GGNB Methods Courses 2012 - Overview Sep 2012 - Feb 2013

Short Methods Courses & Method Seminars; Extended Methods Course

Sep 2012 - Feb 2013 (B)

* Course has also been offered in the previous course announcement (Mar-Aug 2012)

Department/Group	Supervisor(s)	ID	*	Title of Course	Credits	Date
Biochemistry						
Feußner, Ivo	Herrfurth, Cornelia	A 16		Introduction to lipid analysis	1.0	17-19 Sept 2012
Höbartner, Claudia	Höbartner, Claudia	A 32	*	Chemical synthesis and enzymatic ligation of RNA and DNA oligonucleotides	1.0	22-23 Nov 2012
Jahn, Reinhard	van den Bogaart, Geert / Park, Yongsoo	A 33		Reconstitution of neuronal exocytosis	1.0	18-19 Oct 2012
Schmitt, Hans Dieter	Schröter, Saskia	A 34	*	BiFC (bimolecular fluorescence complementation) in yeast	1.0	Oct 2012
Jahn, Reinhard	Chua, John / Binotti, Beyenech / Boyken, Janina	A 35	*	Co-immunoprecipitation as a technique to study protein-protein interactions	1.0	9-10 Oct 2012
Jahn, Reinhard	Kühnel, Karin	A 36	*	Protein purification and characterization	1.0	15 – 16 Nov 2012
Rehling, Peter	Reinhold, Robert	A 53	*	Blue-native PAGE analysis of membrane protein complexes	1.0	5-6 Mar 2013
Tittmann, Kai	Piontek, Alexander / Schneider, Stefan	A 64		Principles and methods of protein purification by chromatography	1.0	13-14 Nov 2012
Urlaub, Henning	Atanassov, Ilian / Hofele, Romina / Karaca, Samir / Qamar, Saadia /	A 65	*	Sequence analysis of proteins and their post-translational modifications by MALDI-ToF and electrospray ionization (ESI) mass spectrometry	1.0	24-26 Oct 2012
Walter, Lutz	Walter, Lutz / NN	A 66	*	Isolation of recombinant proteins by affinity chromatography and binding studies	1.0	17-18 Oct 2012
Tittmann, Kai	Sitte, Astrid	A 71	*	Thermodynamic characterization of biomolecular interactions by isothermal titration calorimetry	1.0	15-16 Nov 2012
Fischle, Wolfgang	Fischle, Wolfgang	A 74		Hydrodynamic analysis of proteins and protein complexes by analytical ultracentrifugation	1.0	15 - 16 Oct 2012
Fischle, Wolfgang	Winter, Stefan / Kost, Nils	A 75		Chromatin Immunoprecipitation (CHiP)	1.0	18 - 19 Oct 2012
Rodnina, Marina	Milon, Pohl	A 81	*	Introduction to transient kinetic methods	1.0	29-30 Oct 2012
Rehling, Peter	Vukotic, Milena	A 91	*	Activity measurements of respiratory chain enzymes	0.5	11 Dec 2012
Rehling, Peter	Deckers, Markus	A 92	*	Subcellular fractionation	0.5	5-9 Nov 2012
Lührmann, Reinhard	Hartmuth, Klaus	A 93		The application of RNA structure determination methodology to the analysis of RNA-protein interactions in RNP complexes	1.0	23-25 Jan 2013
Görlich, Dirk	Frey, Steffen	A 131		Methods in bacterial protein expression and purification	0.5	18 Oct 2012
Görlich, Dirk	Frey, Steffen	A 132		Purification of recombinant proteins from *E. coli*	1.0	18-19 Oct 2012

