hold a Bachelor’s degree or equivalent in biology, medicine, psychology, physics, or related fields. Applicants who are not native speakers of English should demonstrate adequate competence of the English language by acceptable results in an internationally recognized test.

In the year 2009, the coordination office received 183 applications from 31 countries.

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<thead>
<tr>
<th>Continent</th>
<th>Applications</th>
<th>Admissions</th>
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<tr>
<td>Europe (total)</td>
<td>42</td>
<td>5</td>
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<tr>
<td>Germany</td>
<td>17</td>
<td>2</td>
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<tr>
<td>other West Europe</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>East Europe</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>America (total)</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>North America</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Central/South America</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Africa (total)</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>North Africa</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Central/South Africa</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Asia (total)</td>
<td>114</td>
<td>5</td>
</tr>
<tr>
<td>Near East</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Central Asia/ Far East</td>
<td>82</td>
<td>5</td>
</tr>
<tr>
<td>Australia</td>
<td>0</td>
<td>0</td>
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## Students 2009/2010

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Country</th>
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</thead>
<tbody>
<tr>
<td>Dorota Badowska</td>
<td>Poland</td>
</tr>
<tr>
<td>Sarah-Anna Hescham</td>
<td>Germany</td>
</tr>
<tr>
<td>Hung-En Hsia</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Ziqiang Huang</td>
<td>P. R. China</td>
</tr>
<tr>
<td>Oleksandr Korolov</td>
<td>Ukraine</td>
</tr>
<tr>
<td>Este Leidmaa</td>
<td>Estonia</td>
</tr>
<tr>
<td>Chaitali Mukherjee</td>
<td>India</td>
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<tr>
<td>Pooja Rao</td>
<td>India</td>
</tr>
<tr>
<td>Christina Reetz</td>
<td>Germany</td>
</tr>
<tr>
<td>Anthony Hiu King Tsang</td>
<td>Hong Kong</td>
</tr>
<tr>
<td>Diana Elizabeth Urrego Blanco</td>
<td>Colombia</td>
</tr>
</tbody>
</table>
Dorota Badowska

EDUCATION
College / University
University of Warsaw

Highest Degree
B.Sc.

Major Subjects
Biotechnology, Psychology

Lab Experience
Animal Physiology Department in the field of Chronobiology

Projects / Research
Analysis of the daily expression pattern of proteins CRY1 and CRY2 in the male reproductive system of mice

Scholarships / Awards
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

Sarah-Anna Hescham

EDUCATION
College / University:
2006 – 2009 Albertus-Magnus Universität Köln

Highest Degree:
B.Sc.

Major Subjects:
Neuroscience

Lab Experience:
Basic techniques in biochemistry and behavioural testing

Projects / Research:
2008: The effects of exercise on learning and memory in a rat model of developmental stress
2009: Effect of exercise on synaptophysin and calcium/calmodulin-dependent protein kinase II levels in prefrontal cortex and hippocampus of a rat model of developmental stress

Scholarships:
2009 – 2010: International Max Planck Research School support
2008: Travel stipend from the German Academic Exchange Service
Hung-En Hsia

EDUCATION

College / University
National Taiwan University

Highest Degree:
B.Sc.

Major Subjects:
Biochemical Science and Technology

Lab Experience:
Basic methods in molecular biology, biochemistry, animal models (mice)

Projects / Research:
The Molecular Mechanisms Underlying Stem Cells Therapy for Alzheimer’s Disease

Scholarships / Awards
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
2008 - 2009: Fellowship for undergraduate students research, National Science Council, Taiwan
2007 and 2009: Presidential Award, National Taiwan University

Ziqiang Huang

EDUCATION

College / University
Sep 04 – Jul 08: College of Life Sciences, Nankai University

Highest Degree:
B.Sc.

Major Subjects:
Biological Science

Lab Experience:
Aug 08 – Oct 08: Centre for learning and memory, School of Medicine, Tsinghua University
Jul 06 – Jul 08: Lab of Nucleic Acid Biochemistry, Dept. of Biochemistry and Molecular Biology, College of Life Science, Nankai University
Mar 07 – Sep 07: “100 Projects” of Creative Research for the Undergraduates of Nankai University

Projects / Research:
Research on the Method of Cattle and Sheep Breeds Identification by Molecular Biology (advisor: Prof. Xitai Huang)
Study the Effect of Folic Acid on the Growth and Development of Primary Cortex Neurons in Culture (advisor: Dr. Yanqiang Liu)

Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
2004 – 2005: 2nd Prize of Excellent Undergraduate Scholarship of Nankai University
Este Leidmaa

EDUCATION
College / University
University of Tartu
Highest Degree:
B.Sc.
Major Subjects:
Psychology, Biomedicine
Lab Experience:
Behavioural phenotyping methods in mice (motility box test, rota-rod, dynamometer test, social interaction test, tube test), PCR genotyping and RT-PCR, Primer designing, RNA extraction and quantification
Projects / Research:
Sep 08 – Sep 09: Further characterization of Lsamp deficient mice using RNA expression analysis and tests estimating social behaviour
Jan 07 – May 08: „Characterization of Lsamp deficient mice in motor activity and social behaviour tests“
Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
2008 – 2009: Scholarship from the University of Tartu for laboratory work with Lsamp deficient mouse
2006 – 2009: Scholarship from the University of Tartu for excellent academic results

Oleksandr Korolov

EDUCATION
College / University
National Taras Shevchenko University of Kyiv
Highest Degree:
B.Sc.
Major Subjects:
Biology, Genetics
Lab Experience:
Various techniques in molecular biology and biochemistry
Projects / Research:
Study of interaction of various isoforms of intersectin 1 with partner proteins in the Institute of Molecular Biology and Genetics of National Academy of Sciences of Ukraine
Scholarships:
2009 – 2010 Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
Chaitali Mukherjee

EDUCATION

College / University
Mount Carmel College, (autonomous) affiliated to Bangalore University

Highest Degree:
B.Sc.

Major Subjects:
Chemistry, Zoology, Microbiology

Lab Experience:
Molecular biological techniques: restriction digestion, plasmid extraction, PCR, protein chemistry, animal cell lines for transfection and gene expression, ELISA, radial / double diffusion assay, chromatography, spectroscopy, gel electrophoresis, microbiological techniques, staining techniques, streaking, microbial cell culture, replica plating, enzyme extraction, biochemical assays, quality control tests for food and water.

Projects / Research:
Biodiversity of earth worm species at Mount Carmel College campus and vermicomposting
Eco toxicity-effect of mining on environment, health, and hygiene at Kolar Gold fields
Anti bacterial and anti fungal effect of vermicompost
Role of Currency as a fomite in the transfer of diseases
Isolation of yeast strains and their molecular characterization

Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society

Pooja Rao

EDUCATION

College / University
Maharashtra University of Health Sciences

Highest Degree:
M.B.B.S.

Major Subjects:
Medicine

Lab Experience:
Basic molecular biology (molecular cloning, protein expression/purification), immunology (antibody generation, western blotting), and mammalian cell culture techniques

Projects / Research:
July 2008 - May 2009: Worked on “Melanocyte keratinocyte interactions in Vitiligo” at the National Institute of Immunology, New Delhi

Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
Christina Reetz

EDUCATION
College / University
since 2006: University of Göttingen

Highest Degree:
B.Sc.

Major Subjects:
Molecular Medicine

Lab Experience:
Basic techniques in biochemistry, molecular biology, cell culture, fluorescence microscopy

Projects / Research:
May – July 2009: Investigation of EPO effects on primary murine hippocampal neurons in culture in terms of differentiation/maturation and synaptic function (MPI for Experimental Medicine, Division of Clinical Neurosciences)
2008 – 2009: several internships at different research departments (bioinorganic chemistry, stem cell biology, tumor biology, immunology)

Scholarships:
2009 – 2010: International Max Planck Research School support
since 2006: Studienstiftung des deutschen Volkes

Anthony Tsang

EDUCATION
College / University
2006 – 2009: The Hong Kong University of Science and Technology (HKUST)
2003 – 2006: The Chinese University of Hong Kong (CUHK)

Highest Degree:
Master of Philosophy in Biochemistry

Major Subjects:
Biology, Biochemistry, Neuroscience

Lab Experience:
Biochemistry techniques, cell line, primary tissue culture, mice and zebrafish handling

Projects / Research:
Expression profiling functional characterization of a peptide hormone Pituitary Adenylate Cyclase Activating Peptide (PACAP) in the development of zebrafish ovary

Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
2008 – 2009: University Grant Council (UGC) Research Travel Grant (HKUST)
2006 – 2009: Research Postgraduate Studentship (HKUST)
2004 – 2005: The Department/Program Scholarship, Shaw College (CUHK)
Diana Elizabeth Urrego Blanco

EDUCATION

College / University
Universidad Nacional de Colombia, Bogotá

Highest Degree:
B.Sc. in Biology

Major Subjects:
Cell Biology, Animal Physiology, Membrane Biology, Neurophysiology

Lab Experience:
Basic techniques in histology and microscopy, stereotaxic surgery, extracellular recording on Motor Cortex and Patch Clamp recording

Projects / Research:
2008: Structural changes on pyramidal neurons from the primary motor cortex after facial nerve injury in mice and rats

