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

International Max Planck
Research School
Index

Letter from the University ................................................................. 1
Letter from the Max Planck Society .................................................. 2
Overview ......................................................................................... 3
Intensive Course Program (First Year) ............................................. 4
Lectures and Tutorials ...................................................................... 4
Methods Courses ............................................................................ 5
Laboratory Rotations ...................................................................... 5
Seminars .......................................................................................... 6
Examinations ................................................................................... 6
PhD Program .................................................................................... 6
Master’s Program ............................................................................. 6
Orientation, Language Courses, Social Activities ......................... 7
Application, Selection, and Admission 2021 ................................ 7
Students 2021/2022 ......................................................................... 8
Faculty ............................................................................................ 20
Graduate Program Committee ......................................................... 67
Program Coordination ...................................................................... 67
Imprint ............................................................................................. 68
Letter from the President

The University of Göttingen is committed to the education of the next-generation scientists. Firmly rooted in excellent science, our goals are to train competent and critical young academics that are able to meet the challenges of the future. Within the Göttingen Campus, the cooperation between our university, the local Max-Planck Institutes and the German Primate Center fosters a dynamic and vibrant research environment in which the free exchange of ideas leads to top science in a true manifestation of the famous “Göttingen Spirit”.

The two international MSc/PhD programs in Molecular Biology and Neurosciences are highly acclaimed role models in graduate training that continue to be enormously successful more than 20 years after their foundation. Embedded in the Göttingen Campus they integrate faculty members across institutional borders and provide junior faculty members with full rights as thesis supervisors. The programs offer not only scientific training of outstanding quality but also a comprehensive range of services including training in professional skills, career counseling, and practical support for dealing with daily life, greatly facilitating integration of students from abroad. Due to their success, these programs served as blueprints for the creation of additional PhD training programs that are united under the umbrella of the Göttingen Graduate Center for Neurosciences, Biophysics and Molecular Biosciences (GGNB). The GGNB was supported by the Federal Excellence Initiative until the expiration of its Graduate School program and is now stably financed by the university in cooperation with its partners on the Göttingen Campus.

The Molecular Biology and Neuroscience programs remain unique within the GGNB in offering integrated MSc/PhD curricula with a fast track option, which allow excellent BSc graduates to directly enter the PhD phase after successfully absolving the initial first year of research-oriented training. For almost two decades, these international programs have been particularly successful in attracting large numbers of high quality applicants from all around the world, allowing for the selection of the very best candidates. The new concepts that were introduced by these programs have recently been adopted by the Georg-August University School of Science (GAUSS) and other graduate schools for the benefit of the entire University.

While maintaining their successful structure, the content and focus of the training curriculum of the programs has continuously been adapted to keep pace with the dynamic change of research areas in the participating institutions. Accordingly, new faculty members are integrated to reflect novel developments in research. They will further ensure optimal individual supervision and up-to-date research-oriented training. Beyond academia, both programs maintain close links with the relevant industries to enhance the opportunities of the graduates for a successful professional career in the private sector.

I would like to thank all colleagues and institutions for their unwavering commitment to 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 University of Göttingen will continue to support these programs to promote international exchange at all levels and for further interaction with our partners worldwide.

Prof. Dr. Metin Tolan

(President of the University of Göttingen)
Letter from the Max Planck Society

The mission of the Max Planck Society is to conduct top-level basic research in science and the humanities. Because this is only possible with bright young minds, the Max Planck Society funds graduate education nationwide - including the Neuroscience program in Göttingen.

Currently, over 80 Max Planck Institutes are located on scientific campuses across Germany, most of them close to universities. To strengthen the scientific ties with universities, the Max Planck Society, together with the German University Rectors’ Conference, launched the International Max Planck Research Schools (IMPRSs) as a new joint program - during celebrations in Göttingen on the occasion of the 50th anniversary of the Max Planck Society.

The goals of the IMPRSs are

- to attract excellent students from all around the world to intensive PhD training programs in Germany, preparing them for careers in science,
- to integrate internationally renowned Max Planck researchers into top-level scientific training programs for junior scientists, 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, 65 International Max Planck Research Schools have been established involving 69 Max Planck Institutes, 36 German universities, and 29 universities abroad. Over 3,000 PhD students from over 121 countries are presently enrolled.

Since their foundation in 2000, the Göttingen IMPRSs in Neurosciences and Molecular Biology have met with particular - and extraordinary - success. This is due to multiple factors. Most notably, the Göttingen IMPRSs in Neurosciences and Molecular Biology are the result of a true synergism between the local Max Planck Institutes and the University of Göttingen, the University Medical Center Göttingen, the German Primate Center, and additional extra-university institutions, which allowed to completely reform local graduate education in the course of their establishment. Moreover, all of the respective IMPRS funds are invested into the Neurosciences and Molecular Biology graduate programs. This allows us to offer excellent training conditions and financial support, which is a major attraction for the best students worldwide. Accordingly, most former students of our programs moved on to postdoctoral positions, typically at prestigious international institutions, and many have become successful independent scientists themselves.

Over the past two decades, the IMPRS-funded graduate programs in Neurosciences and Molecular Biology have received unanimous acclaim during external evaluations and won national awards. 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 centre of scientific excellence. Furthermore, the schools served as role models and founding members of the Göttingen Graduate Center for Neurosciences, Biophysics, and Molecular Biosciences, thus being instrumental for the continued support by the German Excellence Initiative provided to the University. We hope that in the years to come our IMPRS students will continue to be successful in their professional careers - and that they will remember their training period in Göttingen as an exciting, stimulating, and formative phase of their lives.

Nils Brose
Dean of the IMPRS
Neurosciences
Overview

This yearbook is intended to provide information on the International MSc/PhD/MD-PhD Program for Neurosciences 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 Center for Neurosciences, Biophysics, and Molecular Biosciences (GGNB), which was supported by the Federal Excellence Initiative until the expiration of its Graduate School program and is now stably financed by the university in cooperation with its partners on the Göttingen Campus. 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 current and former Clusters of Excellence (CNMPB 2002-2019 and MBExC since 2019), 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, GRK).

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 22 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 (M.Sc.) is awarded upon successful completion of the Master’s thesis. The continuation in the PhD program is possible and desired.
Intensive Course Program (First Year)

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

Lectures and Tutorials (Theoretical Modules)

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. (M.Neuro.11, M.Neuro.16): Neuroanatomy and Development
B. (M.Neuro.14, M.Neuro.12): Molecular Biology, Neurogenetics & Basic Statistics
C. (M.Neuro.12): Physiology
D. (M.Neuro.13): Modelling, Autonomous Nervous System, Pharmacology
E. (M.Neuro.15): Sensory and Motor Systems
F. (M.Neuro.16): 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 (Practical Modules)

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:

M.Neuro.21 Histology & Cytology
- comparative development of the vertebrate brain
- cytology and ultrastructure of the human brain
- functional neuroanatomy of sensory and motor systems
- immunocytochemical techniques and single neuron recording
- development and neuroanatomy of invertebrate models

M.Neuro.22 Electrophysiology
- introduction to medical statistics and programming languages
- electrophysiological techniques
- membrane physiology / synaptic transmission
- FLIM / Ca-imaging / FCS techniques / confocal microscopy
- sensory and behavioral physiology

M.Neuro. 23 Microscopy & Imaging
- neuronal modelling
- behavioral analysis
- neuroendocrinology / neuropharmacology
- protein separation techniques

M. Neuro.24 Zoo-Physiology
- cell culture methods
- methods in molecular biology
- genetics of transgenic mouse models

Laboratory Rotations (Practical Module M.Neuro.25)

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 regularly to discuss the 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 by the students in the group of a faculty member. The PhD students select three independent faculty members as their thesis advisory committee who closely monitor progress and advise the 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, career planning, time and project management, bioethics and research ethics, elective courses, and participation in international conferences or workshops. Regular industry excursions are offered to biotechnological or pharmaceutical companies, including visits of the R&D facilities and discussions of career options with representatives of the HR departments.

Doctoral students of the program organize the international PhD student symposium “Neurizons” every two years with great success, attracting outstanding speakers and up to 300 participants from all over the world. The meeting was designed by the students to promote scientific exchange between young researchers from different disciplines. Since a few years, a “Career Fair for Scientists” precedes the Neurizons meetings. The career fair offers a unique and exciting program of career presentations, workshops and networking opportunities and is also organized by the Neuroscience students. Both events include an increasing number of alumni, sharing their experience.

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 M.D.-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 an affiliated 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 2021

Applicants must hold a Bachelor’s degree or equivalent in biology, medicine, psychology, physics, chemistry, 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 2021, the coordination office received 451 applications from 66 countries.

<table>
<thead>
<tr>
<th>Continent</th>
<th>Applications</th>
<th>Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe (total)</td>
<td>73</td>
<td>7</td>
</tr>
<tr>
<td>Germany</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>other West Europe / Middle Europe</td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>East Europe</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>America (total)</td>
<td>52</td>
<td>5</td>
</tr>
<tr>
<td>North America</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Central/South America</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Africa (total)</td>
<td>58</td>
<td>1</td>
</tr>
<tr>
<td>North Africa</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Central/South Africa</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>Asia (total)</td>
<td>265</td>
<td>9</td>
</tr>
<tr>
<td>Near East</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>Central Asia/ Far East</td>
<td>215</td>
<td>4</td>
</tr>
<tr>
<td>Australia</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Incl. 2 NEURASMUS students (from Ghana and Pakistan).

Neurasmus is an Erasmus Mundus Joint Master Degree program (EMJMDs) which is based on the cooperation of 5 partner universities, comprising Université de Bordeaux/ France, Vrije Universiteit Amsterdam/Netherlands, Universitätsmedizin Göttingen/ Germany, Charité - Universitätsmedizin Berlin/Germany and Université Laval/Canada.

For details please refer to the Neurasmus website: 
http://www.neurasmus.u-bordeaux2.fr/
# Students 2021/2022

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namra Aamir*</td>
<td>Pakistan</td>
</tr>
<tr>
<td>Romy Maxine Aiken</td>
<td>USA</td>
</tr>
<tr>
<td>César Mateo Bastidas Betancourt</td>
<td>Colombia</td>
</tr>
<tr>
<td>Leon Bösche</td>
<td>Germany</td>
</tr>
<tr>
<td>Uğur Coşkun</td>
<td>Turkey</td>
</tr>
<tr>
<td>Eren Diniz</td>
<td>Turkey</td>
</tr>
<tr>
<td>Rebecca Divarco</td>
<td>USA</td>
</tr>
<tr>
<td>Thanh Thao Do</td>
<td>Vietnam</td>
</tr>
<tr>
<td>Gökberk Günaydin</td>
<td>Turkey</td>
</tr>
<tr>
<td>Veronika Hantáková</td>
<td>Slovakia</td>
</tr>
<tr>
<td>Robert Mihai Haret</td>
<td>Romania</td>
</tr>
<tr>
<td>Princy Kakani</td>
<td>India</td>
</tr>
<tr>
<td>Ege Kingir</td>
<td>Turkey</td>
</tr>
<tr>
<td>Donatus Krah*</td>
<td>Ghana</td>
</tr>
<tr>
<td>Tejas Nair</td>
<td>India</td>
</tr>
<tr>
<td>Alba Milagros Navarro Flores</td>
<td>Peru</td>
</tr>
<tr>
<td>Elisa Panzeri</td>
<td>Italy</td>
</tr>
<tr>
<td>Raquel Sofia Inácio Pinto</td>
<td>Portugal</td>
</tr>
<tr>
<td>Sreedevi Raghu</td>
<td>India</td>
</tr>
<tr>
<td>Marina Saade</td>
<td>Brazil</td>
</tr>
<tr>
<td>Ekaterina Solyus</td>
<td>Russia</td>
</tr>
<tr>
<td>Anna Celine Westhoff</td>
<td>Germany</td>
</tr>
</tbody>
</table>

* NEURASMUS students
Namra Aamir

EDUCATION
College / University:
Lahore University of Management Sciences

Highest Degree:
B.Sc.

Major Subjects:
Microbiology, Genetics, Computational Biology

Lab Experience:
Wet lab skills: *Drosophila melanogaster* husbandry and basic dissections, FACS, Gel Electrophoresis, qPCR, Immunohistochemistry; Dry lab skills: EEG analysis, MATLAB, Python.

Projects / Research:
2020 – 2021: Development of Neuro-inspired Artificial Intelligence systems - Collaborative research project, Swiss Federal Institute of Technology and Lahore University of Management Sciences
2017 – 2018: Computational Analysis of Microautophagy - Research internship, Lahore University of Management Sciences, Lahore, Pakistan

Scholarships:
2021 – 2023: Erasmus Mundus Joint Master Degrees (EMJMD) scholarship

Romy Aiken

EDUCATION
College / University:
Florida State University

Highest Degree:
B.Sc.