Department/Group	Supervisor(s)	ID	*	Title of Course	Credits	Date B
Biophysics, Bioinformatics and Statistics						
Geisel, Theo / Timme, Marc / Wolf, Fred	Battaglia, Demian	A 21	B	Theoretical and Computational Neuroscience I	1.0	WiSe 2012/13
Grubmüller, Helmut	Kaptan, Shreyas	A 24	*	Introduction to molecular dynamic simulation	1.0	WiSe 2012/13
Grubmüller, Helmut / Schmidt, Christoph F.	Grubmüller, Helmut / Schmidt, Christoph F.	A 25	*	Current Topics in Biophysics – Lecture Series	1.0	WiSe 2012/13, Fridays
Grubmüller, Helmut / de Groot, Bert / Groenhof,	Grubmüller, Helmut / de Groot, Bert	A 26		Theoretical and Computational Biophysics: Introduction	1.5	WiSe 2012/13, Mondays
Vink, Richard	Vink, Richard	A 43		Computer simulation methods in statistical physics	1.0	WiSe 12/13, Thursdays
Steinem, Claudia / Janshoff, Andreas	Mey, Ingo / Saßen, Christoph	A 62	*	Scanning Ion Conductance Microscopy, a versatile tool to study surfaces and surface properties	1.0	8 - 9 Nov 2012
Walter, Lutz	Brameier, Markus	A 67	*	Introduction to Bioinformatics Methods	1.0	Oct 2012
Steinem, Claudia / Janshoff, Andreas	Behn, Daniela	A 133	*	Using biosensors to study analyte-ligand interactions: basic principles and applications	1.0 (A) / 0.5 (B)	20 Sep 2012
Hoff, Katharina	Hoff, Katharina	A 94	*	Introductory biostatistics with R	1.0	7-9 Feb 2013
Mitkovski, Mišo	Mitkovski, Mišo	A 98	*	Introduction to image processing in biology with ImageJ	1.0	15-16 Nov 2012
Friede, Tim	Konietsche, Frank / Lange, Katharina	A 100	*	Basic statistics for graduate students in the life sciences	1.0	8 & 11 & 15 & 18 Oct 2012
Kollmar, Martin / Hammesfahr, Börn	Kollmar, Martin / Hammesfahr, Börn	A 116	*	Protein family analysis as basis for experiments and experimental data interpretation	1.0	11-12 Oct 2012
Beißbarth, Tim	Bayerlova, Michaela	A 126		Introduction to R and microarray analysis	1.0	5-7 Dec 2012
Baret, Jean-Christophe	Say Hwa Tan, Gruner, Philipp	A127		Mask Drawing for Microfluidic application	0.5	23 Oct 2012
Baret, Jean-Christophe	Tan, Say Hwa/ Gruner, Philipp/ Negrete, Jose/ Hsu, Hsin-Fang	A128		Introduction to Microfluidics	41.031,0	15-19 Oct 2012

Department/Group	Supervisor(s)	ID	*	Title of Course	Credits	Date B
Cell Biology & Microbiology, Imaging						
Cordes, Volker	Cordes, Volker	A 09		Preparation of *Xenopus laevis* nuclear envelopes and their analysis by field emission scanning electron microscopy	1.0	5-7 Dez 2012
Kehlenbach, Ralph	Kehlenbach, Ralph	A 39		Analysis of nucleocytoplasmic transport by flow cytometry	0.5	18 Sep 2012
Nave, Klaus-Armin	Möbius, Wiebke	A 44	*	Subcellular localization of proteins by immunoelectron microscopy of cryosections	1.0	12-13 Nov 2012
Olympus / Bodenschatz	Tarantola, Marco	A 46/I	*	Theory and basics of fluorescence microscopy and imaging / Introduction to life science research applications FRET, FRAP, FLIM, caging–uncaging, GFP, Fluorescence microscopy of living cells	1.0	Feb 2013
Olympus / Bodenschatz	Tarantola, Marco	A 46/II	*	Theory and basics of fluorescence microscopy and imaging / Introduction to life science research applications FRET, FRAP, FLIM, caging–uncaging, GFP, Fluorescence microscopy of living cells	1.0	Feb 2013
Simons, Mikael	Mitkovski, Miso	A 59		GFP proteins and their application (FRAP, FRET, photo activation)	1.0	8-9 Oct 2012
Görlich, Dirk	Schmidt, Broder	A 79		Permeabilized cell assays for studying intracellular protein transport	0.5	tba
Großhans, Jörg	Gummalla, Mahesh	A 124		Live imaging and laser ablation	1.0	17-18 Sep 2012
Jakobs, Stefan		A 134		Imaging Mitochondria in Eukaryotic Cells	1.0	25-26 Sep 2012
Developmental Biology, Anatomy & Histology						
Eichele, Gregor	Miletic, Helena / van den Boogart, Christine	A 13	*	Mouse histology & *in situ* expression analyses	1.0	5-6 Nov 2012
Hahn, Heidi	Nitzki, Frauke / Becker, Marco	A 28	*	*In situ* hybridization of paraffin embedded tissue sections	1.0	Jan 2013
Pieler, Tomas	Henningfeld, Kristine	A 51		Gene regulation in *Xenopus*	1.0	5-7 Nov 2011
Stadelmann-Nessler, Christine	Stadelmann-Nessler, Christine	A 60	*	Non-radioactive in situ hybridization	1.0	5-7 Nov 2012
Wimmer, Ernst / Bucher, Gregor	Wimmer, Ernst / Bucher, Gregor	A 108	*	Homologs and Paralogs – how they evolve and how to distinguish them	0.5	tba
Dobbelstein, Matthias	Lizé, Muriel	A 129		Preparation of mouse embryonic fibroblasts (culture of primary cells)	1.0	Oct 2012
Dobbelstein, Matthias	Lizé, Muriel	A 130		Mouse preparation and histology	1.0	Oct 2012
Molecular & Cellular Neuroscience, Electrophysiology						
Nave, Klaus-Armin	Roßner, Moritz	A 45	*	Microdissection combined with RNA analysis in the brain	1.0	18-20 Sep 2012
Stühmer, Walter	Pardo, Luis	A 63	*	Patch clamp	1.0	21-23 Jan 2013
Fiala, Andrè / Göpfert, Martin	Fiala, Andrè / Göpfert, Martin	A 83	*	Drosophila Neurogenetics	1.0	10-12 Oct 2012
Rhee, JeongSeop	Rhee, JeongSeop	A 96	*	Nerve cell culture and patch-clamp recordings from nerve cells	1.0	24-25 Sep 2012
Luther, Stefan / Raad, Nour	Raad, Nour	A 120	*	Introduction to cardiac electrophysiology and heart optical mapping	1.0	4 Oct & 8 Nov 2012
Moser, Tobias / Oshima-Takago, Tomoko /	Oshima-Takago, Tomoko / Mendoza Schulz, Alejandro	A 122	*	Basics of electrophysiological measurements in slice preparations	1.0	11 - 12 Oct 2012
Bringmann, Henrik	Spies, Jan / Turek, Michal / Schwarz, Juliane	A 137	B	Neurobiology of *C. elegans*	0.5	3 Dec 2012