Scholarships:
2009 – 2010: Stipend of the Excellence Foundation for the Promotion of the Max Planck Society
Aug-Nov 2008: Stipend of the Max Planck Institute for Experimental Medicine (internship)
Jan 2007 - June 2008: Universidad Nacional de Colombia (to upper 10% class students)
<table>
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<tr>
<th>Name</th>
<th>Institute</th>
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<td>Mathias Bähr</td>
<td>Neurology</td>
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<td>Thomas Bayer</td>
<td>Molecular Psychiatry</td>
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<td>Nils Brose</td>
<td>Molecular Neurobiology</td>
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<td>Wolfgang Brück</td>
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<td>Wolfgang Engel</td>
<td>Human Genetics</td>
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<td>Molecular Neurobiology of Behavior</td>
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<td>Ralf Heinrich</td>
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<td>Swen Hülsmann</td>
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<td>Reinhard Jahn</td>
<td>Neurobiology</td>
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<td>Till Marquardt</td>
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<td>Tobias Moser</td>
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<td>Luis Pardo</td>
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<td>Mikael Simons</td>
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<td>Judith Stegmüller</td>
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<td>Nicole von Steinbüchel</td>
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<td>Victor Tarabykin</td>
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<td>Stefan Treue</td>
<td>Cognitive Neuroscience and Biological Psychology</td>
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<td>Andreas Wodarz</td>
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<td>Fred Wolf</td>
<td>Nonlinear Dynamics</td>
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<td>Fred Wouters</td>
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U Göttingen = Georg August University, MPI bpc = Max Planck Institute for Biophysical Chemistry, MPI em = Max Planck Institute for Experimental Medicine, MPI ds = Max Planck Institute for Dynamics and Self-Organization, DPZ = German Primate Center, ENI = European Neuroscience Institute
Mathias Bähr

Professor of Neurology

- 1985 MD, University of Tübingen Medical School, Training in Neurology at University Hospitals in Tübingen and Düsseldorf
- DFG and Max Planck Fellow at the Max Planck Institute for Developmental Biology Tübingen and at the Department of Anatomy and Cell Biology, Washington University St.Louis
- Schilling-Foundation Professor for Clinical and Experimental Neurology, University of Tübingen
- Director at the Department of Neurology, University of Göttingen since 2001

Major Research Interests

We are interested to understand 2 basic questions in cellular and molecular neurobiology:
1. Which factors support survival of adult CNS neurons?
2. What kills these cells under pathological conditions?

Up to now, only little is known about the mechanisms that support survival of a postmitotic cell like a human neuron for eventually more than 100 years under physiological conditions. However, by examining the molecular regulation of cell survival and cell death during development and in the lesioned adult CNS, one may get some clues to answer this question.

In our group, several *in vitro* and *in vivo* model systems are used which allow examination of neuronal de- and regeneration. Our basic model is the rodent retino-tectal projection. Here, we can study development, de- and regeneration of the respective projection neurons, the retinal ganglion cells (RGCs) in single cell cultures, explants or *in vivo*. Transection or crush-axotomy of the optic nerve induces retrograde death more than 80% of RGCs within two weeks. This secondary cell loss is mainly apoptotic and involves specific changes in gene expression pattern of transcription factors (e.g. c-jun or ATF-2), pro- and anti-apoptotic genes (e.g. bcl-2 or bax) and growth-associated genes (like GAP-43).

Thus, long term survival and initiation of regeneration programmes of RGCs critically depends on inhibition of apoptotic cell death. To that end, we have used a variety of techniques to interfere with the cell death cascades that follow lesions of the optic nerve in adult rats. Inhibition of neuronal apoptosis can be afforded by pharmacological administration of trophic factors or by gene therapy approaches using adeno- or adeno-associated virus vectors that can deliver neurotrophic or anti-apoptotic factors directly into neurons or into surrounding glial cells. These, and other new strategies like using peptide-transduction-domains to deliver anti-apoptotic proteins across the blood-brain-barrier are now used to develop new experimental therapy strategies in animal models of human neurological disorders like stroke, trauma, multiple sclerosis or neurodegenerative diseases (e.g. Alzheimer’s or Parkinson’s disease).

Selected Recent Publications

Thomas Bayer

Professor of Molecular Psychiatry

- 1993 Postdoctoral Research Fellow, University of Cologne, Cologne, Germany
- 1993 - 1997 Postdoctoral Research Fellow, Institute of Neuropathology (Prof. O. Wiestler), University of Bonn Medical Center, Bonn, Germany
- 1997 - 2002 Lab leader, Department of Psychiatry (Prof. P. Falkai), University of Bonn Medical Center, Bonn, Germany
- 2002 - 2007 Head of Neurobiology Lab, University of Saarland Medical Center, Homburg, Germany
- 2004 Appointment to apl Professor at the University Medical Center Saarland
- 2007 - present W2 Professor in Molecular Psychiatry at the University Medicine Göttingen, Department of Psychiatry

Major Research Interests

pathogenesis of Alzheimer’s disease, neuronal cell death mechanisms, preclinical proof-of-concept studies; characterization and development of mouse models for Alzheimer’s disease (neuropathology, anatomy, biochemistry, behavioural tests), preclinical therapy studies in mouse models, blood and CSF biomarker analysis, coordination and design of a phase II clinical study with Alzheimer’s disease patients.

Selected Recent Publications


Nils Brose

Professor, Director at the Max Planck Institute for Experimental Medicine

- Dr. rer. nat. (Ph.D.) 1990, Ludwig Maximilians University Munich
- Appointed as Director at the Max Planck Institute for Experimental Medicine 2001

Major Research Interests

Research in the Department of Molecular Neurobiology focuses on the molecular mechanisms of synapse formation and function in the vertebrate central nervous system. Typically, synapses are formed between cellular processes of a sending and a receiving nerve cell. They are the central information processing units in the vertebrate brain where some 1012 nerve cells are connected by 1015 synapses to form an elaborate and highly structured neuronal network that is the basis for all forms of behaviour. Signal transmission at synapses is mediated by the regulated release of signal molecules (neurotransmitters) which then diffuse to the receiving nerve cell and change its physiological state. In the Department of Molecular Neurobiology, we combine biochemical, morphological, mouse genetic, behavioural, and physiological methods to elucidate the molecular basis of synapse formation and transmitter release processes. Our synaptogenesis research concentrates on synaptic cell adhesion proteins and their role in synapse formation. Studies on the molecular mechanisms of neurotransgenesis research focuses on synaptic cell adhesion proteins and their role in synapse formation. Studies on the molecular mechanisms of neurotransmitter release focus on components of the presynaptic active zone and their regulatory function in synaptic vesicle fusion.

Selected Recent Publications


Wolfgang Brück

Professor of Neuropathology

- 1986 MD Johannes Gutenberg University in Mainz, 1994 national boards in neuropathology
- 1996-2002 Associate professorships for neuropathology at the University of Göttingen and the Charité in Berlin
- Since 2002 full professor and director of the Department of Neuropathology, University of Göttingen

Major Research Interests

- Immunopathology of multiple sclerosis
- Brain-specific mechanisms of immune response in multiple sclerosis
- Axonal damage in inflammatory demyelination and mechanisms of remyelination
- Mechanisms and consequences of microglial activation

Selected Recent Publications


Edgar Brunner

Professor of Medical Statistics

- Student: WS 64/65 - SS 69, Technical University of Aachen
- Diploma: April 1969, Mathematics
- Promotion: 12. May 1971, (Dr. rer. nat.), Technical University of Aachen
- Title: Eine Beziehung zwischen dem Holm-Test und dem Kolmogorov-Smirnov-Test (A Relation between Holm’s Test and the Kolmogorov-Smirnov-Test)
- Habilitation: 11.11.1973, Medical Statistics
- Professor: 01.01.1976 University of Göttingen, Dept. of Medical Statistics, 01.03.1976 Head of the Department

Major Research Interests

Nonparametric Statistics
- asymptotic distribution of rank statistics, ordered categorical data
- multi-factor designs, longitudinal data
- adjustment for covariates
- design and analysis of diagnostic trials
- statistical methods for the analysis of microarray data
- analysis of high-dimensional data

Selected Recent Publications


Hannelore Ehrenreich

Professor of Neurology and Psychiatry

- 1981 Doctor of veterinary medicine, University of Munich
- 1983 Elective Period, University of Newcastle-upon-Tyne, England
- 1985 Guest Lecturer, University of the Philippines, Manila
- 1985 - 1986 Assistant, Department of Internal Medicine, University of Munich
- 1987 Graduation (Medicine), University of Munich
- 1987 - 1988 Assistant, Department of Neurology, University of Munich
- 1989 Doctor of Medicine, University of Munich
- 1989 - 1991 Guest Scientist (BMBF grant) NIAID, NIH, Bethesda, MD, USA
- 1992 - 1994 Assistant, Departments of Neurology and Psychiatry, University of Göttingen
- 1994 Habilitation (Neurology and Psychiatry)
- 1994 - present Head, Division of Clinical Neuroscience, MPIEM
- 1995 - present Consultant & Professor (1998) of Neurology & Psychiatry, University of Göttingen
- 2000 - 2002 Vice President, University of Göttingen

Major Research Interests

Translational Neuroscience
(1) Molecular-cellular basis of neuropsychiatric disease with focus on endogenous mechanisms of neuroprotection
(2) Clinical research on neuroprotection and neuroregeneration in acute (ischemia/hypoxia, trauma) and chronic brain disease (schizophrenia, autism, ALS, MS)
(3) Clinical addiction research

Novel concepts for treatment of alcoholism, psychotherapeutic process-outcome research including kinetics and mechanisms of regeneration

Selected Recent Publications


Stefan Eimer

**Group Leader Molecular Neurogenetics / Neurodegeneration**

- Ph.D. 2003 at the Gene Center of the Ludwig-Maximilian University (LMU in Munich)
- 2003 Postdoc at the Ecole Normale Superieure in Paris, France
- since Oct 2005 independent group leader of the Center for Molecular Physiology of the Brain (CMPB) at the European Neuroscience Institute (ENI) in Göttingen

**Major Research Interests**

Neuotransmitter gated ion channels are involved in a large subset of neuronal events ranging from fast synaptic transmission to the modulation of neuronal circuits that lead to memory formation and cognition. En route to the cell surface these multimeric receptors have to undergo multiple assembly, quality control, and sorting steps to eventually reach the synapse.