Major Subjects:
Cell and Molecular Neuroscience

Lab Experience:
Genotyping, ImageJ quantification of autoradiographs, histology (IHC, nissl, bodipy), epifluorescence imaging, cryosectioning, perfusions, electrophysiology, stereotaxic rodent surgery, two-photon imaging, and circuit mapping.

Projects / Research:
2020 – 2021: Altered amygdala inhibitory circuits in neuroligin3-R451C mutant mouse model of autism, supervisor: Dr. McLean Bolton, Max Planck FL Institute for Neuroscience
2019 – 2020: Oxytocin receptor binding in the periphery of Magel2 knock-out mice, supervisor: Dr. Elizabeth Hammock, Florida State University
2017 – 2019: Oxytocin and metabolic tissue: analysis of skeletal muscle and adipose tissue differences in neonatal oxytocin receptor knock-out mice

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2020 – 2021: Max Planck FL Institute Post-baccalaureate Research Fellowship
2020 : Clara Kibler Davis Women in Neuroscience Scholarship
2016 – 2020: Florida Bright Futures Scholarship
César Mateo Bastidas Betancourt

EDUCATION

College / University:
National University of Colombia

Highest Degree:
B.Sc.

Major Subjects:
Biology

Lab Experience:

Projects / Research:
"JAGGED1 has a spatial relation to cell migration, apoptosis and cell proliferation in the chicken hippocampal development”. Bachelor thesis. Institute of Genetics, National University of Colombia

Scholarships:
2021 – 2022: Scholarship by the International Max Planck Research School
2019: DAAD scholarship for the summer school in Biomembranes and Cell Microcompartments. Osnabrück University, Germany
2016 – 2020: Undergraduate scholarship due to high academic GPA. National University of Colombia

Leon Bösche

EDUCATION

College / University:
Georg-August-University Göttingen

Highest Degree:
B.Sc.

Major Subjects:
Biochemistry

Lab Experience:
IHC/ICC, IP, SEC, Western blotting, (super-resolution) fluorescence microscopy (confocal, DyMIN STED, MINFLUX), purification of synaptic vesicles from rat brains. Basic experience in ImageJ and R.

Projects / Research:
2020 – 2021: Student assistant position for imaging of biological samples at molecular resolution using MINFLUX, Dept. of NanoBiophotonics (Prof. Hell), MPI for Biophysical Chemistry
2020: Bachelor’s Thesis: “Purification of pre-labelled synaptic vesicles for super-resolution microscopy” Dept. of Neurobiology (Prof. Jahn), MPI for Biophysical Chemistry
2019 – 2020: “Co-localization of different Neurotransmitter Transporters on the same Synaptic Vesicle is Bona-fide yet Sparse” Dept. of Neurobiology (Prof. Jahn), MPI for Biophysical Chemistry

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
**Uğur Coşkun**

**EDUCATION**

**College / University:**
Üsküdar University, Turkey

**Highest Degree:**
B.Sc.

**Major Subjects:**
Molecular Biology and Genetics, Bioengineering (Double Major)

**Lab Experience:**
PCR, DNA Cloning, Western blot, Microscopy (Light, Fluorescence, Confocal), Mice-Rat Injection Techniques, Brain Micro injection, Perfusion-Fixation, Prepulse Inhibition Method, Operant Conditioning, Fear Conditioning, Depression Methods, Locomotor Activity Test, Elevated Mazes, Brain Sectioning, Immunohistochemistry, Immunofluorescence, Nissl Staining.

**Projects / Research:**
2019 – 2021: The Evaluation of the Positive Reinforcement Effect of Taurine in Rat by Operant Box Test and Comparison with Caffeine, Üsküdar University, İstanbul-Turkey
2019: Internship “Neuronal Circuits in Fear Memory Extinction”, Nencki Institute of Experimental Biology, Warsaw-Poland
2018: Internship “From Computational Ability to Metric Interaction-Time, Space and Numerosity in the Mouse Mind”, Koç University, İstanbul-Turkey
2017 – 2018: Effect of Combined Implementation Hesperidin and Valproic Acid on a Pentylenetetrazol Induced Epilepsy Model, Üsküdar University, İstanbul-Turkey

**Scholarships:**
2021 – 2022: Stipend by the International Max Planck Research School
2019: ERASMUS+ Traineeship Grant

**Eren Diniz**

**EDUCATION**

**College / University:**
Boğaziçi University, Turkey

**Highest Degree:**
B.Sc.

**Major Subjects:**
Molecular Biology and Genetics

**Lab Experience:**
Mammalian Cell Culture, Immunophenotyping, Immunohistochemistry, Flow Cytometry, FACS Cryosectioning, Viral Vector Design, Western Blot, SDS-PAGE, Agarose Gel Electrophoresis, PCR, Basic Microscopy, Bacterial Culture, Transformation.

**Projects / Research:**
2020 – 2021: Internship at Vural Lab in KUTTAM about Neuroimmunology, specifically on demyelinating diseases. During my time there, I had the opportunity to work with MS patient blood and cerebrospinal fluid samples to analyse immune cell behaviour.
2020 – 2020: Internship in SutluLab in Boğaziçi University on NK cells and cancer immunotherapy methods, with a focus on CAR-NK cells.
2016 – 2017: Internship in FishLab in Boğaziçi University during the study of olfactory neuron regeneration of Zebrafish

**Scholarships:**
2021 – 2022: Stipend by the International Max Planck Research School
Rebecca Divarco

EDUCATION

College / University:
Grinnell College

Highest Degree:
B.A.

Major Subjects:
Biological Chemistry and Neuroscience

Lab Experience:
DNA/protein synthesis, gel electrophoresis, PCR/qPCR, electrophysiology, dissections, Western blots, IR/NMR spectroscopy, EEG, human behavioral studies, general physics, histology, MATLAB data analysis and communication, Minitab/SPSS data analysis, ImageJ, AV equipment, and Chimera/ChimeraX.

Projects / Research:
2021: Modeling the Biochemical Basis of Key Eukaryotic Translation Initiation Factors, SRTP, University of San Francisco, Dr. Adam Frost
2020: Investigation of Cortical Responses Associated with Omission of an Expected Note within Melodies, Visiting Undergraduate Researcher, University of Iowa; Dr. Kirill Norski
2019: Post-Acute Temperature Perturbation Increases Heat Shock Protein Expression in Cancer Borealis, REU, Brandeis University, Dr. Eve Marder
2017 – 2021: Course Embedded Research, Grinnell College

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2021: Amgen Scholars and University of California SRTP Stipend
2019: Research Experience for Undergraduates Stipend, Brandeis University
2017 – 2021: Recipient of the Founder’s Scholarship, Grinnell College

Thanh Thao Do

EDUCATION

College / University:
Georg-August-University Göttingen

Highest Degree:
B.Sc.

Major Subjects:
Molecular Medicine

Lab Experience:
Primary cell cultures (hippocampal neurons and astrocytes), frozen and paraffin sectioning, transfection (calcium phosphate, lipofectamine and electroporation), immunostaining, fluorescent microscopy, STED microscopy, electrophoresis, ELISA, Western Blot., Image processing with ImageJ, Programming in R.

Projects / Research:
2021: “Characterisation of the protein Mover in primary neuronal and astrocyte cultures”. Bachelor’s thesis at the Institute for Anatomy and Embryology (Prof. Dresbach), University Medical Center Göttingen.
2020 – 2021: Student research assistant at the Institute for Anatomy and Embryology (Prof. Dresbach), University Medical Center Göttingen.
2020: Internship at the Institute for Anatomy and Cell Biology (Prof. Wilting), University Medical Center Göttingen

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2019 – 2020: Deutschlandstipendium
Gökberk Günaydın

EDUCATION

College / University:
Boğaziçi University, Turkey

Highest Degree:
B.Sc.

Major Subjects:
Molecular Biology and Genetics

Lab Experience:
Molecular biology techniques (Immunohistochemistry, in situ hybridization, molecular cloning and PCR), fluorescence and confocal microscopy, zebrafish husbandry, zebrafish olfactory tissue dissection, cryosectioning and zebrafish embryo microinjection.

Projects / Research:
2017 – 2021: Undergraduate researcher and technician under the supervision of Assoc. Prof. Dr. Stefan H. Fuss investigating the adult neurogenesis in the olfactory epithelial tissue of the zebrafish model at Boğaziçi University, Istanbul, Turkey
2019: Summer internship focusing on the neurovascular interactions in the zebrafish model at the Acker-Palmer Group, Goethe University, Frankfurt am Main, Germany

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2020 – 2021: TÜBİTAK (The Scientific and Technological Research Council of Turkey) Undergraduate Scholarship Program
2019 – 2021: TÜBİTAK (The Scientific and Technological Research Council of Turkey) Research Projects Funding Program - Undergraduate Researcher Scholarship

Veronika Hantáková

EDUCATION

College / University:
University of Aberdeen

Highest Degree:
M.Sc.

Major Subjects:
Neuroscience and Psychology

Lab Experience:
Human and animal behavioural experiments, EEG and Polysomnography analysis, MatLab, Western Blotting, Immunohistochemistry, Microscopy.

Projects / Research:
2021: “Behavioural phenotype, EEG characteristics, circadian activity and brain tissue markers of PBL2TAU, PLB2APP and PLB1DOUBLE Alzheimer’s disease mouse models” (University of Aberdeen, School of Medicine and Medical Sciences, Scotland, UK)
2019 – 2020: “Phase-locked acoustic stimulation of slow-wave sleep and its influence on sleep structure, declarative memory consolidation and subjective sleep quality in insomnia patients” (National Institute of Mental Health, Department of Chronobiology and Sleep Medicine, Czech Republic)

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
Robert Mihai Haret

EDUCATION

College / University:
Carol Davila University of Medicine and Pharmacy

Highest Degree:
Doctor of Medicine (MD)

Major Subjects:
Human anatomy, physiology & genetics; biochemistry; microbiology; cell biology; biophysics; histology; pharmacology; internal medicine; surgery.

Lab Experience:
Stereotaxic injection of kainic acid in the mouse hippocampus; ECoG recordings; Microtome & vibratome sectioning of mouse brain; Primary cell culture technique; Confocal microscopy; Immunohistochemistry and immunofluorescence techniques; Drosophila husbandry and genetics.

Projects / Research:
2020 – 2021: Dissertation: Optimizing a temporal lobe epilepsy mouse model induced by intrahipocampic injection of kainic acid
2016 – 2020: Investigating neuroprotective strategies for primary rat hippocampal cell cultures subjected to oxygen - glucose deprivation

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2018 – Gurdon/The Company of Biologists Summer Studentship

Princy Kakani

EDUCATION

College / University:
Dr. D. Y. Patil Vidyapeeth University, Pune, India

Highest Degree:
Integrated Master of Technology in Biotechnology

Major Subjects:
Biotechnology, Stem Cell Biology, Neurodegeneration

Lab Experience:
iPSC culture, 3D Cerebral Organoids, Adult mouse brain dissection, Primary mouse neuronal cell culture, Neural differentiation, Mouse feeder layer preparation, Transfection, Tissue Optical Clearing, Cryosectioning, qPCR, In-fusion cloning, AAV directed recombination, Construct Designing, Immunohistochemistry, Confocal Microscopy, Stereomicroscope, Live-cell Imaging.

Projects / Research:
2019 – 2021: Project Assistant, National Centre for Cell Science, Pune, India: “Establishment And Maintenance of Isogenic Down Syndrome Human Induced Pluripotent stem cells (hiPSCs)”

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2018: Meritorious Student Prize by Dr. D. Y. Patil Vidyapeeth, Pune
Ege Kingir

EDUCATION

College / University:
Boğaziçi University, Istanbul

Highest Degree:
B.Sc.

Major Subjects:
Molecular Biology and Genetics

Lab Experience:
Behavioral testing in rats, transcardial perfusion&fixation, tissue slicing, immunohistochemistry, light & fluorescence microscopy.

Projects / Research:
The antidepressant properties of chronic oral ketamine application on male Wistar rats under stress - Funded by TUBITAK 2209/A (Research Support Programme for Undergraduate Students) Programme

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2016 – 2020: Gallagher Foundation Scholar

Donatus Krah

EDUCATION

College / University:
Kwame Nkrumah University of Science and Technology, Ghana

Highest Degree:
B.Sc.

Major Subjects:
Biological Sciences (Microbiology and Molecular Biology inclusive)

Lab Experience:
Medical Lab: Phlebotomy, Hematology, Serology, Blood screening; Research Lab: Light Microscopy, Microbiology, Basics in Molecular Biology; Data Analysis: IBM SPSS.