Department/Group	Supervisor(s)	ID	*	Title of Course	Credits	Date B
Molecular Biology & Genetics						
Brenig, Bertram	Schütz, Ekkehard	A 06		Genotyping using FRET on the LightCycler	1.0	tba
Dobbelstein, Matthias	Schmidt, Franziska	A 10	*	Assessing promoter activity by luciferase assays	1.0	Oct/Nov 2012
Dobbelstein, Matthias	Srinivas, U. Sai / Saini, Priyanka	A 11		Polymerase Chain Reaction I and advanced applications	1.0	25-26 Sep 2012
Jakobs, Stefan	Grotjohann, Tim	A 37	*	PCR based mutagenesis strategies to evolve (photoswitchable) fluorescent proteins	1.0	9-10 Oct 2012
Walter, Lutz	Gruber, Jens	A 68	*	Mechanisms of RNA silencing	1.0	15-16 Nov 2012
Görlich, Dirk	Frey, Steffen	A 77		PCR: self-made enzymes, helpful additives and insights into the reactions	0.5	16 Oct 2012
Stoykova, Anastassia	Tuoc, Tran Cong	A 88		Analysis of protein-DNA interaction *in vitro* by electrophoretic mobility shift assay (EMSA)	1.0	18-20 Sep 2012
Structural Biology						
Bennati, Marina	Türke, Maria Teresa / Tkach, Igor / Argirevic, Tomislav	A 03	*	EPR-Spectroscopy	1.5	27-28 Sep, 1 Oct 2012
Grüne, Tim	Grüne, Tim	A 57		Macromolecular crystal structure determination	2.0	3-7 Dec 2012
Stark, Holger	Platzmann, Florian	A 61	*	3D structure determination of macromolecular complexes by single particle cryo-EM	1.0	tba
Pena, Vlad	Schmitzova, Jana / Steuerwald, Ulrich / De, Inessa / de Moura,	A 102	*	Crystallization of biological macromolecules	1.0	21-22 Jan 2013
Theoretical, Systems & Behavioral Neuroscience						
Ehrenreich, Hannelore	Begemann, Martin / Bartels, Claudia	A 12	*	Translational Neuroscience: (A) Schizophrenia, (B) Multiple Sclerosis	2.0 / module	2-4 Nov 2012 (B)
Gail, Alexander / Treue, Stefan	Gail, Alexander / Treue, Stefan	A 18	*	Non-invasive probing of brain function – Advanced Methods Course in Psychophysics	1.0	tba (beginning of 2013)
Geisel, Theo / Timme, Marc / Wolf, Fred /	Geisel, Theo / Timme, Marc / Wolf, Fred / Battaglia, Demian	A 21		Theoretical and Computational Neuroscience: Collective Dynamics Biological Neural Networks I	2.0	tba
Antal, Andrea	Paulus, Walter	A 48		Transcranial magnetic- and electrical stimulation	1.0	19 - 21 Feb 2013
Vertebrate Animal Models						
Bähr, Mathias	Lingor, Paul	A 01	*	Introduction to animal experiments	0.5	27 Nov 2012
Bayer, Thomas A.	Wirths, Oliver	A 02	*	Alzheimer's disease: Behavioural and neuropathological analysis of transgenic mouse models	1.0	12-13 Nov 2012
Schraepler, Anke	Schraepler, Anke	A 101		Introduction to laboratory animal science	1.5	Feb 2013
Brembeck, Felix	Bunzendahl, Jens	A 107	*	Tissue processing and immunohistochemistry on tissue sections of genetically engineered mouse models	1.0	Nov 12
Extended Methods Courses						
Tittmann, Kai	Kühnel, Karin / Urlaub, Henning / NN	E 02	*	Bioanalytics	4,0	October 2012