Our group aims to understand the mechanisms and rules that control the trafficking and sorting of ligand gated ion channels within the secretory apparatus. In particular, we are focusing on the nicotinic acetylcholine receptor family of ligand gated ion channels, which have been implicated in numerous neurolog- cal and neurodegenerative diseases.

To find new molecules involved in these processes, we take advantage of the nematode *Caenorhabditis elegans* as a main model system, and use a combination of genetic, cell biological, and biochemical approaches as well as electro-physiology and electron-microscopy. As our main model system were are studying cholinergic neurotransmission at the neuro-muscular junction (NMJ) of *C. elegans*. Through genetic screens we have identified novel evolutionary conserved integral membrane proteins that regulate nAChR sorting at the Golgi-Endosomal interface. Further studies have implicated these molecules in the regulation and activation of small GTPases at Golgi complex. Based on these findings we have also started to study systematically how these GTPases are required for structure and function of the Golgi apparatus and how their activity affects the trafficking and neurotransmission at the NMJ of *C. elegans*.

**Selected Recent Publications**


Wolfgang Engel

Professor of Human Genetics

• Dr. med., Universität Freiburg, 1967
• Physician, Hospital Schorndorf, 1966 - 1968
• Postdoc, Institute of Human Genetics and Anthropology, Universität Freiburg, 1968 - 1977
• Habilitation (Human Genetics), Universität Freiburg, 1974
• Professor of Human Genetics and Director of the Institute, Universität Göttingen, 1977

Major Research Interests

Our research is focussed on the molecular analysis of normal human variability and genetic disturbances of development and differentiation. Isolated genes are being analysed in detail with respect to their functional properties by animal models (transgenic and knock-out-mice). For suitable genetic diseases therapeutic strategies (substitution; gene therapy) are being developed and initial evaluation of such strategies is done in the mouse. - We are working on the genotype – phenotype correlations in neurological and cardiovascular diseases (e.g. Spastic paraplegia, Rett syndrome, mental retardation by subtelomeric microdeletions, molybdenum cofactor deficiency; cardiomyopathies, Noonan syndrome) and several genetically determined malformation syndromes (e.g. Townes-Brocks syndrome, Okihiro syndrome, Morbus Osler). We are also engaged in the molecular and cellular basis of initiation events of cancer, specifically in prostate cancer, medulloblastoma and rhabdomyosarcoma. - One main interest in our institute is the analysis of structure, expression and function of genes involved in differentiation of male gametes. The knowledge of the function of those genes can help us to clarify the genetic causes of male infertility. We have isolated spermatogonial stem cells (SSCs) from adult mouse testis and demonstrated that these cells are as pluripotent as embryonic stem cells (ESCs). Our main interest is now to isolate and proliferate SSCs from adult human testis. These cells would be of great interest for regenerative medicine.

Selected Recent Publications


André Fiala

Professor of Molecular Neurobiology of Behavior

- 2008 Professor of Molecular Neurobiology of Behavior, University of Göttingen
- 2008 Habilitation in Neurobiology and Genetics, University of Würzburg
- 2001-2008 Research Assistant, University of Würzburg
- 2000-2001 Research Fellow, Memorial Sloan-Kettering Cancer Center, New York
- 1996-1999 PhD student, Free University of Berlin
- 1996 Degree (Diploma) in Biology, Free University of Berlin

Major Research Interests

We study neuronal mechanisms underlying olfaction, learning and memory, and goal-directed behavior using the model organism Drosophila melanogaster. The fruit fly Drosophila offers the advantage of expressing transgenes in almost any population of it’s about 100,000 neurons. Transgenes used by us are, for example, fluorescent sensor proteins that allow us to monitor the spatio-temporal activity of neurons, or light-sensitive proteins by which neuronal activity can be stimulated through illumination. Using these optogenetic techniques in combination with behavioral analyses we aim at unraveling the functioning of dedicated neuronal circuits, and how these circuits contribute to organizing behavior. In addition, molecular mechanisms underlying learning and memory processes are investigated.

Selected Recent Publications


André Fischer

Group Leader Laboratory for Aging and Cognitive diseases

- 2002: Dr. rer. nat.(PhD). University Goettingen/Max Planck Institute for Experimental Medicine, Germany
- 2003 - 2006: Postdoctoral Associate in the lab of Li-Huei Tsai; Harvard Medical School, Department of Pathology, Boston, USA; Picower Center for Learning and Memory, M.I.T, Cambridge, USA
- since 2006 independent group leader at the European Neuroscience Institute (ENI) in Goettingen

Major Research Interests

Our group aims to understand the molecular mechanisms underlying learning and memory processes under physiological and pathological conditions. To this end we combine molecular, biochemical, pharmacological and behavioral approaches using mice as model organisms. We are particularly interested to understand cognitive impairment associated with normal aging as well as the pathogenesis of mental and neurodegenerative diseases, such as anxiety disorders and Alzheimer's disease. Using animal models we deeply aim to identify therapeutic strategies that would help to reinstate neuroplasticity, learning behavior and the retrieval of lost long-term memories in patients suffering form such devastating diseases.

Selected Recent Publications


Gabriele Flügge

**Apl. Professor, Experimental Neuroscience**

- Dr. rer. nat., University of Munich, 1979
- Senior Scientist, Clinical Neurobiology Laboratory at the German Primate Center

**Major Research Interests**

In humans, stressful or traumatic life events such as death of a close relative often represent a strong psychological load that may induce psychopathologies such as depression. The central nervous mechanisms that lead to such diseases are still not clear. We therefore investigate processes that occur in the course of chronic psychosocial stress in the brains of animals that show similar symptoms as depressed patients. Using molecular techniques, we identify central nervous genes that are regulated by stress; quantitative real time PCR, in situ hybridization and immunocytochemistry serve to localize changes in neurotransmitter systems, receptors, transporters and other molecules in distinct neurons of the brain. Similar tools are used to clarify the mechanisms that underlie the beneficial effects of antidepressant drugs. In conjunction with behavioral studies we are able to find molecular factors that play a role in central nervous processes underlying depression.

**Selected Recent Publications**


Jens Frahm

Professor of Physical Chemistry

- 1974 Diploma in Physics, Univ. of Göttingen
- 1977 Doctorate in Physical Chemistry, Univ. of Göttingen
- 1977 - 1982 Postdoctoral Researcher, MPI for Biophysical Chemistry
- 1982 - 1992 Head, Independent Research Group ‘Biomedizinische NMR’ (BMFT grant)
- since 1993 Director, Biomedizinische NMR Forschungs GmbH (not-for-profit, based on group’s patents)
- 1994 Habilitation, Faculty of Chemistry, Univ. of Göttingen
- since 1997 Adjunct Professor, Faculty of Chemistry, Univ. of Göttingen

Major Research Interests

- Development and application of magnetic resonance imaging (MRI): noninvasive studies of structure and function at the system level, animals and humans
- Methodology: non-Cartesian MRI, parallel MRI, numerical reconstruction techniques, real-time MRI, contrast agents (nanoparticles)
- Human neuroscience: functional neuroimaging, neuro-feedback, fiber tractography
- Animal studies: models of human brain disorders, nonhuman primates, genetically modified mice

Selected Recent Publications


Eberhard Fuchs

Professor of Neurobiology

- 1977: Dr. rer. nat., University of München
- 1996 - 2000: Professor (Animal Physiology), University of Karlsruhe
- 2000 - 2003: Professor for Animal Physiology, University of Göttingen
- since 2003: Professor for Neurobiology, Department of Neurology, Medical School, University of Götting

Major Research Interests

The Clinical Neurobiology Laboratory (CNL) at the German Primate Center is an interdisciplinary research laboratory using neuroanatomical, neuropharmacological, behavioral and molecular techniques to investigate functioning of the brain in animal models of psychiatric and neurodegenerative diseases. The aim of our work is to elucidate brain structures, circuits, pathways and mechanisms that underlie normal and pathological behavior. This work integrates inputs from other research fields with the ultimate aim of developing new therapeutic strategies for psychiatric and neurodegenerative diseases. The laboratory specializes in the development, validation and investigation of animal models to detect abnormal cognitive, motor and emotional expressions of brain pathology. Currently, we are engaged in the investigation of central nervous and behavioral phenomena associated with stress and depression. In addition, we provide service platforms to study Parkinson's disease and multiple sclerosis.