Projects / Research:
2021: Laboratory Technician at University for Development Studies- assisting students with laboratory experiments and in designing and implementing laboratory aspects of their final year projects.
2016: “Intercropping of maize with cowpea and okra in the management of maize stem borers.”
2013 – 2015: Annual Medical screening of pupils in Basic School under the NGO Compassion International Ghana by Mercy Women’s Catholic Hospital Laboratory

Scholarships:
2021 – 2023: Erasmus Mundus Joint Master Degrees (EMJMD) scholarship
2012 – 2016: Lower Prah Rural Bank Scholarship
Tejas Nair

EDUCATION

College / University:
SRM Institute of Science and Technology (SRMIST), Chennai, India

Highest Degree:
Bachelor of Technology

Major Subjects:
Genetic Engineering, Human Physiology, Human Genetics, Recombinant DNA Technology

Lab Experience:
PCR, SDS PAGE, Liquid Chromatography, Plasmid Transfection, Molecular Cloning, DNA & RNA Isolation, Gene Expression Techniques, Basic handling of SH-SY5Y cell lines and Oxyacarne luetus species; ImageJ, Illastik, Python, Bioinformatics, Widefield Fluorescent Microscope, Light Microscope and Live-Cell Imaging.

Projects / Research:
2020: “Comparison of Dopamine Transporter (DAT) Trafficking under varying concentrations of methylphenidate and amphetamine in neuroblastoma cell lines”, Dr. Edna Grünblatt, University of Zurich.
2019: “Gut Metagenomic Profiling of Gossypol Induced Oxyacarne luetus (Hemiptera: Lygaeidae) Gossypol Tolerating Bacterial Species”, Dr. SKM Habeeb. SRMIST.
2018: Clinical Pathologists Intern at Poona Hospital and Research Center, Pune, India

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2020: Student Researcher Stipend by the Department of Child and Adolescent Psychiatry and Psychotherapy, University of Zurich
2017 - 2019: Three Merit-based performance scholarships by SRM Institute of Science and Technology

Alba Navarro Flores

EDUCATION

College / University:
Federico Villarreal National University (UNFV), Lima - Peru

Highest Degree:
Medical Doctor

Major Subjects:
Human Medicine

Lab Experience:
General laboratory techniques required in medical training.

Projects / Research:

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
Elisa Panzeri

EDUCATION

College / University:
University of Leicester, UK

Highest Degree:
B.Sc.

Major Subjects:
Neuroscience, Molecular Biology, Physiology, Genetics

Lab Experience:
Cryosectioning, immunohistochemistry, (fluorescence) microscopy, dissection, cell culture, PCR, gel electrophoresis; Basic experience in MATLAB, R, ImageJ.

Projects / Research:
2020 – 2021: B.Sc. Thesis “The role of the 5-HT7 and the 5-HT1A serotonergic receptors in dendritic and synapse formation in the development of cortical neurons”. Straub Lab, University of Leicester
2020: “A meta-analysis of areas of structural variation in grey matter in individuals with Autism Spectrum Disorder (ASD) in relation to gene expression of candidate ASD genes”. Dr Brischetto Costa, University of Turin
2019: “Time course of the development of inhibitory interneurons in developing primary somatosensory cortex”. Orefice Lab, Massachusetts General Hospital

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School

Raquel Pinto

EDUCATION

College / University:
University of Coimbra, Portugal

Highest Degree:
M.Sc.

Major Subjects:
Biochemistry, Neuroscience

Lab Experience:
Biochemistry (qPCR, RNA/protein extraction, Western Blot, immunofluorescence), mice husbandry and behavior (tMCAO, sensorimotor tests, injection administrations (intracerebral,IV, etc), osmotic pump placements, CSF and brain collection), primary neuronal culture.

Projects / Research:
2019 – 2021: Stroke in translation: Biomarkers for diagnosis and management of acute ischemic stroke; Molecular Neurobiology lab, i3s, Porto, Portugal
2019 – 2021: CRISPR/Cas9 TTR gene editing conjugated lipid nanoparticles, as a tool for conditional TTR KO mice, in CSF and Sera independently; Molecular Neurobiology lab, i3s
2018: Neuronal Cell Death in Alzheimer’s Disease: Effect of Aß Oligomers in axons of cultured hippocampal neurons; Neurotrophin Signaling and Synaptic (Dys)Function, CNC, Portugal

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2020 – 2021: Professional Internship supervised by João R. Gomes (PhD) at Molecular Neurobiology lab, i3s
Sreedevi Raghu

**EDUCATION**

**College / University:**
Rheinische Friedrich Wilhelms University Bonn

**Highest Degree:**
M.Sc.

**Major Subjects:**
Neuroscience, Developmental biology, Assembly of Neural circuits, Senescence and Aging

**Lab Experience:**
Cortical Organoid generation, Microfluidics, Recording of Electrical activity on high density MEA chips, *Drosophila* genetics, Immunostaining and confocal imaging, Western blotting, Quantitative PCR, PCR, NGS-based RNA sequencing, Mass spectrometry, Laser capture microdissection.

**Projects / Research:**
2021: Emergence of Electrical activity in cortical organoids grown on a 3D mesh based MEA chip at IMEC, KU Leuven, Belgium.
2020 – 2021: A novel method to isolate in vivo senescent cells from multiple murine tissues using Laser Capture Microdissection at the German Centre for Neurodegenerative disorders, Bonn, Germany.
2019: Patterning of human brain organoids on a microfluidic chip at DBSSE, ETH Zurich, Switzerland.

**Scholarships:**
2021 – 2022: Stipend by the International Max Planck Research School
2021: International Research Scholarship by KU Leuven
2021: DAAD Scholarship for Academic Excellence at the University of Bonn
2011 - 2016: INSPIRE Scholarship by MHRD, Govt. of India

Marina Saade

**EDUCATION**

**College / University:**
Federal University of Paraná (UFPR), Brazil University of São Paulo (USP), Brazil

**Highest Degree:**
M.Sc.

**Major Subjects:**
Biomedical Sciences (BSc), Pharmacology (MSc)

**Lab Experience:**
Primary and Cell line culture, RNA extraction, RT-PCR, Protein extraction, Western Blotting, Immunocytochemistry, Fluorescent microscopy, ELISA, Cell viability assays, Animal behavior, Rat and mice perfusion, Brain dissection, Human behaviour analysis.

**Projects / Research:**
2018 – 2021: Effects of GPNMB in the modulation of neuroinflammatory processes induced by LPS in glia, Molecular Neuropharmacology Laboratory, USP
2016 – 2018: Reactivation of aversive memory by stress: comparison between reconsolidation and extinction, Neurophysiology Laboratory, UFPR
2015: Reward anticipation and time perception in intertemporal choice, Decision Neuroscience Laboratory, UniMelb

**Scholarships:**
2021 – 2022: Stipend by the International Max Planck Research School
2018 – 2020: Master’s scholarship by the Research Support Agency of São Paulo (FAPESP)
2015: Science without Borders scholarship (CNPq)
2013 – 2014: Undergraduate researcher scholarship by Araucária Foundation
Ekaterina Solyus

EDUCATION

College / University:
Lomonosov Moscow State University

Highest Degree:
B.Sc.

Major Subjects:
Biology, Bioorganic Chemistry

Lab Experience:
Molecular Biology (cloning, RNA extraction and reverse transcription), Animals (perfusion, basic experience with stereotaxis, preparation of murine hippocampal neurons culture), Microscopy (brain samples preparation, antibody staining), Maintenance and operation with cell culture (transduction, transfection).

Projects / Research:
2020 – 2021: “Thermogenetic activation of neurons and astrocytes in primary cell culture of the murine embryonic hippocampus” at the Institute of Bioorganic Chemistry, Laboratory of Molecular Technologies by V. Belousov, O. Podgorny’s group
2018 – 2020: “Inhibition of long non-coding RNAs in U87 glioblastoma cells with small inhibitory RNAs” at the Institute of Bioorganic Chemistry, Laboratory of Molecular Oncology by O. Dontsova, Yu. Rubtsov’s group, Moscow, Russia
2017 – 2018: Computational Analysis of Microautophagy - Research internship, Lahore University of Management Sciences, Lahore, Pakistan

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
2017 – 2021: Increased scholarship for academic achievements by Lomonosov Moscow State University

Anna Westhoff

EDUCATION

College / University:
Georg-August University Göttingen

Highest Degree:
B.Sc.

Major Subjects:
Molecular Medicine

Lab Experience:
Gel electrophoresis, western blot, gel shift assay, RT-QuIC, cell culture, light microscopy, cryosectioning, paraffinsectioning, immunohistochemistry Analysis: ImageJ, Excel, GraphPad Prism, ANY-maze, Pathfinder, Stereo Investigator.

Projects / Research:
Basics of Radio Isotopes, Laboratory for Radioisotopes, Göttingen, Bernd Kopka, Prof. Dr. mult. Thomas Meyer
Basics and Diagnostics of Neurodegenerative Diseases, Department of Neurology, Göttingen, Dr. rer. nat. Matthias Schmitz
Characterization of Abeta-antibodies, Department of Psychiatry and Psychotherapy, Göttingen, Prof. Dr. Thomas Bayer
Bachelor’s Thesis: Influence of Δ9-tetrahydrocannabinol on Spatial Reference Memory, Neurogenesis and Inflammation in an Alzheimer’s Disease Mouse Model, Department of Psychiatry and Psychotherapy, Göttingen, Priv.-Doz. Dr. Yvonne Bouter

Scholarships:
2021 – 2022: Stipend by the International Max Planck Research School
<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrea Antal</td>
<td>Clinical Neurophysiology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Mathias Bähr</td>
<td>Neurology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Thomas Bayer</td>
<td>Molecular Psychiatry</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Susann Boretius</td>
<td>Functional Imaging Laboratory</td>
<td>MPI bpc</td>
</tr>
<tr>
<td>Nils Brose</td>
<td>Molecular Neurobiology</td>
<td>MPI em</td>
</tr>
<tr>
<td>Wolfgang Brück</td>
<td>Neuropathology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Gregor Bucher</td>
<td>Developmental Biology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Brett Carter</td>
<td>Synaptic Physiology and Plasticity</td>
<td>ENI</td>
</tr>
<tr>
<td>Jan Clemens</td>
<td>Neural Computation and Behavior</td>
<td>ENI</td>
</tr>
<tr>
<td>Peter Dechent</td>
<td>Cognitive Neurology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Thomas Dresbach</td>
<td>Anatomy and Embryology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Hannelore Ehrenreich</td>
<td>Clinical Neurosciences</td>
<td>MPI em</td>
</tr>
<tr>
<td>Gregor Eichele</td>
<td>Genes and Behavior</td>
<td>MPI bpc</td>
</tr>
<tr>
<td>Rubén Fernández-Busnadiego</td>
<td>Institute for Neuropathology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>André Fischer</td>
<td>German Center for Neurodegenerative Diseases</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Alexander Flügel</td>
<td>Neuroimmunology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Tim Friede</td>
<td>Medical Statistics</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Alexander Gail</td>
<td>Sensorimotor Transformations</td>
<td>DPZ</td>
</tr>
<tr>
<td>Tim Gollisch</td>
<td>Ophthalmology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Martin Göpfert</td>
<td>Cellular Neurobiology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Ralf Heinrich</td>
<td>Cellular Neurobiology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Stefan Hell</td>
<td>NanoBiophotonics</td>
<td>MPI bpc</td>
</tr>
<tr>
<td>Swen Hülsmann</td>
<td>Experimental Neuroanesthesiology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Reinhard Jahn</td>
<td>Neurobiology</td>
<td>MPI bpc</td>
</tr>
<tr>
<td>Igor Kagan</td>
<td>Decision and Awareness</td>
<td>DPZ</td>
</tr>
<tr>
<td>Siegrid Löwel</td>
<td>Systems Neuroscience</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Tobias Moser</td>
<td>Auditory Neuroscience &amp; InnerEarLab</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Klaus-Armin Nave</td>
<td>Neurogenetics</td>
<td>MPI em</td>
</tr>
<tr>
<td>Tiago Outeiro</td>
<td>Experimental Neurodegeneration</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Luis Pardo</td>
<td>Molecular Biology of Neuronal Signals</td>
<td>MPI em</td>
</tr>
<tr>
<td>Arezoo Pooresmaeili</td>
<td>Perception and Cognition</td>
<td>ENI</td>
</tr>
<tr>
<td>Viola Priesemann</td>
<td>Neural Systems Theory</td>
<td>MPI ds</td>
</tr>
<tr>
<td>Jeong Seop Rheem</td>
<td>Neurophysiology</td>
<td>MPI em</td>
</tr>
<tr>
<td>Silvio O. Rizzoli</td>
<td>Neuro- and Sensory Physiology</td>
<td>ENI</td>
</tr>
<tr>
<td>Annekathrin Schacht</td>
<td>CRC Text Structures</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Hansjörg Scherberger</td>
<td>Neurobiology</td>
<td>DPZ</td>
</tr>
<tr>
<td>Oliver Schlüter</td>
<td>Molecular Neurobiology</td>
<td>ENI</td>
</tr>
<tr>
<td>Caspar Schwiedrzik</td>
<td>Neural Circuits and Cognition</td>
<td>ENI</td>
</tr>
<tr>
<td>Michael Sereda</td>
<td>Molecular and Translational Neurology</td>
<td>MPI em</td>
</tr>
<tr>
<td>Jochen Staiger</td>
<td>Neuroanatomy</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Stefan Treue</td>
<td>Cognitive Neurosciences</td>
<td>DPZ</td>
</tr>
<tr>
<td>Melanie Wilke</td>
<td>Cognitive Neurology</td>
<td>University of Göttingen</td>
</tr>
<tr>
<td>Sonja Wojcik</td>
<td>Neurotransmitter Systems</td>
<td>MPI em</td>
</tr>
<tr>
<td>Fred Wolf</td>
<td>Theoretical Neurophysics</td>
<td>MPI ds</td>
</tr>
<tr>
<td>Fred Wouters</td>
<td>Molecular and Cellular Systems</td>
<td>University of Göttingen</td>
</tr>
</tbody>
</table>