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340032	**Credits:**	0.5	**Date:**	27 Nov 2012

Title of Course: (Course ID):	Introduction to animal experiments (A 01)
Group Leader / Supervisor(s):	Paul Lingor, Mathias Bähr
Place:	S2 Lab, Waldweg 33, Basement

Participants:	min: 2	max: 6
Duration:	1 day	**Time on Day 1:** 09:00 h
Preparatory Meeting:	No	

Course description:

Animal models are widely used in the life sciences, medical research and especially neuroscience. They are used to study the etiology of various diseases as well as experimental treatment methods. In this course we will give an overview on what is considered an animal experiment and why animal experiments are necessary. We will discuss the strict prerequisites preceeding experiments on life animals and study the possibilities to reduce harm to research animals.

In the second part, students will have the possibility to follow a surgical intervention on animals within an ongoing research project depending on the current research activity in our lab. Special emphasis will be given to proper anaesthesia of the animal. We will demonstrate interventions on the optic nerve in Wistar rats, such as axotomy, optic nerve crush or intravitreal injections. Students will be able to watch brain injections according to stereotactic coordinates. We will also demonstrate behavioral tests, such as the rotarod examination.

Contact 1:	PD Dr. Paul Lingor	plingor@gwdg.de	Tel. 0551-39 4927
Contact 2:			

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340034	**Credits:**	1.0	**Date:**	12-13 Nov 2012

Title of Course (Course ID):	Alzheimer's disease: Behavioural and neuropathological analysis of transgenic mouse models (A 02)
Group Leader / Supervisor(s):	Thomas Bayer, Oliver Wirths
Place:	Molecular Psychiatry Lab, Dept. of Psychiatry, von-Siebold-Str. 5, Basement

Participants:	min: 2	max: 4		
Duration:	2 days	**Time on Day 1:**	09:30 h	
Preparatory Meeting:	No			

Course description:

Transgenic mouse models have been proven to be valuable research tools to facilitate our understanding of the pathological alterations in Alzheimer's disease (AD) and are indispensable in the development of new therapeutic treatment strategies.

Students will be introduced to different AD mouse models, will prepare brain tissue for histochemical analyses and will carry out immunostainings for relevant neuropathological markers. In addition, they will be introduced into mouse behavioural experiments and will learn to conduct simple motor and learning performance tasks.

Contact 1:	Dr. Oliver Wirths	owirths@gwdg.de	Tel. 0551-39 10290
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340055	**Credits:**	1.5	**Date:**	27-28 Sep, 1 Oct 2012

Title of Course (Course ID):	EPR-Spectroscopy (A 03)
Group Leader / Supervisor(s):	Marina Bennati, Igor Tkach, Roberto Rizzato
Place:	Max-Planck-Institut für biophysikalische Chemie, AG Elektronenspinresonanz-Spektroskopie, Am Fassberg 11

Participants:	min: 2	max: 6
Duration:	3 d	**Time on Day 1:** 9:00 h
Preparatory Meeting:	No	

Course description:

Investigation of protein structure by EPR spectroscopy and site directed spin labeling.