Selected Recent Publications


Theo Geisel

Professor of Theoretical Physics
Director, Max Planck Institute for Dynamics and Self-Organization
Coordinator, Bernstein Center for Computational Neuroscience

- Dr. rer.nat., University of Regensburg (1975)
- Professor of Theoretical Physics, Universities of Würzburg (1988 - 1989), Frankfurt (1989 - 1996), and Göttingen (since 1996)
- Director, Max Planck Institute for Dynamics and Self-Organization, Göttingen (since 1996)

Major Research Interests

How do the myriads of neurons in our cortex cooperate when we perceive an object or perform another task? How do they self-organize in the preceding learning process? Questions like these address the complex dynamics of spatially extended and multicomponent nonlinear systems, which still reserve many surprises. In networks of sufficiently many spiking neurons e.g. we find unstable attractors, a phenomenon which would neither have been guessed nor understood without mathematical modelling and which many physicists consider an oxymoron. They can provide a neuronal network with a high degree of flexibility to adapt to permanently changing tasks. The tools and mathematical methods developed in studies of chaotic behaviour in the past can now help us clarify the dynamics and function of complex networks and spatially extended systems and reveal the biological role of dynamical phenomena like unstable attractors. These methods lend themselves to applications in neuroscience from the level of single cells to the level of cell assemblies and large cortical networks, from the time scales of action potentials (milliseconds) to the time scales of learning and long-term memory (up to years). My work in the past has dealt among others with studies of stochastic resonance of single neurons under periodic and endogenous stimulation, detailed investigations of the properties, functions, and conditions of neuronal synchronization, and the development of neuronal maps in the visual cortex. We have elucidated the influence of the network topology on synchronization and other dynamical properties and demonstrated the existence of speed limits to network synchronization due to disordered connectivity. Besides, I am also focusing on other applications of nonlinear dynamics, e.g. for quantum chaos in semiconductor nanostructures and in mathematical models for the description and forecast of the spread of epidemics.

Selected Recent Publications


Martin Göpfert

**Professor for Cellular Neurobiology**

- 2008 Full Professor for Cellular Neurobiology, University of Göttingen
- 2008 Associate Professor for Molecular Biology and Biophysics of Sensory Systems, University of Cologne
- 2002-2003 Royal Society University Research Fellow, School of Biological Sciences, University of Bristol
- 1998-2002 DAAD and Leopoldina Research Fellow, Dept. Neurobiology, University of Zürich and School of Biological Sciences, University of Bristol
- 1998 Degree in Biology, University of Erlangen-Nürnberg

**Major Research Interests**

Our group studies fundamental processes in hearing. By combining mechanical measurements with genetics, molecular biology, immunohistochemistry, electrophysiology, calcium imaging, and biophysical modelling, we are trying to decipher how molecular processes shape the performance of an ear. Our preferred model system is the hearing organ of the fruit fly *Drosophila melanogaster*, the auditory sensory cells of which share conserved molecular modules with the hair cells in our ears.

Our work has uncovered striking parallels between fly and vertebrate hearing, including the functional equivalence of the auditory transduction and adaptation machineries, the motility of auditory sensory cells, transducer-based force generation, and the expression of homologous genes. Our work also provided first insights into the diverse roles of – and interactions between – transient receptor potential (TRP) ion channels in hearing, and a model of TRP-function in the fly's auditory system has been devised. Using a novel electrostatic actuation method, we were able to identify hair cell-like signatures of transducer gating and adaptation in the fly's auditory mechanics and could show that a simple transduction model as proposed to describe hair cell mechanics comprehensively explains the macroscopic behaviour of an ear. Based on these findings, we are currently devising a computational model that allows for the high-throughput characterization of genetic hearing defects. Candidate genes for hearing, in turn, are narrowed down by expression profiling using whole-genome microarrays. By testing how these genes contribute to auditory function and performance, we aim for a comprehensive molecules-to-system description of the functional workings of an ear.

**Selected Recent Publications**


Uwe-Karsten Hanisch

Professor for Experimental Neurobiology

- 1986 Diploma Degree Biochemistry University of Leipzig, Germany
- 1990 Ph.D. (Dr. rer. nat.) University of Leipzig, Germany
- 1991-1993 Douglas Hospital Research Centre, McGill University, Montreal, Canada
- 1993-2002 Department of Cellular Neurosciences, Max Delbrück Center for Molecular Medicine (MDC) Berlin, Germany
- 1999 Habilitation (Biochemistry/Neurobiology) University of Leipzig, Germany
- 2002-2004 Professor for Biochemistry University of Applied Sciences Lausitz, Germany
- 2002-2004 Guest scientist and Project leader Molecular Medicine (MDC) Berlin, Germany
- since 2004 Professor for Experimental Neurobiology Institute for Neuropathology, University of Göttingen, Germany
- since 2007 Guest Professor Medical Physiology, University of Groningen, The Netherlands

Major Research Interests

Expression and functions of cytokines in the CNS
Mechanisms of microglial activation and consequences of microglial activities
Role of plasma factors as endogenous signals for microglial cells

Selected Recent Publications


Ralf Heinrich

Juniorprofessor of Molecular Neuropharmacology of Behavior

- Dr. rer. nat., University of Göttingen, 1995
- Postdoctoral fellow, Harvard Medical School, Boston, USA, 1997 - 1999

Major Research Interests

Behavior results from integration of sensory information with internal physiological states involving complex interactions between various types of neurons. In order to study cellular and molecular mechanisms that contribute to the selection and control of situation-specific behavior, invertebrate preparations can offer unique advantages over more complex nervous systems of vertebrates, especially mammals. The nervous systems of invertebrates contain smaller numbers of neurons, many of which can be individually identified, and their behavioral repertoires are rather limited to combinations of genetically determined stereotyped components.

Studies are conducted with intact or partially dissected behaving animals (insects, crustaceans, annelids) and with isolated nervous systems or cultured organs and cells. Projects for experimental theses usually combine two or more of the following methods: neuroethology, pharmacology, electrophysiology, histology and immunocytochemistry, cell culture and molecular biology. Examples of current research projects are

- Acoustic communication in grasshoppers: control of sound production by converging signaling pathways (transmitters and second messengers) in the central complex neuropil of the brain.
- Physiological characterization of neurosecretory neurons that mediate general physiological states e.g. serotonin-releasing neurons of leeches and crustaceans.
- Control of agonistic behavior and the formation of hierarchies in crustaceans, crickets and fruitflies.
- Presence and function of erythropoietin in invertebrate nervous systems: development, regeneration and hypoxia-related functions

Selected Recent Publications


Michael Hörner

Professor of Cellular Neurobiology
- Research Assistant, MPI for Ethology, Seewiesen, 1985/1986
- Dr. rer. nat., University of Göttingen, 1989
- 1989 - 1990 Postdoctoral Fellow, Medical University of Kiel, Dept. Physiology
- 1990 - 1997 Assistant Professor, Institute for Zoology and Anthropology, Göttingen
- 1992/1997 Research Fellow Marine Biological Labs, Woods Hole, USA
- 1993/1996 Research Fellow, Arizona Research Labs, Tucson, USA
- 1994 - 1995 Feodor-Lynen/Humboldt Fellow, Harvard Medical School, Boston, USA
- 1997 Habilitation (Zoology)
- 1997 - 2002 Associate Professor, Institute for Zoology and Anthropology, Göttingen
- 2002 - 2004 Guest Professor, University of Science & Technology, Hongkong
- Apl. Professor, J.-F. Blumenbach Institute for Zoology and Anthropology Göttingen, since 2004 and Scientific Coordinator International MSc/PhD/MD-PhD Program Neurosciences

Research Interests
Molecular Mechanisms Of Synaptic And Non-Synaptic Modulation
Biogenic amines such as serotonin, dopamine, histamine or octopamine (OA), the pendant of norepinephrine in invertebrates, are widely distributed within the animal kingdom. These evolutionary conserved neuroactive substances are involved in the control of vital functions in both vertebrates and invertebrates. Biogenic amines often initiate long-lasting neuro-modulatory effects in their targets, which is due to diffusion following non-synaptic release activating G-protein coupled to intracellular pathways. My work is focussed on the investigation of cellular and molecular mechanisms underlying the modulation of neuronal signaling in identified networks in invertebrate model systems. Using electrophysiological, pharmacological and immunocytochemical techniques in combination with behavioral measurements, I am investigating mechanisms of aminergic modulation in identified neurons of defined networks in insects and crustacea. To address both mechanistic and functional questions, a parallel approach has been developed, which allows to investigate single identified neurons both in-vivo with intact synaptic connections and in-vitro in primary “identified” cell culture, where neurons are separated from connections to other neurons. The functional meaning of aminergic modulation on the cellular level in behaviorally-relevant circuits is assessed by quantitative behavioral measurements. The investigations show that OA enhances the responsiveness of a neuronal network in insects (“giant fiber pathway”) which triggers a fast escape reaction. The reaction to sensory stimuli in the postsynaptic giant interneurons, which are monosynaptically coupled to sensory neurons via excitatory cholinergic synapses, is significantly enhanced by OA application. Characteristic changes of the action potentials in-vivo (“spike broadening”) and patch-clamp recordings in-vitro suggest, that OA selectively affects slow K+-conductions in postsynaptic giant interneurons

Selected Recent Publications
Swen Hülsmann

Privatdozent, Department of Neurophysiology

- Dr. med., University of Münster, 1995
- Postdoctoral fellow, University of Münster Dept. of Neurosurgery, 1995 - 1996
- Postdoctoral fellow, University of Göttingen, Dept. of Neurophysiology, 1996 - 2001
- Group leader (Wissenschaftlicher Assistent) Neurophysiology, since 2001
- Principle Investigator at the DFG Research Center for Molecular Physiology of the Brain (CMPB) since 2002
- Habilitation, University of Göttingen, 2005

Major Research Interests

The majority of cells in the human brain are glial cells, outranging the number of neurons by a factor of 10. However, most behavioral aspects of life are attributed to neurons, leaving a rather white spot of knowledge about the function of the different types of glial cells. Our group aims to identify and clarify the mechanisms that allow glial cells, e.g. astrocytes to modulate and stabilize the most vital behavior of breathing.