U Göttingen = University of Göttingen, 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
Andrea Antal

Group Leader Non-Invasive Brain Stimulation Laboratory, Dept. of Neurology

- 1990 Diploma in Biology, Attila József University of Sciences, Szeged, Hungary
- 1993 University Doctor, Attila József University of Sciences, Szeged, Hungary
- 1998 Ph.D., Albert Szent-Györgyi Medical University, Szeged, Hungary
- 2005 Habilitation University of Göttingen, Germany
- 2010 Extraordinary professor, University of Göttingen, Germany

Major Research Interests

Neuroplasticity became one central topic of neuroscience research in the last decades. Dynamic modifications of neuronal networks are an important substrate for learning and memory formation. Furthermore, pathological neuroplasticity might be one foundation of numerous central nervous system diseases.

The primary aim of our recent work is to develop and establish new non-invasive brain stimulation methods to induce physiological changes in the central nervous system in order to investigate cognition and complex information processing. Transcranial direct current stimulation (tDCS) was developed by our group as a non-invasive tool to induce neuroplasticity in the human cerebral cortex. tDCS as a tool aims to induce prolonged neuronal excitability and activity alterations in the human brain via alterations of the neuronal membrane potential. Accordingly, this method is a promising tool in the treatment of diseases that are accompanied by changes of cortical excitability. Transcranial alternating current stimulation (tACS) and random noise stimulation (tRNS) are new external stimulation techniques influencing cortical activity. tACS and tRNS permit, due to the oscillating stimulation, external interference with the cortical oscillations. They can particularly modulate the temporary connections of cortical areas during a given task. Neuronal oscillations in the brain are associated with the processing of sensory information, learning, cognition, arousal, attention and also pathological conditions (e.g. Parkinson’s tremor, epilepsy). Therefore, the external modulation of cortical oscillations could be an important component of induced cerebral plasticity. In terms of effectiveness tRNS seems to have at least the same therapeutic potential for the treatment of diseases such as depression and chronic pain as rTMS and tDCS.

Selected Recent Publications


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
- since 2001 Director at the Department of Neurology, University of Göttingen

Major Research Interests

Our research examines cellular and molecular mechanisms of neuronal dysfunction and neuronal cell death in neurodegenerative disorders focusing on Parkinson’s disease (PD). In a translational approach we use several models to study pathophysiological cascades, potential biomarkers and develop new therapeutic strategies.

In the Excellence Cluster MBExC we cooperate with several other groups of the Göttingen Campus to determine the role of α-synuclein aggregation for dopaminergic dysfunction and cell death. To that end, we have recently also established new differentiation protocols for iPSC cells from idiopathic and genetic PD patients. In all our model systems we use AAV-mediated viral gene transfer to express different disease-related genes as research tools and also as potential therapeutic factors to manipulate the respective molecular events in vitro and in vivo. In parallel, we examine the pathophysiology in PD patients and develop new diagnostic and prognostic biomarkers.

Final aim of our research approaches is to describe in detail the molecular pathophysiology that leads to axonal and neuronal loss and to develop new therapeutic strategies, some of which have already been translated into proof of concept studies in human patients.

Selected Recent Publications


Thomas Bayer

Professor of Molecular Psychiatry

- 1984 – 1989 Diploma in biology, University of Stuttgart and Whitney Lab Florida
- 1989 – 1993 PhD at the University of Cologne (PhD Thyssen Graduate School)
- 1993 Postdoctoral Research Fellow, University of Cologne, Cologne
- 1993 – 1997 Postdoctoral Research Fellow, Institute of Neuropathology, University of Bonn Medical Center, Bonn
- 1997 – 2002 Lab leader, Department of Psychiatry, University of Bonn Medical Center, Bonn
- 2002 – 2007 Head of Neurobiology Lab, University of Saarland Medical Center, Homburg
- 2004 Appointment to apl Professor at the University Medical Center Saarland
- 2007 – present University Professor in “Molecular Psychiatry” at the University of Göttingen, University Medical Center Göttingen

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


Susann Boretius

Professor of Functional Imaging at the German Primate Center

- 1994 License to practice veterinary medicine
- 2000 Doctor of veterinary medicine, University of Leipzig
- 2003 Diploma in Physics, University of Göttingen
- 2003 – 2011 Scientific assistant, Max-Planck-Institute for Biophysical Chemistry, Göttingen, Biomedizinische NMR Forschungs GmbH (Prof. J. Frahm)
- 2011 – 2015 Professor of Biomedical Imaging with focus on magnetic resonance technologies, Christian-Albrechts University of Kiel, Germany
- 2013 – 2015 Head of the Molecular Imaging North Competence Center, Christian-Albrechts University of Kiel
- since 2015 Professor of Functional Imaging, Faculty of Biology and Psychology, University of Göttingen and head of the Functional Imaging Laboratory, German Primate Center, Göttingen

Major Research Interests

Magnetic resonance imaging (MRI) and spectroscopy (MRS) Neurosciences: basic and translational research

Our research is focused on the development and improvement of magnetic resonance (MR) methods for application in basic biomedical and applied clinical research especially in the fields of neurosciences. We are particularly interested in applying this method on experimental animals, but we do complementary studies in humans as well. As truly non-invasive techniques, MRI and MRS are important methods for translational research, because almost the same methods can be applied in animals and humans. In this context, our research and development activities aim to continuously improve the spatial and temporal resolution of MRI and MRS in rodents, in non-human primates and in humans. With the help of these techniques we are “watching” the brain while it thinks and aiming to better understand what happens with the brain during maturation and aging, and under healthy and pathological conditions as well. Moreover, by using appropriate animal models and more advanced contrast mechanism like diffusion based techniques, magnetization transfer and susceptibility mapping our goal is to increase the sensitivity and specificity of these MR methods for more precise diagnostics and for a more specific and early detection of the response to therapeutic intervention.

Selected Recent Publications


Nils Brose

Professor, Director at the Max Planck Institute for Experimental Medicine

- 1981 – 1985 Undergraduate studies in Biochemistry, Eberhard Karls University, Tübingen, Germany
- 1987 MSc in Physiology with Marianne Fillenz, University of Oxford, Oxford, UK
- 1990 PhD in Biology with Reinhard Jahn, Ludwig Maximilians University, Munich, Germany
- 1991 – 1995 Postdoctoral training with Stephen F. Heinemann (Salk Institute, La Jolla, CA, USA) and Thomas C. Südhof (University of Texas Southwestern Medical Center, Dallas, TX, USA)
- 1995 – 2001 Research Group Leader, Max Planck Institute of Experimental Medicine, Göttingen, Germany
- since 2001 Director, Department of Molecular Neurobiology, Max Planck Institute of Experimental Medicine, Göttingen, Germany

Major Research Interests

Our research focuses on the molecular mechanisms of nerve cell development and synapse formation and function in the vertebrate central nervous system. To this end, we combine biochemical, morphological, mouse genetic, physiological, and behavioral methods to elucidate the molecular basis of nerve cell differentiation, synapse formation, transmitter release, and postsynaptic transmitter sensing. In selected cases, we explore the dysfunction of corresponding biological processes in neuropsychiatric diseases. Our work in the field of nerve cell development focuses on the role of SUMOylation in cell polarity formation, cell migration, and neuritogenesis, our synaptogenesis research concentrates on synaptic cell adhesion proteins and their role in synapse formation and function, and our 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


Gregor Bucher

Professor of Evolutionary Developmental Genetics

- since 2017 Head of Department Evolutionary Developmental Genetics
  GZMB, Johann Friedrich Blumenbach Institut, University of Göttingen, Germany
- 2013 – 2017 DFG Heisenberg Professor Evolutionary Developmental Genetics,
  GZMB, Johann Friedrich Blumenbach Institut, University of Göttingen, Germany
- 2006 – 2013 Junior Professor of Developmental Genetics in the Department of
  Developmental Biology, GZMB, Johann Friedrich Blumenbach Institut, University of
  Göttingen, Germany (2002)
- 2006-2013 Junior Group Leader of the Göttingen Center for Molecular Biology
  (GZMB)
- 2004 – 2006 Postdoc University of Göttingen, Germany

Major Research Interests

Head Development and Evolution
We seek to understand the formation of the insect head from pattern formation to
morphogenesis. These data provide insights into some long standing zoological ques-
tion concerning the arthropod head and its evolution.

Brain Development and Evolution
We want to identify the cellular and genetic mechanisms that underly the evolution of
the astonishing diversity of insect brains. Further, we identify the genetic signals speci-
fying neural stem cells of the brain. We focus on the central complex as model.

Insect Functional Genomics
We expand the power of our model system by developing novel tools. Transgenic tools
and CRISPR/Cas9 genome editing allow a deeper analysis of gene function. The genome
wide iBeetle RNAi screen reveals novel gene functions.

Selected Recent Publications
Farnworth MS, Eckermann KN, Bucher G (2020) Sequence heterochrony led to a gain
of functionality in an immature stage of the central complex: A fly–beetle insight. PLOS
Biol 18, e3000881

He B, Buescher M, Farnworth MS, Strobl F, Stelzer EH, Koniszewski ND, Muehlen D,
Bucher G (2019) An ancestral apical brain region contributes to the central complex
under the control of foxQ2 in the beetle Tribolium. eLife 8.

in a short-germ insect: Zygotic control of axis formation revealed in the beetle
Tribolium castaneum. Proc Natl Acad Sci 201716512

Schmitt-Engel C, Schultheis D, Schwirz J, Ströhlein N, Troelenberg N, Schoppmeier M,
for insect development and physiology. Nat Commun 6: 7822

Bucher G (2012) Asymmetrically expressed axin required for anterior development in
Tribolium. Proc Natl Acad Sci USA 109: 7782–7786

Posnien N, Koniszewski NDB, Hein HJ, Bucher G (2011) Candidate Gene Screen in the
Red Flour Beetle Tribolium Reveals Six3 as Ancient Regulator of Anterior Median Head
and Central Complex Development. PLoS Genet 7, e1002418
Brett Carter

Group Leader at ENI

- 2002 Undergraduate studies in chemical engineering, Georgia Institute of Technology, Atlanta, USA
- 2004 – 2006 Research Assistant with David Clapham, Children's Hospital Boston, USA
- 2006 – 2011 PhD in Neurobiology with Bruce Bean, Harvard, Boston, USA
- 2011 – 2017 Postdoctoral training with Craig Jahr, Vollum Institute, Portland, USA
- since 2017 Research group leader, European Neuroscience Institute, Göttingen, Germany

Major Research Interests

Our research focuses on synaptic function and the changes that can occur after synaptic plasticity. We study intact glutamatergic synapses in brain slices using a combination of electrophysiology, 2-photon imaging, and pharmacology. In particular, we are interested in understanding the role of NMDA receptors in signaling synaptic depression.