Contact 1:	Dr. Igor Tkach	Igor.Tkach@mpibpc.mpg.de	Tel. 0551 201-1004
Contact 2:	Roberto Rizzato	Roberto.Rizzato@mpibpc.mpg.de	Tel. 0551 201-1063

Comments:	Basic knowledge in spectroscopy is required

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340170	**Credits:**	1.0	**Date:**	tba

Title of Course: Genotyping using FRET on the LightCycler (A 06)

Group Leader / Supervisor(s): Bertram Brenig, Ekkehard Schütz

Place: Institute of Veterinary Medicine, Burckhardtweg 2, 37077 Göttingen

Participants: min: 2 max: 4

Duration: 2 days **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Participants will understand the chemical and physical background of FRET in the context of nucleic acid hybridization. The special case of hybridization probes that lead to FRET will be shown and the prediction of assay performance will be shown. Real-time PCR with fluorescence monitoring of probe melting curves for detection of variants in genes, such as single nucleotide polymorphisms and different techniques of multiplexing are given as examples and the value of *in silico* design of probes is shown.

The beneficial use of well parameterized model calculations for molecular haplotyping with loci-spanning probes will be discussed.

Contact 1:	Dr. Ekkehard Schütz	eschuetz@mac.com	Tel. 0551-39 13964
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340110	**Credits:**	1.0	**Date:**	5 - 7 Dez 2012

Title of Course: (Course ID):	Preparation of *Xenopus laevis* nuclear envelopes and their analysis by field emission scanning electron microscopy (A09)
Group Leader / Supervisor(s):	Volker Cordes
Place:	MPI for Biophysical Chemistry, Department of Cellular Logistics, T3, 3rd floor

Participants:	min: 2	max: 3			
Duration:	3 days	**Time on Day 1:**	09:30 h		
Preparatory Meeting:	No				

Course description:

Modern field emission in-lens scanning electron microscopes (FEISEMs) allow for three-dimensional analyses of biological structures at a resolution of less than a few nanometers, provided that the sites of interest can be made accessible for the scanning electron beam. The large-sized nuclei of amphibian oocytes and their nuclear envelopes (NEs) represent specimens well suitable for such high-resolution analysis.

On day 1 of this course, participants will manually isolate and dissect nuclei from the South African clawed frog *Xenopus laevis* in order to obtain NEs that they will further process for EM. After having completed all steps of the specimen preparation procedure by the end of day 2, the participants will then analyze their samples in a FEISEM on day 3 and visualize the distinct morphological features characteristic for the NE's cytoplasmic and nuclear side.

Contact 1:	PD Dr. Volker Cordes	vcordes@gwdg.de	Tel. 0551-201 2404
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340003	**Credits:**	1.0	**Date:**	Oct/Nov 2012

Title of Course: (Course ID):	Assessing promoter activity by luciferase assays (A 10)
Group Leader / Supervisor(s):	Matthias Dobbelstein, Veena Jagannathan, Franziska Schmidt
Place:	Department of Molecular Oncology, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants:	min: 3	max: 6

Duration:	2 days	**Time on Day 1:**	10:00 h

Preparatory Meeting:	No

Course description:

Reporter assays are commonly used to determine the activity of a promoter and in particular its response to specific transcription factors. Luciferase reporters provide a particularly wide linear range and can therefore be used to quantify the activity of weak and strong promoters with accuracy. The use of different luciferase species allows the determination of two different promoter activities simultaneously, e. g. to provide an internal control.

On the first day, we will discuss the opportunities and limitations of transient reporter assays, and we are going to transfect cells with combinations of reporter plasmids and expression plasmids for transcription activators. On the second day, we are going to determine luciferase activities (firefly and renilla) using a dual assay, by semi-automated luminometry. The results will be discussed and different modes of measurement will be explained. Participants are welcome to bring their own promoter constructs if desired, but a brief discussion in advance would be helpful.