Selected Recent Publications


Reinhard Jahn

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- Dr. rer. nat. 1981, University of Göttingen
- Assistant Professor, The Rockefeller University, New York (USA) 1985
- Junior Group leader, Max Planck Institute for Psychiatry, Martinsried, 1986
- Associate Professor of Pharmacology and Cell Biology, Yale University, and Investigator, Howard Hughes Medical Institute, New Haven (USA) 1991
- Professor of Pharmacology and Cell Biology, Yale University, New Haven, 1995
- Director, Max Planck Institute for Biophysical Chemistry, Göttingen, 1997

Major Research Interests

Our group is interested in the mechanisms of membrane fusion, with the main emphasis on regulated exocytosis in neurons. Since recent years it is known that intracellular membrane fusion events are mediated by a set of conserved membrane proteins, termed SNAREs. For fusion to occur, complementary sets of SNAREs need to be present on both of the fusing membranes. The neuronal SNAREs are among the best characterized. They are the targets of the toxins responsible for botulism and tetanus. To understand how these proteins make membranes fuse, we studied their properties in detail using biochemical and biophysical approaches. We found that they assemble into a tight complex which ties the membrane closely together and thus probably initiates bilayer mixing. In our current approaches, we study membrane fusion at the level of isolated proteins as well as in semi-intact and intact cells. Thus, we are investigating conformational changes of the SNARE proteins before and during fusion. Furthermore, we use reconstitution of membrane fusion in cell-free assays and in proteoliposomes. Other projects of the group include the study of neurotransmitter uptake by synaptic vesicles and the function of Rab-GTPases in neuronal exocytosis

Selected Recent Publications


Hubertus Jarry

Professor of Clinical and Experimental Endocrinology

- 1976 - 1980 University of Göttingen, study of biology, diploma degree in biochemistry, microbiology, organic chemistry
- 1980 - 1983 PhD thesis, Department of Biochemistry, University of Göttingen,
- PhD degree in biochemistry, microbiology, organic chemistry (summa cum laude)
- Until February 1985 German Primate Center Göttingen, Dept. Reproductive Biology
- March 1985 until March 1986 Michigan State University, Dept. Pharmacology and Toxicology
- Since April 1986 Research Associate Dept. Clinical and Experimental Endocrinology University of Göttingen
- Januar 1991 Habilitation
- Dezember 1995 Promotion to Professor

Major Research Interests

The proper function of the GnRH pulse generator is essential for reproduction of all mammals studied so far. GnRH pulses are a prerequisite for proper pituitary gonadotropin release. The neurochemical mechanisms leading to pulsatile GnRH release involve norepinephrine and gamma amino butyric acid (GABA) as most important neurotransmitters. In addition, other catecholamines, amino acid neurotransmitters and neuropeptides play a modulatory role in the function of the GnRH pulse generator. Many of the GABAergic neurons in the hypothalamus are estrogen-receptive. The mechanisms by which the estrogen receptors of the alpha and beta subtype regulate gene and protein expression of neurotransmitter-producing enzymes are at present a prime focus of interest. Induction of puberty is not a gonadal but a hypothalamic maturational process. The initiation of proper GnRH pulse generator function is the ultimate trigger signal for puberty which is currently investigated. Ageing involves also neuroendocrine mechanisms. The GnRH pulse generator function deteriorates in aged rats, mechanisms which involve a variety of catecholamines and amino acid neurotransmitters which are currently investigated. Steroidal feedback signals (of estradiol, progesterone, and glucocorticoids) are crucial for the development and proper function of the adult hypothalamus of which the molecular and neurochemical mechanisms are studied with cell biological and animal experimental tools. Proper function of the GnRH pulse generator is also of crucial importance for initiation of puberty and maintenance of normal menstrual cycles in women. Many of hitherto unexplained infertilities can be explained by malfunctioning GnRH pulse generators which are studied in a series of clinical experiments.

Selected Recent Publications

Till Marquardt

Group Leader Developmental Neurobiology Laboratory

- Since 2007: independent research group leader, DFG Emmy Noether group leader at the European Neuroscience Institute, Göttingen
- 2001 - 2006: postdoctoral research associate and staff scientist with Samuel L. Pfaff at the Salk Institute for Biological Studies in La Jolla, California, USA
- 2001: Ph.D. with Peter Gruss at the Max-Planck Institute of Biophysical Chemistry, University of Göttingen

Major Research Interests

Adequate control of body motion and posture depends on elaborate circuitries that connect both motor and sensory neurons with the musculature. The central importance of these connections is illustrated by the debilitating consequences of diseases affecting motor neurons, such as Amyotrophic Lateral Sclerosis (ALS) and diabetic neuropathy. Our research aims at understanding the molecular mechanisms driving the assembly of functional neuromuscular circuitries during embryonic and postnatal development. This includes the study of cell surface-based signaling molecules that control motor and sensory axon connectivity in mice. Another research focus of the lab aims at identifying and characterizing novel mechanisms driving the functional specification of motor neurons within the context of operative neuromuscular circuitry. We extensively take advantage of mouse genetics in order to selectively trace and manipulate specific neuron populations. We combine this genetic approach with live 3D fluorescence (spinning disk) microscopy, as well as electrophysiological methods to elucidate the role of cell surface and nuclear receptor proteins in sensory-motor connectivity and functional neuron specification.

Selected Recent Publications


Tobias Moser

Professor of Experimental and Clinical Audiology

- Dr. med. (M.D.) 1995, University of Jena
- Postdoctoral fellow with E. Neher at the MPI for Biophysical Chemistry, 1994 - 1997
- Group leader at the Department of Otolaryngology, University of Göttingen since 1997

Major Research Interests

Our group focuses on the physiology and pathology of sound coding at the hair cell ribbon synapse. Molecular dissection and detailed physiological characterization of ribbon synapse function employ a spectrum of molecular and biophysical techniques such as single cell RT-PCR, immunohistochemistry of hair cells, auditory systems physiology (recordings of otoacoustic emissions, compound action potentials and auditory brainstem responses, single unit recordings), pre- or postsynaptic patch-clamp, optical methods (epifluorescence, evanescent wave and confocal imaging as well as flash photolysis of caged compounds).

The group has contributed to understanding normal hair cell ribbon synapse function (reviews in Nouvian et al., 2006 and Moser et al., 2006). In our previous work we have physiologically and in part morphologically characterized mutant mice with defects in hair cell synaptic coding (Brandt et al., 2003; Khimich et al., 2005, Roux et al., 2006) and auditory nerve function (Lacas-Gervais et al., 2004). The results demonstrated that defects of hair cell synaptic sound coding cause sensorineural hearing loss in animal models – auditory synaptopathy and confirmed impaired hearing in case of nerve disorders - auditory neuropathy.

Selected Recent Publications


Brandt A, Khimich D, Moser T (2005) Few Ca$_{V}$ 1.3 channels regulate a synaptic vesicle’s exocytosis at the hair cell ribbon synapse. J Neurosci 25: 11577-11585
Klaus-Armin Nave

Professor of Molecular Biology, Director at the Max Planck Institute of Experimental Medicine

- 1987 PhD, University of California, San Diego
- 1987-1991 Postdoc, The Salk Institute, La Jolla, California
- 1991 Junior Group Leader, ZMBH, University of Heidelberg
- 1998 Professor of Molecular Biology (C4), ZMBH
- 2000 Director, Department of Neurogenetics Max Planck Institute for Experimental Medicine, Göttingen, and Professor of Biology, University of Heidelberg

Major Research Interests

We are interested in the mechanisms of neuron-glia interactions in the higher nervous system, and in the genes that are required for normal glial cell function. Here, transgenic and mutant mice have become important to study developmental processes as well as genetic diseases. For example, oligodendrocytes are glial cells highly specialized for enwrapping CNS axons with multiple layers of membranes, known to provide electrical insulation for rapid impulse propagation. We found that oligodendrocytes are also essential for maintaining the long-term integrity of myelinated axons, independent of the myelin function itself. The mechanisms by which oligodendrocytes support long-term axonal survival are still under investigation. The importance of glial cells as the “first line of neuroprotection”, however, is illustrated by several myelin-associated diseases in which axonal neurodegeneration contribute to progressive disability. These range in humans from peripheral neuropathies (CMT1) to spastic paraplegia (SPG2), and presumably multiple sclerosis (MS) and certain forms of psychiatric disorders. We are developing transgenic animal models for some of these diseases, in order to dissect the underlying disease mechanisms and, in the case of CMT1A, have used these models to design novel therapeutic strategies.