Selected Recent Publications


Carter BC and Jahr CE (2016) Postsynaptic, not presynaptic NMDA receptors are required for spike timing dependent LTD induction. Nat Neurosci 19: 1218-1224


Jan Clemens

Group leader, European Neuroscience Institute

- 2012 PhD in Computational Neuroscience, Humboldt-Universität zu Berlin, BCCN Berlin
- 2012 – 2017 Postdoctoral Fellow, Princeton University
- since 2017 Group leader, European Neuroscience Institute

Major Research Interests

The “Neural Computation and Behavior” works on how acoustic communication signals are processed to inform behavior. Acoustic communication is widespread in the animal kingdom - yet it’s neural basis is only poorly understood. Like songbirds or crickets - fruit flies also produce mating songs during courtship. We use high-throughput behavioral assays and computer vision to precisely quantify how song influences behavior on multiple time scales – from changes in locomotion in response to the song over tens of milliseconds to a mating decision based on song accumulated over several minutes of courtship. We then exploit the genetic toolbox available in Drosophila to identify the neural substrates of these behaviors: Using optogenetics, we activate or inactivate individual neurons in the fly brain during courtship interactions – quantitative models of the behavior then allow us to identify the time scales and components of the behavior controlled by these neurons. Having found individual neurons involved in processing song, we then use electrophysiology and two-photon Calcium imaging to interrogate the dynamical neural representations of song to determine how song is encoded in the brain and how these neural codes give rise to behavior.

Selected Recent Publications


Peter Dechent

Research Group Leader, Cognitive Neurology

- 1991 – 2001 Studies of Biology, University of Mainz
- 1994 Scientific Assistant at the Biophysical Institute, University of Mainz
- 1996 Research Fellow at the Neuroscience Department, Karolinska Institute, Stockholm, Sweden
- 1997 – 1998 Diploma Thesis at the ‘Biomedical NMR Research’ at the Max-Planck-Institute for Biophysical Chemistry, Göttingen; Diploma in Biology
- 1998 – 2001 Doctoral thesis at the ‘Biomedical NMR Research’; Dr.rer.nat. (Biology)
- 2001 – 2003 Postdoc at the ‘Biomedical NMR Research’ (Laboratory of Prof. Dr. J. Frahm)
- since 2004 Head of the Research Group ‘MR-Research in Neurology and Psychiatry’ Medical Faculty, University Göttingen

Major Research Interests

- Combination of functional magnetic resonance imaging (fMRI) with non-invasive brain stimulation techniques like transcranial Direct / Alternating Current Stimulation (tDCS/tACS) and Transcranial Magnetic Stimulation (TMS) to modulate functional brain networks in healthy and pathologic conditions.
- Characterization of hemodynamic processes, the basis of blood oxygenation level dependent (BOLD) changes in standard fMRI investigations.
- Application of modern MR techniques to investigate the human brain in healthy and pathologic conditions. Applied methods comprise:
  - Structural MRI
  - Diffusion-weighted- and diffusion-tensor-imaging (DWI/DTI)
  - Localized MR-spectroscopy (MRS)

Selected Recent Publications


Thomas Dresbach

Professor of Anatomy

- 1996 Dr. rer. nat. (Biology), University of Bonn
- 1997 – 2003 DFG research fellow and postdoctoral Fellow with E. Gundelfinger at the Leibniz Institute for Neurobiology
- 2003 – 2010 Teacher and independent research group leader at the University of Heidelberg, Institute for Anatomy and Cell Biology (Dept. Prof. Dr. J. Kirsch)
- 2010 Professor at the School of Medicine, University of Göttingen

Major Research Interests

Our group studies synapse formation with particular focus on the biogenesis of presynaptic nerve terminals. Our goal is to understand the mechanisms of synaptogenesis in enough detail to pinpoint molecular causes of synaptopathies. We study neuronal cultures to unravel fundamental mechanisms operating at the heart of synaptogenesis, and we have begun to study specialized synapses such as the giant synapses of the mammalian auditory system to determine how these mechanisms act together to gene-rate the remarkable specification and heterogeneity of synapses in the brain.

Using live imaging, molecular biological and ultrastructural approaches, we currently analyze
- the role of novel, vertebrate-specific presynaptic proteins in synaptic function
- the trafficking and assembly of synaptic organelles and protein complexes
- the transsynaptic signalling events controlling presynaptic differentiation.

These efforts should help us understand both the common principles by which the various types of synapses are generated, and how they are fine-tuned for specific tasks, such as a particular strength, reliability or adaptivity.

Selected Recent Publications


Hannelore Ehrenreich

**Professor of Neurology and Psychiatry, Head, Clinical Neuroscience, MPI-EM**

- 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 Clinical Fellow, Department of Internal Medicine, University of Munich
- 1987 Graduation (Medicine), University of Munich
- 1987 – 1988 Residency, Department of Neurology, University of Munich
- 1989 Doctor of Medicine, University of Munich
- 1989 – 1991 Postdoctoral Fellow NIAID, NIH, Bethesda, MD, USA (Dr. A.S. Fauci)
- 1994 Habilitation (Neurology and Psychiatry)
- 1994 – present: Head, Clinical Neuroscience, MPIEM
- 1995 – present: Consultant & Professor of Neurology & Psychiatry, University of Göttingen
- 2000 – 2002 Vice President, University of Göttingen
- 2008 Professor of Biology and Psychology (Honorary), University of Göttingen
- 2016 Member of the Leopoldina, German National Academy of Science
- 2020 Jean Delay Prize of the World Psychiatric Association (WPA)

**Major Research Interests**

**Translational Neuroscience**

Research with particular focus on:

1. Genetic and environmental underpinnings of neuropsychiatric diseases;
2. Endogenous neuroprotection and neuroregeneration as therapeutic strategies for patients: Research centering on the brain erythropoietin system and hypoxia;
3. Autoimmune and inflammatory processes contributing to neuropsychiatric phenotypes.

**Selected Recent Publications**


Gregor Eichele

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- 1976 – 1980 Ph.D. protein crystallography (J. N. Jansonius, Biocenter, University of Basel, Switzerland)
- 1981 – 1984 Postdoctoral training in Developmental Biology (B. M. Alberts, University of California, San Francisco)
- 1985 – 1989 Assistant Professor of Cellular and Molecular Physiology, Harvard Medical School, Boston, USA
- 1989 – 1990 Associate Professor of Cellular and Molecular Physiology, Harvard Medical School, Boston, USA
- 1991 – 1992 Associate Professor of Biochemistry, Baylor College of Medicine, Houston, USA
- 1992 – 1998 Professor of Biochemistry and Neuroscience, Baylor College of Medicine, Houston, USA
- 1998 – 2006 Director at the Max Planck Institute of Experimental Endocrinology, Dept. of Molecular Embryology, Hanover, Germany
- 2006 – Director at the Max Planck Institute of Biophysical Chemistry, Dept. Genes and Behavior, Goettingen, Germany

Major Research Interests
Dynamic interplay between gene expression, brain development and architecture and behavior.

Selected Recent Publications
Rubén Fernández-Busnadiego

Professor of Neuropathology

- 2005 – 2010 Department of Chemistry at the Technical University of Munich, Germany, Degree: Doctor Rer.Nat.
- 2010 – 2011 Postdoctoral Fellow at the Max-Planck-Institute for Biochemistry, Martinsried, Germany, Department of Cell Biology
- 2011 – 2013 Postdoctoral Fellow, Yale University School of Medicine, New Haven, CT, USA, Department of Cell Biology
- 2013 – 2019 Project Group Leader, Max Planck Institute of Biochemistry, Martinsried, Germany, Department of Molecular Structural Biology
- since 2019 Full Professor at the University Medical Center, University of Göttingen, Germany, Institute of Neuropathology

Major Research Interests

We use cutting-edge electron microscopy to reveal the intricate detail of cellular architecture. We combine cryo-FIB milling with cryo-electron tomography (cryo-ET) to image cells pristinely preserved by vitrification at molecular resolution.

One of our focus is the study of membrane contact sites (MCS), structures where two cellular membranes come into close apposition to directly exchange Ca²⁺, lipids and metabolites. We combine cryo-ET with molecular biology and functional assays to reveal the structural and functional roles of different MCS-resident proteins in situ, i.e. within their unaltered cellular environment.

Another major research area is the molecular architecture of neurons, both in their healthy state and in the context of neurodegenerative diseases. For example, our work has revealed the intricate structure of the presynaptic cytomatrix, a dense network of filaments linking synaptic vesicles to each other and to the active zone, likely playing important roles in the regulation of neurotransmitter release. We have also investigated toxic protein aggregates related to e.g. Huntington’s disease or amyotrophic lateral sclerosis. Our work reveals the broad diversity of such aggregates, both structurally and in terms of cellular interactions. These studies are shedding new light into the molecular mechanisms of neuron (dys)function.

Selected Recent Publications

André Fiala

Professor of Molecular Neurobiology of Behavior

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

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 its 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

Professor for Psychiatry and Psychotherapy

- 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
- 2007 – 2011 Independent Group Leader at ENI
- since 2011 W3 Professor at the Department for Psychiatry and Psychotherapy, University Medical Center Göttingen
- since 2011 Speaker of the German Center for Neurodegenerative Diseases (DZNE) site Göttingen

Major Research Interests

The long-term goal of our research is to understand the cellular and molecular mechanisms underlying brain diseases and to develop neuroprotective and neurodegenerative therapeutic approaches. There is now accumulating evidence that on an individual level health or disease critically depends on the interaction between genes and environment. Epigenetic mechanisms such as histone-modification, DNA-methylation and non-coding RNA-mediated processes are key-regulators of gene-environment interactions. Important, such epigenetic mechanisms have recently been implicated with the pathogenesis of neurodegenerative and psychiatric diseases. Thus our current hypothesis is that deregualtion of genome-environment interactions, especially via epigenetic gene-expression, is a key feature of neurodegenerative diseases such as Alzheimer’s disease. We combine studies in patient material, mouse and cellular models, behavioral, molecular, genetic, and bioinformatic techniques to address these questions.

Selected Recent Publications


Alexander Flügel

Professor of Neuroimmunology

- 1993 MD Ludwig-Maximilians-University (LMU) Munich
- 2002 – 2007 Group leader at the Institute of Neuroimmunology, Max-Planck-Institute for Neurobiology, Martinsried, Munich
- 2008 Associate professor for Experimental Immunology at the Institute for Immunology, LMU Munich
- since 12/2008 Full professor and director of the Institute for Neuroimmunology and Multiple Sclerosis Research, University of Göttingen

Major Research Interests

- Neuroimmunology
- T cell biology
- Intravital imaging

The focus of my interest lies on the mechanisms and factors that allow T cells to enter the central nervous system, to communicate in this milieu and to influence the brain tissue.

My colleagues and I pursue the following aims, i) development of new models and tools to study CNS autoimmunity; ii) revealing the basics of pathogenesis in (auto-)immune diseases of the nervous system; iii) deducing and developing new therapeutical approaches; and iv) analyzing the mechanisms of action for (adverse) effects of new therapeutical procedures.

Selected Recent Publications


Tim Friede

Professor of Biostatistics

- 1998 Dipl.-Math. (Master’s degree in Mathematics), University of Karlsruhe, Germany
- 2001 Dr. sc. hum. (PhD), University of Heidelberg, Germany
- 2004 – 2006 Expert Statistical Methodologist, Novartis Pharma AG, Basel, Switzerland
- 2006 – 2009 Associate Professor of Medical Statistics, University of Warwick, UK
- since 1/2010 Professor of Biostatistics and Director, Dept. of Medical Statistics, University Medical Center Göttingen

Major Research Interests

Clinical biostatistics including designs for clinical trials (in particular flexible adaptive designs) and systematic reviews / meta-analyses

Selected Recent Publications


Nicholas RS, Han E, Raffel J, Chataway J, Friede T (2019) Over three decades study populations in progressive multiple sclerosis have become older and more disabled, but have lower on-trial progression rates: a systematic review and meta-analysis of 43 randomized placebo-controlled trials. Multiple Sclerosis Journal 25: 1462–1471


Alexander Gail

Professor for Sensorimotor Neuroscience and Neuroprosthetics at the German Primate Center

- 1997 Physics Diploma, Philipps University, Marburg
- 2002 Dr. rer. nat. (Physics) Philipps University, Marburg
- 2002 – 2003 Postdoc (Neurophysics Laboratory of R. Eckhorn, Marburg)
- 2003 – 2006 Postdoc (Laboratory of R. Andersen, Pasadena, CA, USA)
- since 2006 Head of Sensorimotor Research Group, German Primate Center and Bernstein Center for Computational Neuroscience
- since 2012 Professor for Sensorimotor Neuroscience and Neuroprosthetics, University of Göttingen

Major Research Interests

Sensorimotor integration, cognitive movement planning, neuroprosthetics, neuronal synchronization, visual object coding; methods: awake monkey electrophysiology, extracellular multi-channel microelectrode recordings, psychophysics in human and non-human primates, correlation and spectral coherence analysis, pattern recognition

Selected Recent Publications

Martinez-Vazquez P, Gail A (2018) Directed interaction between monkey premotor and posterior parietal cortex during motor-goal retrieval from working memory. Cerebral Cortex


Kuang S, Morel P, Gail A (2016) Planning movements in visual and physical space in monkey posterior parietal cortex. Cerebral Cortex 26(2): 731-747


Taghizadeh B, Gail A (2014) Spatial task context makes short-latency reaches prone to induced Roelofs illusion. Front Hum Neurosci 8(673)


Tim Gollisch

Professor for Sensory Processing in the Retina

- 2000 Diploma in Physics, University of Heidelberg
- 2004 PhD in Biophysics, Humboldt University Berlin
- 2004 – 2007 Postdoctoral Researcher, Harvard University, Dept. of Molecular and Cellular Biology
- 2007 – 2010 Max Planck Research Group Leader, Max Planck Institute of Neurobiology, Munich-Martinsried
- since 2010 Professor for Sensory Processing in the Retina, School of Medicine, University of Göttingen

Major Research Interests

We are interested in how the neuronal network of the retina processes visual information. The focus of our work is on studying the function of the various neuron types in the retina and their synaptic connections. One goal is to better understand the “neural code” of the retina: how do the patterns of electrical activity in retinal neurons transmit information about the visual environment to downstream brain areas? Another goal is to better understand “neural computation” in the retina: how do the cells in the retinal network work, adapt, and interact to produce specific, useful responses? On the basis of these questions, we also study how dysfunction of the retinal circuitry, for example in retinal diseases, compromises sensory processing and how optogenetics can be used to artificially stimulate retinal neurons for vision restoration when photoreceptors are degenerating.