The glial “decision” to myelinate an axonal segment is partly controlled by the axon itself, but the signaling mechanism is not understood. We have found that axonal neuregulin-1 (NRG1) is the major determinant of myelination in the peripheral nervous system. We are now investigating NRG1 dysregulation also in CNS myelination, using quantifiable behavioural functions in mice. By combining genetics with enviromental risk factors for schizophrenia (in collaboration with H. Ehrenreich) we will explore the hypothesis that NRG1, a known human schizophrenia susceptibility gene, points to an important role of myelinating glia in some psychiatric disorders.

Future Projects and Goals

Mechanisms of neuron-glia signalling; function of myelin proteins and lipids; transcriptional profiling of single cells in vivo; novel mouse models of neuropsychiatric disorders.

Selected Recent Publications


Erwin Neher

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- M.Sc. (Physics), University of Wisconsin, (1967)
- Ph.D. (Physics), Institute of Technology, Munich (1970)
- Research associate at the Max Planck Institute for Biophysical Chemistry in Göttingen, Germany (1972 - 1975 and 1976 - 1982) and as a guest in the laboratory of Dr. Ch.F. Stevens at Yale University, Dept. of Physiology, New Haven, Conn. (1975 - 1976)
- Fairchild Scholar, California Institute of Technology; Pasadena, USA (1989)
- Director of the Membrane Biophysics Department at the Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, since 1983

Major Research Interests

Molecular Mechanisms of Exocytosis, Neurotransmitter Release, and Short Term Synaptic Plasticity

In order to understand how the brain handles its information flow and adjusts synaptic connections on the second and subsecond timescale, one has to understand all aspects of synaptic transmission ranging from availability of vesicles for exocytosis, presynaptic electrophysiology, Ca++ signalling, the process of exocytosis, and postsynaptic neurotransmitter action. Our work concentrates on presynaptic aspects. We use neuronal cell cultures and brain slices for studying mechanisms of short term plasticity, such as depression and paired pulse facilitation. The Calyx of Held, a specialized synapse in the auditory pathway, offers unique possibilities for simultaneous pre- and postsynaptic voltage clamping. This allows a quantitative analysis of the relationship between [Ca++] and transmitter release. We recently developed techniques to express mutated synaptic proteins in the Calyx terminal, such that the functional role of specific molecules can be studied on the single-cell level.

A second line of research concerns the analysis of fluorescence images, particularly the separation of multiple labels.

Selected Recent Publications


Young S. Jr, Neher E (2009) Synaptotagmin has an essential function in synaptic vesicle positioning for synchronous release in addition to its role as a calcium sensor. Neuron 63: 482-496


**Luis A. Pardo**

**Group Leader, Max Planck Institute for Experimental Medicine**

- 1986 M.D., University of Oviedo, Spain
- 1990 Ph.D. University of Oviedo, Spain
- 1991 - 1993 Postdoctoral fellow, Max-Planck Institute of Biophysical Chemistry
- 1994 - 1996 Researcher, University of Oviedo, Spain
- 1997 - 2000 Senior researcher, Max-Planck Institute of Experimental Medicine
- 2001 - 2003 Chief Scientific Officer, iOnGen AG
- since 2004 group leader at the Max-Planck Institute of Experimental Medicine

**Major Research Interests**

Our research interest focuses on the role of ion channels in the initiation and progression of tumors. For this, we take advantage of the knowledge of the physiology and molecular biology of channels and use electrophysiological techniques along with advanced microscopy, protein engineering and animal models. Most of our work has been on a particular potassium channel frequently expressed (75%) in human tumors. We try to take advantage of the particular features of ion channels (for example, their surface expression) to design novel diagnostic and therapeutic procedures.

We also try to understand the mechanisms underlying the role of ion channels in tumors, regarding both permeation properties as well as non-canonical functions.

**Selected Recent Publications**


Walter Paulus

Professor of Clinical Neurophysiology

- Dr. med., University of Düsseldorf, 1978
- Training in Neurology at the Universities of Düsseldorf, UCL London and Munich
- Habilitation (Neurology and Clinical Neurophysiology) in Munich
- Prof. and Head of the Department of Clinical Neurophysiology 1992

Major Research Interests

Our main research goal is to develop new neurophysiologically based therapies for neurological diseases incorporating excitability changes of the brain. For this we use repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (TDCS). TMS induces a short electric current in the human brain. Both rTMS and TDCS offer the prospect of inducing LTD and LTP like effects in the human brain. Diseases in our focus are Parkinson’s disease, epilepsy, migraine, stroke and dystonia.

Both methods may also be used to measure excitability changes in the motor cortex or alterations in visual perception thresholds. We also evaluate rTMS and TDCS induced changes in motor cortex excitability by functional MR imaging.

Selected Recent Publications

Kuo MF, Paulus W, Nitsche MA (2007) Boosting Focally-Induced Brain Plasticity by Dopamine. Cereb Cortex


Diethelm W. Richter

Professor of Physiology
Chairman of the II. Department of Physiology,
University of Göttingen
Speaker of the European Neuroscience Institute Göttingen

- 1974 Universitätsdozent, I. Physiol. Inst., University of Munich
- 1976 - 1988 C-3 Professor, I. Physiol. Inst., University of Heidelberg
- 1988 C-4 Professor, II. Physiol. Inst., University of Göttingen

Major Research Interests

Neurotransmitters, neuromodulators, and peptide hormones are known to activate metabotropic receptor proteins that control ion channels or second messenger cascades. These receptors regulate an intracellular network of interacting signal transduction pathways by means of G-proteins. Thus, receptors transmit extracellular signals to intracellular proteins and other chemical factors. These signals are normally not transduced in a stereotype manner, but they are integrated in a space- and time-dependent manner, resulting in highly dynamic and variable cellular responses. The specific nature of the cellular response depends on individual cell types that may differ in the expression pattern of receptor subtypes or of intracellular signaling factors. Our research group concentrates on the spatial organization of various subtypes of serotonin receptors and targets an understanding of the highly localized regulation of molecular interactions occurring simultaneously at many sites of a neuron. The goal is to achieve a refined understanding of the parallel signal processing within networks of chemical signal pathways and to clarify their effects on the properties of the neuron as a whole.

Another task addressing complex brain functions is to transfer this knowledge about molecular signaling within cells to the integrated function of neuronal networks. The problem is that modulation of network systems cannot be predicted simply on the basis of cellular reactions, because subgroups of diversely wired neurons mostly express heterogeneous receptor profiles.

Selected Recent Publications


Silvio O. Rizzoli

Group Leader STED Microscopy of Synaptic Function

- 2000 - 2004 Research assistant with William Betz at the Dep. of Physiology and Biophysics, University of Colorado Health Sciences Center (USA)
- 08/2004 PhD degree (Physiology) awarded by the University of Colorado
- 2004 - 2007 Post doctoral fellow with Reinhard Jahn at the Neurobiology Department of the Max Planck Institute for Biophysical Chemistry in Göttingen (Germany)
- since 2007 Group Leader (STED Microscopy) at the European Neuroscience Institute Göttingen (ENI-G)

Major Research Interests

Conventional fluorescence microscopy is limited by the diffraction of light: fluorescent objects that are close together cannot be discerned. Stimulated emission depletion (STED) is a recent advancement in optical physics that breaks the diffraction barrier, allowing microscopes to obtain much clearer images.

The diffraction barrier has been particularly problematic for imaging synaptic vesicles, which are among the smallest known organelles (30-50 nm in diameter). They are located in small areas in the synapses (about 1 micron in diameter). The group takes advantage of the increased imaging resolution provided by STED to investigate synaptic vesicle function, with an emphasis on synaptic vesicle recycling. Since STED microscopy also allows imaging of protein domains, the group aims at studying the patterning of protein domains in the synapse, in order to understand its molecular architecture.

Selected Recent Publications


Detlev Schild

Professor of Physiology

- 1979 Diplom in Physics, University of Göttingen
- 1982 M.D., University of Göttingen
- 1985 Dr. rer.nat., University of Göttingen
- 1987 Dr. med., University of Göttingen
- 1997 Appointed head of the Department of Molecular Neurophysiology in the Center of Physiology and Pathophysiology, Medical School, University of Göttingen

Major Research Interests

We are trying to understand how the sense of smell works. Olfactory systems are able to detect and distinguish thousands of molecules in our environment. Receptor neurons are endowed with hundreds of different receptor molecules to bind odorants and transduce the chemical signals into electrical ones. Chemosensory information is thus represented in a rather high-dimensional space. The receptor neurons, which code the hitting probability of odor molecules binding to their molecular receptors, eventually generate trains of action potentials, a one-dimensional vector of stochastic processes. They convey their information onto the brain, in particular the olfactory bulb, where the receptor neuron signals are transformed into a two-dimensional neuronal image of firing activities. Glomerula, small skeins of receptor nerve fibers and synapses in the olfactory bulb, appear to be the heart of olfactory coding.

Using a combination of electrophysiological techniques, single molecule detection, photochemical and high resolution imaging techniques as well as computational and modeling methods, we are studying the biophysical and physicochemical details of
- the primary coding processes,
- the synaptic transmission in glomerula
- the generation of the neuronal chemotopic map as well as
- the processes and mechanism of odor learning and memory.

Selected Recent Publications


Oliver Schlüter

Group Leader Molecular Neurobiology

- 1995 - 2001 M.D. Ph.D. with Thomas C. Südhof at the Max-Planck-Institute for Experimental Medicine in Göttingen (Germany)
- Dr. rer. nat. (PhD) 2000, University of Hannover
- Dr. med. (Medical thesis), University of Göttingen
- 2002 - 2006 Postdoc with Robert C. Malenka at Stanford University Medical Center (USA)
- Independent group leader (Emmy-Noether/DFG) at the European Neuroscience Institute Göttingen (ENI-G), since 2006

Major Research Interests

Activity-dependent modulations of synaptic transmission are important mechanisms of information processing and storage in neuronal circuits. A variety of related but mechanistically distinct forms of synaptic plasticity have been described in in vitro preparations of brain slices.

A major goal of my laboratory is to elucidate the underlying molecular events, leading to and regulating changes in synaptic efficacy. Newly developed techniques of molecular replacement, using mouse genetics and/or viral-mediated gene transfer allow us to manipulate the molecular composition of single neurons in a spatial and temporal controlled manner.

In particular, we are able to investigate the effects of heterologously expressed proteins on the background of wild-type neurons, or neurons, in which the endogenous protein expression is diminished. We combine this technique with simultaneous dual whole cell patch clamp recordings from rodent brain slices to monitor changes in synaptic efficacy in the manipulated cell in comparison to the neighboring control cell.

Knowledge gained from the understanding of molecular mechanisms of synaptic transmission and plasticity will ultimately provide important clues for the function of neuronal circuits and potentially the functioning of the brain

Selected Recent Publications


Mikael Simons

Group Leader Membrane Biology (Molecular and Cellular Neurobiology)

- 1991-1997 Medical School, University of Heidelberg
- 1993-1996 MD thesis (Laboratory of K. Beyreuther, ZMBH, University of Heidelberg)
- 1997-1999 Residency in Neurology, Department of Neurology, University of Tübingen
- 1999-2000 Post-Doc (Laboratory of J. Trotter, Department of Neurobiology, University of Heidelberg)
- 2000-2004 Residency in Neurology, Department of Neurology, University of Tübingen
- 2004 Facharzt/Specialty qualification in Neurology
- 2005 Habilitation in Neurology, University of Tübingen
- 2004 Junior group leader, Centre for Biochemistry and Molecular Cell Biology, University of Göttingen
- Junior research group leader (SFB 523), Max Planck Institute for Experimental Medicine

Major Research Interests

Mechanisms of myelin biogenesis; neuron and glia interactions; membrane trafficking in oligodendrocytes; mechanisms of remyelination in multiple sclerosis; amyloid precursor protein processing in Alzheimer’s disease

Selected Recent Publications


Judith Stegmüller

Group leader, Max Planck Institute for Experimental Medicine

- 1998 Diploma, University of Heidelberg
- 2002 Ph.D. University of Heidelberg
- 2003 - 2008 Postdoc, Harvard Medical School, Boston
- Since 2008 Independent group leader at the Max Planck Institute for Experimental Medicine

Major Research Interests

Growing evidence implicates intrinsic mechanisms such as the ubiquitin proteasome systems (UPS) in brain development and disease. Our focus lies on the role of the UPS in axon growth and regeneration. We are particularly interested how E3 ubiquitin ligases regulate these processes. To further enhance our understanding of the UPS in the central nervous system, we are also seeking to identify novel brain-specific E3 ligases and to determine their role in various aspects of neuronal development.

To address these research objectives, we apply molecular and cell biological and biochemical techniques. We also use mouse models to gain comprehensive insight into the ligases of interest and to complement in vitro studies with meaningful in vivo experiments.

Selected Recent Publications


Nicole von Steinbüchel-Rheinwall

Professor, Director of the Department of Medical Psychology and Medical Sociology

- 1993: Professor of Medical Psychology, Institute of Medical Psychology (IMP), Munich University (LMU)
- 1998 - 2002 Vice-chairperson of the German Society of Medical Psychology
- since 1998 editorship of the section “Quality of life and disease coping” of the “Zeitschrift für Medizinische Psychologie”
- 1999 Professor of the Dorothea-Exlbeben Foundation, Magdeburg University
- 2001 Associate Professor of Gerontopsychology at Geneva University and Head of the Department of Neurogerontopsychology at the Unit of Psychogeriatrics at Geneva University Hospital
- 2001 - 2005 Member of the board of the Swiss Society of Psychology
- 2004 Director of the Department of Medical Psychology, Georg August University of Göttingen
- 2004 - 2005 Member of the board and vice-treasurer of the Academia Multidisciplinaria Neurotraumatologica
- since 2004 editor of the series “Psychomed Compact”, UTB textbooks series
- 2005 Director of the Department of Medical Psychology and Medical Sociology, Georg August University of Göttingen

Major Research Interests
Medical Psychology
- Cross-cultural Outcome
- Cognitive Neuroscience
- Neuropsychology
- Quality and communication improvement in medicine

Medical Sociology
- Assessment of the Consequences of Technology in Medicine
- Professionalisation

Selected Recent Publications


Anastassia Stoykova

Privatdozentin, Developmental Biology, Max Planck Institute for Biophysical Chemistry

- 1973 - 1988 Research Associate, Bulgarian Academy of Sciences, Sofia
- 1987 PhD, Institute Molecular Biology, Bulg. Acad. Sci., Sofia
- 1989 Habilitation (neurochemistry), Sofia
- 1989 Habilitation (developmental biology), Faculty of Medicine, University Göttingen
- since 2008 Independent Research Group Leader MPI-bpc (W2, MPG Minerva Program)

Major Research Interests

Composed of six cellular layers, the mammalian neocortex is a modular structure with many functional areas in which the neurons have specific morphology, number, connections and unique physiological properties. Our group is interested in understanding the molecular and cellular mechanisms involved in specification of the immense diversity of the cortical neurons in order to be generated in a correct time, number and place during development. We have recently identified sets of genes with a differential expression between distinct domains and layers of the embryonic mouse cortex. To study the function of selected candidates in the transcriptional control of neurogenesis, we combine approaches for targeted gene inactivation or gene activation in transgenic mice using the conventional and conditional knock-out strategies with biochemical, morphological, gene expression, tissue culture methods and techniques for gene transfer in isolated brain or living mouse embryos.

With one gene, the transcription factor Pax6, we are further ahead in understanding its function. Pax6 is a critical gene for neocortical development, endowing the pluripotent radial glial progenitors with neurogenic ability and controlling the cortical patterning, including layer and area formation. Our current research focuses in unraveling genetic mechanisms by which Pax6 regulates these developmental processes with a special emphasis on its role in the control of neuronal subtype identity. We address these questions by studying the function of genes recently identified by us to act as Pax6 targets or Pax6 protein partners controlling its neurogenic function. We further aim to get insight into Pax6 dependent mechanisms involved in generation of stem/progenitors cells and their regenerative properties in neurogenic zones of the adult brain.

Selected Recent Publications


Walter Stühmer

Professor of Neurophysiology, Director at the Max Planck Institute for Experimental Medicine

- 1978 - 1980 PhD with Dr. F. Conti in Camogli, Italy
- 1980 - 1983 Post Doc in the Department of Physiology and Biophysics in Seattle, USA, with Dr. W. Almers
- 1983 - 1992 group leader at the Max Planck Institute for Biophysical Chemistry in Göttingen with Dr. E. Neher
- 1992 - present Director of the Department Molecular Biology of Neuronal Signals at the Max Planck Institute for Experimental Medicine in Göttingen

Major Research Interests

The principal aim of the department “Molecular Biology of Neuronal Signals” is the study of signaling within cells and between cells. To this end, molecular biology, genetics and electrophysiology are used to elucidate structure-function relationships of membrane-bound proteins, especially ion channels and receptors. Specific tools such as antibodies and toxins are developed and used to interfere with signaling pathways relevant for cell cycle control, ion selectivity and the secretion of cells in culture and in primary cells.

Selected Recent Publications


Andreas Stumpner

Professor of Neuroethology

- Dr. rer. nat., University of Erlangen, Germany, 1988
- Postdoctoral fellow, Andrews University, Berrien Springs, USA, 1990 - 1991
- Habilitation, University of Göttingen, 1997
- Guest professor, University of Zurich, Switzerland, 2002 - 2003
- Since April 2003 Professor of Zoology at the University of Göttingen

Major Research Interests

My research focuses on how a small nervous system recognises specific frequencies and temporal patterns (in the context of acoustic communication in insects, mainly in Orthoptera). Understanding these processes bears implications also for understanding function and evolution of the same performances of the vertebrate brain. I see the strength of the acoustic and invertebrate system a) in the precise temporal and spectral stimuli one can deliver and the clear (innate) responses on the behavioural and neuronal level, b) in the comparative potential (song recognition in groups of related species and differences in neuronal layout to related non-singing or non-hearing groups) allowing to understand what mechanisms might have played a role in evolution and how evolution of songs and recognition systems depend on each other, c) in the identified neuron approach allowing to find homologous neurones in related species and indicating evolutionary changes on the cellular level and d) the potential to directly test hypotheses in behavioural experiments.