Our investigations are based on various techniques of recording the activity of neurons in the retina while stimulating the network with visual images or movies. To do so, we use isolated retinas of mice and salamanders and apply extracellular multi-electrode array recordings and intracellular recordings with glass pipettes. A central theme of our work is to combine the experiments with novel tools of data analysis and with mathematical modeling of the signal processing in the retina.

Selected Recent Publications


Martin Göpfert

Professor for Cellular Neurobiology

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

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 machines, 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


Ralf Heinrich

Professor, Department of Cellular Neurobiology

- 1995 Dr. rer. nat., University of Göttingen
- 1997 – 1999 Postdoctoral fellow, Harvard Medical School, Boston, USA
- 2004 Habilitation, Zoology
- since 2008 apl Professor, Dept. of Cellular Neurobiology

Major Research Interests

Vertebrates and invertebrates evolved from common ancestors that already possessed neurons, neurosecretory systems and structured central nervous systems. Though nervous systems of invertebrates are typically less complex than those of vertebrates (especially mammals) they share many molecular and functional characteristics. We study the neural basis of insect behaviors and mechanisms underlying neuroprotection and neuroregeneration in insect nervous systems with an evolutionary perspective.

1) The cytokine erythropoietin (Epo) mediates neuroprotective and neuroregenerative functions in insects similar to its beneficial effects described in mammals including humans. Similar structural and functional characteristics of the Epo-binding receptors, partly shared transduction pathways that prevent apoptosis and the functional implication in neuroprotective and neuroregenerative processes in both mammalian and insect species suggest that Epo-like signaling was already established in their common ancestors. We study insects, both with invitro and invivo approaches, to identify “ancient” Epo-like signals and their cell-protective receptors and to characterize their functions when animals face environmental and/or physiological challenges.

2) Apoptosis plays a major role in development, tissue renewal and the progression of degenerative diseases. Similar molecular players and mechanisms in vertebrates and invertebrates indicated that the complex “mammalian-like” apoptosis regulatory network was already present in early metazoans. Our recent studies identified the pro-apoptotic function of insect acetylcholinesterase as another shared characteristic between vertebrate and insect apoptosis.

3) Social behavior is the product of complex interactions between various types of neurons that integrate external sensory information with internal physiological states. We study the regulation of insect social behaviors by synaptic molecules (e.g. neuroligins, transmitters) and the neurochemical mechanisms of motivational states with a combination of neuroethological, pharmacological, electrophysiological, histochemical and immunocytochemical methods.

Selected Recent Publications


Stefan Hell

Professor, Director at the Max Planck Institute for Biophysical Chemistry

- 1987 Diploma in Physics, University of Heidelberg
- 1990 Doctorate in Physics, University of Heidelberg
- 1991 – 1993 Postdoctoral Researcher, EMBL (European Molecular Biology Laboratory)
- 1993 – 1996 Principal Investigator, Laser Microscopy Group; Univ. of Turku, Finland
- 1996 Habilitation in Physics, Univ. Heidelberg; Physics teaching since 02/1996
- 1997 – 2002 Head, Max-Planck Junior Group High Resolution Optical Microscopy, at the Max-Planck-Institute for Biophysical Chemistry Göttingen, Germany
- since 10/2002 Director at the Max Planck Institute for Biophysical Chemistry, Head of Department of NanoBiophotonics
- since 12/2003 Apl. Prof., Faculty of Physics, Univ. of Heidelberg
- 2003 – 2017 Head of High Resolution Optical Microscopy Division, DKFZ Heidelberg
- since 01/2004 Hon. Prof., Faculty of Physics, Univ. of Göttingen
- 2014 Nobel Prize in Chemistry
- 2014 Kavli Prize in Nanoscience
- since 11/2015 Director at the Max Planck Institute for Medical Research, Head of Department of Optical Nanoscopy

Major Research Interests
Optical microscopy beyond the diffraction barrier with far-field optics
Invention of STED, RESOLFT, GSDIM and 4Pi microscopy and related techniques

Selected Recent Publications


Swen Hülsmann

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

**Major Research Interests**
Most behavioral aspects of life are attributed to neurons, leaving many white spots of knowledge about the function of the different types of glial cells. Our group aims to identify and clarify the mechanisms that allow 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

- 1981 Dr. rer. nat., University of Göttingen
- 1985 Assistant Professor, The Rockefeller University, New York (USA)
- 1986 Junior Group leader, Max Planck Institute for Psychiatry, Martinsried
- 1991 Associate Professor of Pharmacology and Cell Biology, Yale University, and Investigator, Howard Hughes Medical Institute, New Haven (USA)
- 1995 Professor of Pharmacology and Cell Biology, Yale University, New Haven
- 1997 Director, Max Planck Institute for Biophysical Chemistry, Göttingen
- 1997 – 2001 Adjunct Professor of Pharmacology, Yale University School of Medicine, New Haven, USA
- 2001 Adjunct Professor of Biology, University of Göttingen
- 2019 Emeritus Group Leader, Max Planck Institute for Biophysical Chemistry, Göttingen
- 2019 President of the University of Göttingen

Major Research Interests

Our group is interested in the mechanisms of membrane fusion, with the main emphasis on regulated exocytosis in neurons. 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, which then assemble in a zipper-like fashion to initiate membrane merger. The neuronal SNAREs are among the best characterized. They are the targets of the toxins responsible for botulism and tetanus, and they are regulated by several additional proteins including synaptotagmin, the calcium sensor for neurotransmitter release. To understand how these proteins mediate fusion, we study their properties in vitro with biochemical and biophysical approaches using native and artificial membranes.

In a second set of projects, we are interested in the mechanisms by which synaptic vesicles sequester and store neurotransmitters. Uptake is mediated by specific vesicular neurotransmitter transporters that are energized by an electrochemical proton gradient across the membrane. Presently we aim for a better understanding of the transport mechanisms using a variety of biochemical and biophysical approaches including imaging of single vesicles. Finally, we use quantitative proteomics to better understand how the presynaptic protein network contributes to the regulation of synaptic release, focusing on protein phosphorylation.

Selected Recent Publications


Igor Kagan

Group Leader, Decision and Awareness Group, Cognitive Neuroscience Laboratory, German Primate Center

- Since 2011 Group Leader, German Primate Center, Göttingen, Germany
- 2009 – 2010 Senior Research Fellow, Andersen Lab, Caltech, Pasadena, CA, USA
- 2003 – 2008 Postdoctoral Scholar, Andersen Lab, Caltech, Pasadena, CA, USA
- 2003 Ph.D. Biomedical Engineering, Technion – Israel Institute of Technology, Haifa, Israel, and Schepens Eye Research
- Institute, Harvard Medical School, Boston, MA, USA
- 1996 B.Sc. Biology, Faculty of Life Sciences, Tel Aviv University, Israel
- 1989 – 1991 Department of Biophysics, Faculty of Physics and Mechanics, St. Petersburg State Technical University, Russia

Major Research Interests

Neurophysiology and functional imaging of decision-making, cognitive and visuomotor functions in primates, interhemispheric interactions and bihemispheric network processing for action planning in the context of goal-directed behaviors. Human-monkey cross-species comparison using functional imaging, pharmacological inactivation, and behavioral approaches. Neuronal basis of fMRI signals. Neurophysiology of active vision in primary visual cortex.

Selected Recent Publications


*shared authorship
Siegrid Löwel

Professor, Head of Department of Systems Neuroscience, University of Göttingen

- 1988 Dr. phil. nat., University of Frankfurt a. M. / Department of Neurophysiology (Prof. Dr. Wolf Singer), Max-Planck-Institut für Hirnforschung, Frankfurt a. M.
- 2002 – 2003 Associate Research Physiologist/Research Associate Professor, School of Medicine, Department of Physiology, University of California in San Francisco, USA
- 2003 – 2004 Dorothea-Erxleben-Guest Professorship, University of Magdeburg
- 2004 – 2005 Scholarship Hertie-Excellency Program “Neurosciences”
- 2005 – 2010 Professor of Neurobiology, University of Jena
- since 2010 Full Professor of Systems Neuroscience, Institute for Zoology and Anthropology, University of Göttingen
- since 2021 Board Member of the Göttingen Campus Institute for Dynamics of Biological Networks

Major Research Interests

The Löwel lab is focussed on understanding the development and plasticity of neuronal circuits in the mammalian cortex. We use a combination of techniques, including optical imaging, 2-photon imaging, electrophysiology and virus-mediated knock-down to explore how experience and learning influence the structure and function of nerve cell networks. We hope that answering these key questions not only helps to understand the rules underlying brain development, functioning and learning but additionally will open up new avenues to develop clinically relevant concepts to promote regeneration and rehabilitation for diseased and injured brains. The Löwel lab has made major contributions to experience-dependent changes in nerve cell networks: We were e.g. the first to demonstrate that the learning rule for the development of long-range cortical circuits is correlated activity: “neurons wire together if they fire together” (Löwel & Singer, 1992, Science 255: 209-212).

Selected Recent Publications


Tobias Moser

Professor of Auditory Neuroscience

- 1995 M.D. University of Jena
- 1994 – 1997 Postdoc with E. Neher at the MPI for Biophysical Chemistry
- 1997 – 2001 Junior Group Leader at the at the MPI for Biophysical Chemistry, Göttingen
- since 2001 Leader of the InnerEarLab and Clinical Work at the Department of Otolaryngology, University Medical Center Göttingen
- Director of the Institute for Auditory Neuroscience, University Medical Center Göttingen and group leader at the MPIs for Experimental Medicine and Biophysical Chemistry and the German Primate Center

Major Research Interests

Auditory Neuroscience - Synaptic Physiology and Pathophysiology – Audiology and Neuroprosthetics

Our work focuses on the molecular anatomy, physiology and pathophysiology of sound encoding and information processing in the auditory system as well as the restoration of hearing by gene replacement therapy and optogenetic stimulation. We combine various techniques to characterize synapses of hair cells and the auditory brainstem from the molecular to the systems level. This way we have contributed to the understanding of structure and function of auditory synapses and initiated the concept of auditory synaptopathy. Towards restoration of hearing we aim to establish virus-mediated gene replacement therapy of auditory synaptopathy and pursue the optogenetic stimulation of auditory nerve for improving the performance of the cochlear implant.