Recent findings from intracellular studies in bushcrickets are: Central neurons receive lateral frequency-dependent inhibitions. After blocking such inhibitions the frequency tuning broadens considerably. Species-specificity of a neuron in related species depends on specific inhibitions, not on specific excitations. And homologous neurones in more distantly related species may differ considerably in their properties..

Selected Recent Publications


Victor Tarabykin

Group Leader at the Max Planck Institute for Experimental Medicine

- MD, Russian State Medical University, Moscow 1993
- PhD in Molecular Biology with S. Lukyanov, Russian Academy of Sciences, Moscow 1996
- Postdoctoral fellow with P. Gruss at the Max Planck Institute for Biophysical Chemistry, 1996 - 2001
- since 2002 Research Group Leader at the Max Planck Institute for Biophysical Chemistry; Department Molecular Cell Biology, Göttingen

Major Research Interests

During development, several populations of progenitor cells in the dorsal telencephalon generate a large variety of neurons. These neurons acquire distinct morphologies and physiological properties and serve distinct functions in the mammalian cerebral cortex.

We are interested in the cellular and molecular mechanisms underlying cell fate specification in the mouse cerebral cortex. We focus on the mechanisms controlling the generation of neurons of different cortical layers. We apply a combination of genetic, molecular and cell biological approaches. We have identified several genes that control cortical development. One of them, Sip1 is a transcription factor implicated in Mowat-Wilson syndrome (MWS) in humans. MWS patients suffer from intellectual disability, microcephaly and seizures. We inactivated the gene specifically in cortical precursors. This resulted in the degeneration of the entire hippocampus. We have shown that in the hippocampus Sip1 controls activity of non-canonical Wnt pathway.

Another gene we identified, Satb2 is a transcription factor of a novel type that interacts with special chromosomal regulatory elements, Matrix Attachment Regions. Satb2 is an important determinant of neurons of superficial cortical layers. In order to study its role in neural development we produced several mouse mutants where Satb2 expression is altered. There are several other genes that have been identified in the lab whose function in the cortical development remains to be revealed.

Selected Recent Publications


Stefan Treue

Professor, Director of the German Primate Center

- Head of the Cognitive Neuroscience Laboratory
- Ph.D. 1992, Massachusetts Institute of Technology
- Postdoctoral Fellow, MIT, 1992 - 1993
- Postdoctoral Fellow, Baylor College of Medicine, Houston, Texas, 1993 - 1995
- Work Group Leader, Laboratory of Cognitive Neuroscience, University of Tübingen, 1995 - 2001
- Professor of Animal Physiology, University of Tübingen, 2000 - 2001
- Professor of Cognitive Neuroscience and Biological Psychology, University of Göttingen, 2001

Major Research Interests

Research at the Cognitive Neuroscience Laboratory is aimed at understanding the neural basis of visual perception. Vision is an active process that is far more than a passive registration of our environment. Rather, on its way from the eyes to and through the cortex, visual information is modulated by numerous processes that enhance some aspects while diminishing others. One of these processes is attention, i.e. the ability to filter out unwanted information and concentrate the brain’s processing abilities on relevant information.

The accurate representation of visual motion in the environment is one of the most important tasks of the visual system. Correspondingly, research in the laboratory concentrates on this ability as a model for sensory information processing in general.

We use various techniques. While our emphasis is on electrophysiology, i.e. the recording of the activity of neurons in the visual cortex of macaque monkeys and measuring human perceptual abilities with psychophysical methods, we also use theoretical approaches and functional brain imaging.

Using these techniques, we have been able to elucidate how motion information is represented in primate cortical area MT and how attention changes that representation and correspondingly the perception of the visual environment.

Selected Recent Publications


Andreas Wodarz

Professor of Stem Cell Biology

- Diploma Biology, University of Cologne, 1990
- Dr. rer. nat. Developmental Biology, University of Cologne, 1993
- Postdoc, Howard Hughes Medical Institute, Stanford University, 1994 - 1997
- Junior Group Leader, Heinrich Heine University Düsseldorf, 1997 - 2004
- Habilitation in Genetics, Heinrich Heine University Düsseldorf, 2001
- Appointed as Head of the Department of Stem Cell Biology at the University of Göttingen, 2004

Major Research Interests

At the center of my research interests is the question of how neural stem cells divide asymmetrically to produce another stem cell and a progenitor cell that will differentiate and give rise to neurons and glia cells. One important aspect of asymmetric cell division is the establishment of an intrinsic polarity which is the prerequisite for the asymmetric localization of proteins and mRNAs that serve as cell fate determinants. Our model system for the asymmetric division of stem cells is the embryonic neuroblast of Drosophila. Here we study the function of genes that control cell polarity, asymmetric localization of cell fate determinants and orientation of the mitotic spindle. The knowledge obtained in the Drosophila system has stimulated intense research on the participation of the orthologous genes and proteins in the asymmetric division of vertebrate stem cells.

Selected Recent Publications


Fred Wolf

Group Leader at the Max Planck Institute for Dynamics and Self-Organization

- Visiting Scholar, Kavli Institute for Theoretical Physics, UC Santa Barbara (USA), Fall 2001, 2003, 2004
- Research Associate, Max-Planck-Institut für Strömungsforschung, Göttingen, 2001 - 2004
- Amos de Shalit Fellow, Racah Institute of Physics and Interdisciplinary Center for Neural Computation, Hebrew Univ., Jerusalem (Israel), 2000
- Dr. phil. nat., J.W. Goethe Universität, Frankfurt, 1999

Major Research Interests

- Theoretical neuroscience and nonlinear dynamics
- Dynamics and synchronization in cortical neural networks
- Function and development of the visual cortex
- Sensory processing in the auditory system

The brains of humans and animals arguably are among the most complex systems in nature. Over the past decade, theoretical neuroscience - the use of quantitative theories, mathematical modelling and advanced quantitative data analysis methods for the study of brain function - has started to provide powerful new approaches for understanding the neuronal basis of perception, learning, memory, and other higher brain functions. This is because, even during the neuronal processing of the most elementary sensory stimulus large ensembles of interacting nerve cells distributed throughout the brain are activated, the collective operations of which are often hard to understand by means of purely qualitative reasoning.

The primary focus of our research in theoretical neuroscience is self-organization in the dynamics of cortical networks. In particular, we have developed novel approaches to model and predict the dynamics and neuronal plasticity of the visual cortex. To quantitatively connect theory and experiment in this system, we recently also designed methods that enable to quantify the organization of visual cortical functional architecture with high precision. Another important focus of our work is the mathematical analysis of the dynamics of large and complex networks of pulse-coupled neuron models. The concepts and tools for the representation of the dynamics of cortical circuits developed enable a rational and transparent design of models of higher cortical functions such as the processes underlying perceptual learning phenomena.

Selected Recent Publications


Fred Wouters

Professor, Laboratory for Molecular and Cellular Systems

- Dr. (Ph. D.) 1997, Faculty of Chemistry, University of Utrecht, The Netherlands

- Postdoctoral fellow, Imperial Cancer Research Fund (ICRF), London UK, 1997 - 2000

- Postdoctoral fellow, European Molecular Biology laboratory (EMBL), Heidelberg, 2000 - 2001

- Appointed as group leader at the European Neuroscience Institute, Göttingen 2001

- PD (habilitation) 2006, Physiology, Göttingen University

Major Research Interests

The focus of our research is the regulation and role of the neuronal cytoskeleton in the modulation of neuronal shape and motility during chemotactic processes. The growing neuronal growth cone probes its environment for the chemical composition of its substrate and the presence of neighbouring cells. The former information is sampled by cell adhesion receptors in focal adhesion structures that, next to their sensing function also perform a structural function in that they provide the cell with a means to exert force on its substrate. We are primarily interested in the signal transduction processes that regulate these effects and the cross-talk between the different motility systems.

The main interest areas in this question are; 1. The role and molecular mechanism of lipid raft-resident cell adhesion molecules in the remodelling of the membrane cytoskeleton, 2. Dynamic control of growth cone protein content by local proteolysis and chaperone function during chemotactic responses, 3. Role and mechanism of the neuronal exocyst complex as critical landmarks for dendritic/axonal neuritogenesis.

Our group has a related interest in the pathophysiological mechanism of neurodegeneration by intracellular aggregation of the tau protein, as occurs in Alzheimer's disease. As tau is an intrinsically unstructured protein that can undergo remarkable conformational changes upon binding to microtubules and in the Alzheimer-related aggregation condition, it presents an ideal model system for the biophysical analysis of protein conformational change and protein interactions. Our research depends on the development and application of advanced microscopy techniques, primarily; fluorescence lifetime imaging microscopy (FLIM), and Förster resonance energy transfer (FRET) microscopy, in combination with a range of GFP-based optical biosensors and novel bioconjugation approaches for organic dyes, and protein biochemical/molecular biological techniques to resolve and quantify biochemical reactions and conditions in living cells.

Selected Recent Publications


Graduate Program Committee

Prof. Dr. Gabriele Flügge
Prof. Dr. Martin Göpfert
Prof. Dr. Ralf Heinrich
Prof. Dr. Michael Hörner
PD Dr. Swen Hülsmann
Prof. Dr. Klaus-Armin Nave
Dr. Silvio Rizzoli
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