Selected Recent Publications


Klaus-Armin Nave

Director at the Max Planck Institute for 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, University of Heidelberg
- since 1999 Director at the Max Planck Institute for Experimental Medicine

Major Research Interests

We are studying the interactions of neurons and glial cells in the mammalian nervous system with a special interest in the role of oligodendrocytes and Schwann cells, best known as myelin forming cells of the central and peripheral nervous system. These highly specialized glial cells enwrap axons with a multilayered sheath that provides electrical insulation for rapid impulse propagation. However the biology of these axon-glia interactions is complex. Using mouse genetics, originally to study the role of proteins in the myelin architecture and in neurogenetic disorders, we made the unexpected discovery of a novel function of oligodendrocytes, which even precedes myelin in nervous system evolution: the glial metabolic support of axonal conduction, axonal transport and long-term integrity. We determined that oligodendrocytes and Schwann cells take up glucose and deliver lactate, here the product of aerobic glycolysis, to the axonal compartment. This supportive function helps maintaining axon functions especially when ATP demands are increased at higher firing rates, also because access of axons to extracellular metabolites is restricted by myelin itself. Here, the fine architecture of the myelin sheath that we visualize with advanced electron microscopic techniques appears critical. Specialized cytoplasmic connections within the myelin sheath (’myelinic nanochannels’) must provide a pathway of continuous communication between oligodendrocytes and the encapsulated axon. In neurological diseases, in which myelin is structurally affected or even destroyed, such as in multiple spones, leukodystrophies and various peripheral neuropathies, there is invariably secondary axonal degeneration that we propose is caused by the lack of adequate metabolic support. We are investigating the underlying molecular mechanisms of these diseases in detail, using correspongding animal models that we have generated with a range of genetic techniques. A further goal is to understand the role of myelinating glial cells in higher brain functions and psychiatric diseases, which we approach in close collaboration with the Department of Hannelore Ehrenreich at our institute.

Selected Recent Publications


Tiago Fleming Outeiro

Professor of Aggregopathies, Director of the Department of Neurodegeneration and Restaurative Research

- 1994 – 1998 B.S. in Biochemistry Faculty of Sciences, University of Porto, Portugal
- 1999 – 2004 Ph.D. in Molecular and Cell Biology Whitehead Institute for Biomedical Research, MIT Cambridge, University of Chicago (UC), USA
- 2004 Consultant and Research Scientist, FoldRx Pharmaceuticals, Inc, Cambridge, USA: Ph.D. work was transferred to the start-up company FoldRx Pharmaceuticals, Inc.
- 2004 – 2007 Postdoctoral Research Fellow; advisor Dr. Brad Hyman, MGH Harvard University, USA
- 2007 – 2011 Principal Investigator and Group Leader at Instituto de Medicina Molecular, Lisbon, Portugal
- 2007 – 2008 Visiting Scientist, Massachusetts General Hospital, Harvard Medical School, Boston, USA
- 2007 – present Auxiliar Professor, Instituto de Fisiologia, Faculdade de Medicina da Universidade de Lisboa, Portugal
- 2010 – present: Full Professor of Aggregopathies, Director of the Department of Neurodegeneration and Restaurative Research, University Medical Center Göttingen

Major Research Interests

Our research interests are focused on the understanding of the molecular mechanisms which lead to neurodegeneration in diseases such as Parkinson’s, Huntington’s, or Alzheimer’s disease. These diseases are intimately associated with protein misfolding and aggregation in specific regions of the brain.

Because the molecular pathways involved in protein homeostasis are highly conserved, we employ a wide variety of model organisms, from the simple but powerful budding yeast to mammalian cell culture and mice, to study the origin of the problems.

We are also developing novel in vivo imaging approaches based on multi-photon microscopy to observe protein misfolding and aggregation in the living brain.

Our ultimate goals are to develop novel therapeutic approaches for these and other related disorders. We are working closely together with clinicians in order to accelerate drug discovery efforts, translating basic research into clinical applications that will improve the lives of patients.

Selected Recent Publications


Luis A. Pardo

**Professor of Molecular Biology of Neuronal Signals, Group Leader at the 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
- since 2008 Max-Planck Research Group Leader
- since 2011 Apl. Professor, University Medical Center Göttingen

**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**


Arezoo Pooresmaeili

Group Leader Perception and Cognition

• 1994 – 2001 Tehran University School of Medicine and Health Sciences, obtained degree: MD
• 2003 – 2009 PhD projects exploring mechanisms of visual attention in the primary visual cortex and Frontal Eye Fields (under supervision of Dr. Pieter Roelfsema)
• 2009 – 2011 Postdoctoral fellow, Pisa Vision Lab, with Dr. Concetta Morrone and Dr. David Burr
• 2011 – 2014 Postdoctoral fellow, Berlin School of Mind and Brain, with Dr. Ray Dolan (Einstein Visiting Fellow)
• since 2015 Group Leader, Perception and Cognition Group, European Neuroscience Institute, Göttingen, Germany

Major Research Interests

• Systems Neuroscience
  • Cognitive Neuroscience
    • Behavioral, Neuroimaging, Electrophysiology and Brain Stimulation Studies in humans
      • Sensory Perception
      • Attention
      • Reward Processing
      • Decision Making
      • Social Cognition

Selected Recent Publications

Viola Priesemann

Max Planck Research Group Leader Neural Systems Theory

- Since 2016: Max Planck Research Group Leader, MPI for Dynamics and Self-Organization, Göttingen, Germany
- 01/2017 – 03/2017: Guest Researcher, Ernst-Strüngmann-Institute, Frankfurt
- 2014 – 2016: Bernstein Fellow and Group Leader, Bernstein Center for Computational Neuroscience & MPI for Dynamics and Self-Organization, Göttingen, Germany
- 2013 – 2014: PostDoc, MPI for Dynamics and Self-Organization, Göttingen, Germany
- 2013: PhD, Goethe University Frankfurt, Germany
- 2008 – 2013: Research Projects at the Ecole Normale Superieure (Paris, France), Caltech
- Pasadena, USA, MPI for Brain Research & FIAS (Frankfurt, Germany)

Major Research Interests

Neural Networks
Information Processing
Statistical Physics
Nonlinear Dynamics
Collective Phenomena
Living Computation
Self-Organization of Computation
Neural Plasticity & Learning
Homeostatic Plasticity
Design and Optimization of Neural Computation
Information Theory
Bayesian Inference
Spreading Dynamics
Information Spreading in Social Networks
COVID-19

Selected Recent Publications


Jeong Seop Rhee

Professor, Max Planck Institute for Experimental Medicine

- 1992 M.S. in Biology, Sogang University Master thesis, Seoul, Korea
- 1997 Ph. D. Kyushu University, School of Medicine Department of Physiology, Japan
- 1997 – 2000 Assistant Professor, Kyushu University, Faculty School of Medicine Department of Physiology, Japan
- 2000 – 2004 Postdoctoral fellow, Max-Planck Institute Biophysical Chemistry, Department of Membranobiophysik, Germany
- 2004 – 2006 Assistant Professor, Baylor College of Medicine, Department of Human Genetics and Neuroscience, USA
- since 2006 Group Leader, Max Planck Institute of Experimental Medicine, Göttingen, Germany
- since 2017 Professor, University of Göttingen, Germany

Major Research Interests

We study that signaling between nerve cells in the brain is mainly mediated at synapses, which are specialized cellular contact sites. The transfer of information at synapses can be regulated dynamically, a process that is called synaptic plasticity. Our main research goal is to elucidate the molecular mechanisms that underlie synaptic plasticity at synapses in the central nervous system. For this purpose we mainly use electrophysiological methods, in combination with nerve cells from genetically modified mice or virus-mediated molecular perturbation of nerve cell function.

Neurotransmitter release is the first step in synaptic signaling. It is mediated by exocytosis of synaptic vesicles at highly specialized contact sites, the active zones of synapses. Neurotransmitters are stored in synaptic vesicles, which undergo a complex trafficking cycle in the presynaptic compartment in order to sustain the rapid and repetitive transfer of information between nerve cells. Synaptic vesicles are initially tethered at the active zone plasma membrane, a process termed docking. Subsequently vesicles undergo a prefusion reaction termed priming, which renders docked vesicles fusion competent, thus defining the readily releasable pool of vesicles. Triggered by the arrival of an action potential at the nerve terminal and the concomitant increase in the intracellular Ca²⁺ concentration, a fraction of fusion competent vesicles in the readily releasable pool fuse with the plasma membrane and release their content. After fusion, vesicular membrane and protein components are recycled by endocytosis and used for additional rounds of exocytosis.

Essentially, each step of the synaptic vesicle cycle can contribute to the regulation of synaptic plasticity. We combine mouse genetics, molecular biological and morphological methods, and patch clamp electrophysiological analyses of autaptic cultured neurons, organotypic brain slice cultures, acute brain slices, or acutely isolated neurons with active presynaptic terminals in order to identify the molecular mechanisms underlying the individual synaptic vesicle recycling steps. In the past, we characterized mutant mice lacking identified presynaptic protein components of the neurotransmitter release machinery. Experiments on mutant mouse neurons are complemented by virus mediated expression of proteins in cultured neurons, which allows us to perform detailed structure-function analyses of presynaptic proteins.

Selected Recent Publications


Silvio O. Rizzoli

Professor, Director of Department of Neuro- and Sensory Physiology

- 1996 – 2000 BSc in Biochemistry at the University of Bucharest, Romania
- 2000 – 2004 PhD in Physiology at the University of Colorado, Denver, USA (Department of Physiology and Biophysics, Prof. W. J. Betz)
- 2004 – 2007 Postdoctoral Fellow, Dept. of Neurobiology, Max-Planck Institute for Biophysical Chemistry, Göttingen
- 2007 – 2012 Group Leader (STED Microscopy) at the European Neuroscience Institute Göttingen (ENI-G)
- 2012 – 2014 Professor (W3), University Medical Center Göttingen
- 2014 – Director of the Department of Neuro- and Sensory Physiology, University Medical Center Göttingen

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


Annekathrin Schacht

Professor of Affective Neuroscience and Psychophysiology

- 2004 – 2008 Research Scientist, Biological Psychology / Psychophysiology (Prof. Dr. Werner Sommer), Institute of Psychology, HU Berlin
- 2008 Dissertation (Dr. rer. nat., HU Berlin)
- 2009 Visiting Professor of Psychology of Motivation and Emotion (substitution), Department of Psychology, University of Potsdam
- 2010 Invited Junior Professor of Affective Neuroscience, Swiss Center for Affective Sciences (CISA), University of Geneva
- 2010 Visiting Professor of Cognitive Neuroscience, Institute of Psychology, Humboldt-Universitaet zu Berlin
- 2011 Habilitation (venia legendi) in Psychology (HU Berlin)
- since 10/2010 Junior Professor (tenure track), Courant Research Centre “Text Structures”, University of Goettingen
- since 2016 Professor of Affective Neuroscience and Psychophysiology, Institute of Psychology, University of Goettingen

Major Research Interests

Our main research activities focus on the interplay of cognition and emotion in several domains of human information processing, including faces and written and spoken language. Our work aims to identify the specification of the origins, dynamics, and boundary conditions of emotion effects within and between different stimulus domains and modalities, as well as to better define the emotional outcomes of cognitive operations. In order to answer our research questions, we employ a combination of well-established experimental paradigms with several psychophysiological measures, including event-related brain potentials (ERPs), eye movements, electrodermal and respiratory activity, facial muscle activity (via EMG recordings), and changes of pupil diameter.

Research areas:
- Affective and motivational impacts on visual sensory processing
- Emotion-cognition interplay in the processing of written and spoken language
- Face processing, including emotional expressions, attractiveness, and face identity
- Audiovisual integration of social signals in human communication

Selected Recent Publications


Hansjörg Scherberger

Professor of Primate Neurobiology at the German Primate Center

- 1993 Dipl. math. (MS Math), University of Freiburg, Germany
- 1996 Dr. med. (MD), University of Freiburg, Germany
- 1995 – 1998 Postdoctoral Fellow, Dept of Neurology, University of Zürich, Switzerland
- 1998 – 2000 Postdoctoral Fellow, California Institute of Technology
- 2000 – 2004 Senior Postdoctoral Fellow, California Institute of Technology
- 2004 – 2009 Work group leader, Institute of Neuroinformatics, ETH / University of Zürich, Switzerland
- since 2008 Professor for Primate Neurobiology, University of Göttingen and Deutsches Primatenzentrum GmbH

Major Research Interests

We are interested in how hand movements are generated in the primate brain and how intentions to grasp objects can be decoded for controlling a neural prosthesis. For this, we investigate the cortical representation of hand movements in motor-related cortical areas and their relation to sensory systems and decision making. Furthermore, we are developing brain-machine interfaces that can read out such movement intentions to control robotic devices. Such systems could be useful for future applications aiming to restore hand function in paralyzed patients.

Selected Recent Publications


Schaffelhofer S, Scherberger H (2016) Object vision to hand action in macaque parietal, premotor, and motor cortices. eLife 5: e15278


Oliver Schlüter

Group Leader Molecular Neurobiology

- 2000 Dr. rer. nat. (PhD), University of Hannover
- 2001 Dr. med. (Medical thesis), University of Göttingen
- 2001 – 2002 Postdoc with Christian Rosenmund and Reinhard Jahn at the Max-Planck-Institute for Biophysical Chemistry in Göttingen
- 2002 – 2006 Postdoc with Robert C. Malenka at Stanford University Medical Center (USA)
- 2006 – 2015 Independent group leader (Emmy-Noether/DFG) at the European Neuroscience Institute Göttingen (ENI-G), since 2006
- Assistant Professor at the Department of Neuroscience, University of Pittsburgh, since 2015
- since 2016 Adjunct Professor at the Department of Psychiatry and Psychotherapy, University Medical Center Göttingen

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


Caspar M. Schwiedrzik

Group Leader

- 2003 – 2008 University of Konstanz, Germany, studies of Psychology
- 2008 – 2011 Max Planck Institute for Brain Research, Frankfurt a. M., Germany, PhD student, advisor Prof. Wolf Singer
- 2012 – 2016 The Rockefeller University, New York, USA, Postdoc, advisor Prof. Winrich Freiwald
- since 2017 Group Leader, Neural Circuits and Cognition Lab, European Neuroscience Institute, Göttingen, Germany
- since 2019 Group Leader, Perception and Plasticity Group, German Primate Center, Göttingen, Germany

Major Research Interests

Learning is a core building block of intelligent behavior. It endows complex systems with flexibility to adjust to changing environments and with the capacity to generalize to novel situations. We pursue the idea that inroads into understanding learning and generalization can be made in the visual system, where these complex problems can be broken down into tractable hypotheses. Visual processing hierarchies provide an ideal testing ground and offer unique opportunities to unravel the role of feedforward and feedback message passing along the hierarchy as a function of learning and generalization. To this end, we capitalize on combining noninvasive neuroimaging with electrophysiological recordings and causal manipulations of brain activity in non-human primates, and parallel experiments using fMRI in humans. We investigate learning at multiple time scales, from learning effects that build up within seconds to learning effects that take days and weeks to materialize, and across levels of complexity, from learning to discriminate simple visual features to high-level associative and statistical learning. Our overall goal is to determine the neural basis of the visual system’s capacity to learn and generalize through an explicitly comparative approach - a necessary step towards understanding the human mind and its complexity.

Selected Recent Publications

Schwiedrzik CM, Bernstein B, Melloni L (2016) Motion along the mental number line reveals shared representations for numerosity and space. eLife 5:e10806
Michael Sereda

Professor of Neurology and Neurogenetics, Group Leader at the Max Planck Institute for Experimental Medicine

- 2007 Group leader "Translational Neurogenetics", Max Planck Institute for Experimental Medicine
- 2008 Attending Neurologist and Head Neurogenetics Outpatients Clinic, Dept. of Clinical Neurophysiology, University Medical Centre Göttingen (UMG)
- 2012 DFG-Heisenberg Professorship “Hereditary Neuropathies”, Dept. of Clinical Neurophysiology, UMG
- 2017 Tenured Professorship of Neurology, Dept. of Clinical Neurophysiology/ Dept. of Neurology, UMG

Major Research Interests

We are studying the molecular mechanisms of altered axon-glia cell interactions in the peripheral nerve system (PNS). We focus on the molecular understanding of Charcot-Marie-Tooth disease (CMT), a group of genetically heterogeneous rare diseases causing a broad clinical spectrum and aim to develop novel therapeutic approaches. Highlights from our basic research on PNS glial biology were: (i) that lipid supplementation in CMT1A rats is a highly effective form of therapy (Fledrich et al., Nat Comm, 2018), a concept that can be easily translated to patients. Moreover, building on the notion that (ii) Neuregulin therapy corrected the dysbalance of MAPK/PI3K signaling in CMT1A rats (Fledrich et al., Nat Med, 2014), we are now focusing on novel interaction partners of the causative protein, PMP22 -still without known function for over 30 years- that are related to signaling. Work on Neuregulin itself has been continued by (iii) identifying soluble NRG1-1 as a detrimental growth factor driving onion bulb formation in CMT, but is also likely play an important role in acquired hereditary neuropathies (Fledrich et al., Nat Comm, 2019). Another myelin related project identifies (iv) a novel role of the barely understood cytoplasmatic channels in PNS myelin (“Schmidt-Lanterman-Incisures”) for sustaining axonal function in CMT. Due to my dual appointment at the MPIEM and the UMG and with the support of CMT-NET, a national BMBF funded network on rare diseases, we can translate findings to CMT patients.

Selected Recent Publications

Jochen Staiger

Professor of Neuroanatomy

- 1993 Graduation as Dr. med. at the Medical Faculty of the Justus-Liebig-University Giessen; grade: summa cum laude
- 1994 – 2000 Post-doc at the C. & O. Vogt-Institute for Brain Research, Düsseldorf, (Head: Prof. Dr. K. Zilles); Leader of the research group “Cortical microcircuits”
- 2000 Habilitation and Venia legendi for Anatomy at the Medical Faculty of the Heinrich-Heine-University Düsseldorf
- 2006 Appointment as W3 Univ.-Professor for Cell Biology at the Albert-Ludwigs-University Freiburg
- since 2010 Full professor and director of the Department of Neuroanatomy at the University of Göttingen

Major Research Interests

- Developmental plasticity induced by early postnatal deprivation of sensory stimulation in mice with intact or genetically altered thalamocortical projections
- Thalamo-cortical interactions as the first stage of cortical information processing
- Microcircuits in columnar modules – examining the Bauplan of synaptic connectivity of neocortex
- Tactile learning: Genomic regulation of experience-dependent plasticity in the trigeminal somatosensory system

Selected Recent Publications


Zhou XJ, Rickmann M, Hafner G, Staiger JF (2017) Subcellular targeting of VIP boutons in mouse barrel cortex is layer-dependent and not restricted to interneurons. Cerebral Cortex 27: 5353-5368


Stefan Treue

Professor, Director of the German Primate Center
Head of the Cognitive Neuroscience Laboratory

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

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 percept of the visual environment.

Selected Recent Publications


Melanie Wilke

Professor of Cognitive Neurology
- 1997 – 2001 M.A. in Psycholinguistics, Neuropsychology and Neurobiology, Ludwig-Maximilians-University, Munich, Germany
- 2001 – 2005 PhD student at the Max Planck Institute for Biological Cybernetics, Tübingen, Advisor: Dr. D.A. Leopold
- 2005 – 2008 Postdoctoral Fellow in the Laboratory of Neuropsychology, NIMH, Bethesda, Advisor: Dr. D.A. Leopold
- 2008 – 2010 Postdoctoral Fellow in the Division of Biology, Caltech, Pasadena; Advisor: Prof. R.A. Andersen
- since 2011 Co-Investigator in the “Decision and Awareness” group (DAG) at the German Primate Center (DPZ)
- since 2011 Schilling Foundation Professor (W3), Director of the department of Cognitive Neurology and Head of the MR-Research Unit, UKG, University of Göttingen

Major Research Interests
The long-term goal of our research is to understand how neural activity gives rise to spatial awareness and how distributed information is integrated to guide the selection of movement goals. Furthermore we are dedicated to perform translational research from monkey models of cognitive disorders to human patients. Current research focuses on the question how thalamic nuclei and cortical areas interact during visual perception and decision making. Another line of research is concerned with the neural mechanisms underlying spatial neglect, which is a frequent and severe consequence of brain damage in humans. Specifically, we are investigating pathological and compensatory changes in large-scale brain networks in human stroke patients by means of imaging (DTI, fMRI) and stimulation (tACS, tDCS, TMS) methods. We develop and employ monkey models of spatial neglect to study the underlying neural mechanisms by means of fMRI, electrophysiological recordings, inactivation and stimulation techniques with the goal to develop new therapeutic interventions.

Selected Recent Publications
Sonja M. Wojcik

**Group Leader at the Max Planck Institute for Experimental Medicine**

- 1994 Diploma in Biology, RWTH Aachen, Germany
- 2000 Ph.D. in Molecular and Cellular Biology, Baylor College of Medicine, Houston, TX, USA
- 2001 Postdoctoral fellow, Department of Molecular Neurobiology, Max Planck Institute of Experimental Medicine, Göttingen, Germany
- 2008 Group leader, Max Planck Institute of Experimental Medicine, Göttingen, Germany
- 2014 Habilitation, Medical Faculty of the University of Göttingen, Germany

**Major Research Interests**

We study the molecular processes underlying neurotransmitter release and the functional consequences of alterations in these processes at the cellular and network levels. In the past, projects were mainly focused on analyzing the role of vesicular neurotransmitter transporters in neurons as determining factors in the establishment and maintenance of glutamatergic, GABAergic and glycinergic synaptic phenotypes. Current projects include the analysis of regulatory mechanisms that control the release of non-classical neurotransmitters from large dense-core vesicles in neuroendocrine chromaffin cells and peptidergic neurons.

**Selected Recent Publications**


Fred Wolf

Professor of Dynamics and Biological Physics at the University of Göttingen
Research Group Leader at the Max Planck Institute for Dynamics and Self-Organization

- 1999 Dr. phil. nat., Goethe University Frankfurt
- since 2004 Head of the Research Group ‘Theoretical Neurophysics’, Max Planck Institute for Dynamics and Self-Organization, Göttingen
- since 2013 Director Bernstein Centre for Computational Neuroscience Göttingen
- 2015 Fellow of the American Physical Society (APS)
- since 2019 Spokesperson of the German Research Foundation Priority Programme “Evolutionary Optimization of Neuronal Processing”
- since 2021 Professor of Dynamics and Biological Physics, University of Göttingen
- since 2021 Director of the Göttingen Campus Institute for Dynamics of Biological Networks, University of Göttingen and Max Planck Society

Major Research Interests

- Evolution of neuronal circuits in the visual cortex. We discovered that these biological neural networks follow universal quantitative laws. Using theoretical physics approaches, we aim to uncover the underlying mechanisms and evolutionary optimization principles.
- Dynamics and sensory information processing in large-scale cortical circuits. Here we use the ergodic theory of network dynamical systems to link cellular dynamics to information representation and decay on the circuit scale.
- Biophysics and dynamics of high-bandwidth encoding by neuron populations. Here we are integrating concepts from non-equilibrium statistical physics with the biophysics of membranes. We aim at simple but dynamically realistic neuron models and are particularly interested in the evolutionary optimization towards the processing requirements in complex circuits.

Selected Recent Publications


Fred Wouters

Professor for Molecular and Cellular Systems

- 1997 Dr. (Ph. D.), Faculty of Chemistry, University of Utrecht, The Netherlands
- 1997 – 2000 Postdoctoral fellow, Imperial Cancer Research Fund (ICRF), London UK
- 2000 – 2001 Postdoctoral fellow, European Molecular Biology laboratory (EMBL), Heidelberg
- 2001 Appointed as group leader at the European Neuroscience Institute, Göttingen
- 2006 PD (habilitation), Physiology, Göttingen University
- since July 2007 Professor

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. Susann Boretius
Prof. Dr. Nils Brose (Spokesperson of the IMPRS)
Dr. Jan Clemens
Prof. Dr. Alexander Gail
Prof. Dr. Martin Göpfert (Program Director)
Prof. Dr. Ralf Heinrich (Chair Examination Board)
Prof. Dr. Siegrid Löwel
Prof. Dr. Silvio Rizzoli
Prof. Dr. Jochen Staiger
Prof. Dr. Melanie Wilke
Delane Espinueva
Perianen (Krishna) Ramasawmy
Gökberk Günaydın
Thanh Thao Do

Program Coordination

Neuroscience Program

Dr. Jonas Barth
(Program Coordinator)

Sandra Drube
(Administrative Coordinator)

Franziska Kühne
(Program Assistant)

Molecular Biology Program

Dr. Steffen Burkhardt
(Program Coordinator)

Kerstin Grüniger
(Program Assistant)

Further Information: www.gpmolbio.uni-goettingen.de

Address
Georg-August-Universität
Göttingen
European Neuroscience Institute
Coordination Office
Neurociences
Grisebachstraße 5
37077 Göttingen
Germany

phone: +49-551-39 61359
+49-551-39 61369
+49-551-39 61379
e-mail: gpneuro@gwdg.de

Further Information
www.gpneuro.uni-goettingen.de
Imprint

Publisher:
Coordination Offices Neurosciences & Molecular Biology,
Georg-August-Universität Göttingen

Text:
Dr. Jonas Barth,
Dr. Steffen Burkhardt

Cover Design and Page Layout:
bioGrafik (M. Nolte)

Photography:
Reprostelle MPI for Biophysical Chemistry (P. Goldmann)
Fotostudio Hornig, Göttingen
Ingo Bulla Fotografie (Cover)
Georg-August-Universität Göttingen / Swen Pförtner
Neurosciences
MSc/PhD/MD-PhD Program