Contact 1:	Franziska Schmidt	fschmid1@gwdg.de	Tel. 0551-39 13841
Contact 2:	Veena Jagannathan	vjagann@gwdg.de	Tel. 0551-39 13841

Comments:	2 days, each time starting in the morning

GGNB Short Methods Courses: Sep 2012 – Feb 2013

GGNB
Göttingen Graduate School for
Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340185	**Credits:**	2.0 / module*	**Date:**	2-4 Nov 2012

Title of Course (course ID): Translational Neuroscience: **Multiple Sklerosis** (A 12.II)

Group Leader / Supervisor(s): Hannelore Ehrenreich, Martin Begemann

Place: MPI for Experimental Medicine, Division of Clinical Neuroscience

Participants: min: 1 | max: 3

Duration: 2 x 3 days* **Time on Day 1:** 08:00 h

Preparatory Meeting: No

Course description:

Target Group: Interdisciplinary approach, addressing medical students in the clinical part of their studies as well as students of biology and psychology at a progressed state of their studies (at least semester 5); all lectures will be in English.
General Outline: A total of 78 hours will be provided, covering translational neuroscience, presented in 2 blocks á 26 hours. Each block comprises a large area of translational neuroscience under the umbrella of one specific disease, thereby delivering an exemplary guideline for teachers and students: (1) Schizophrenia as an example of diseases affecting higher brain functions; (2) Multiple Sclerosis as an example of an inflammatory degenerative disease of the nervous system.

Content Block 1: Schizophrenia: Introduction to the disease, historical aspects, epidemiology, patient presentation (including videos), DSM criteria for the diagnosis, frequent comorbidities, including drug abuse and associated problems, important differential diagnoses, neuroimaging, neuropsychology, psychopathology, instruments for clinical rating of disease severity and follow-up (PANSS etc), established treatments, dopamine hypothesis of schizophrenia, novel approaches targeting the glutamate system and neuroprotection, genetics of schizophrenia, environmental risk factors, animal models (previous, present and future), behavioral battery focusing on testing higher brain functions in mice, magnetic resonance imaging (MRI), histology, and drug-challenge tests in experimental animals, long-term potentiation and short-term potentiation in the hippocampus, short-term plasticity, multi-electrode array (MEA) recordings, autaptic neuron preparation, multivariate covariance analysis as statistical means for evaluation of proof-of-concept trials.

Content Block 2: Multiple Sclerosis: Introduction to the disease, historical aspects, epidemiology, patient presentation (including videos), diagnostic criteria for disease classification including subtypes, imaging, neurophysiology, CSF diagnostics, neuropsychology, differential diagnoses and frequent comorbidities including psychopathology, pathophysiology including mediators of inflammation, mechanisms of axonal loss, demyelination, immunology including auto-immunity, basics of the functioning of the blood-brain-barrier and the brain immune system, genetics, environmental risk factors, animal models of multiple sclerosis and animal neuroimaging, mouse test battery for measuring motor function, fine motor performance and ataxia, therapeutic targets, established and experimental therapeutic approaches including symptomatic/supportive measures, the drug development process (clinical trials) and its challenges in multiple sclerosis.

Contact: Prof. Dr. Dr. H. Ehrenreich | timner@em.mpg.de | Tel. 0551-3899 615

Comments:

* 2 blocks of 3 days each in June and November, Friday through Sunday
Written test (multiple choice) at the end of each block. The lecture series comprises also *practical parts* (short lab visits), e.g. psychopathology rating, neuropsychology testing, imaging, diagnostics, cell culture work, behavioral studies etc.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340029	**Credits:**	1.0	**Date:**	5 - 6 Nov 2012

Title of Course: (Course ID):	Mouse histology and in situ expression analyses (A 13)
Group Leader / Supervisor(s):	Gregor Eichele, Lars Geffers
Place:	MPI for Biophysical Chemistry, Department of Genes & Behavior, Am Fassberg 11, Tower 5, 2nd floor

Participants:	min: 2	max: 4

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

The histological analysis of gene and protein expression in tissue sections has become a widely used tool for studying biological processes *in vivo*. In the course we will stage mouse embryos, prepare histological sections of embryo and adult brain tissues from mice and analyze histology using standard staining procedures. If students are interested, the second part of the course will focus on expression analyses on sections using immunohistochemistry and *in situ* hybridization approaches. Applied techniques will be: embryo preparation and staging, tissue sectioning, histological staining, chromogenic *in situ* hybridization and immunohistochemistry

Contact 1:	Helena Miletic	helena.miletic@mpibpc.mpg.de	Tel. 0551-201 2700
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340045	**Credits:**	1.0	**Date**	17-19 Sep 2012

Title of Course (Course ID):	Introduction to lipid analysis (A 16)
Group Leader / Supervisor(s):	Ivo Feußner, Cornelia Herrfurth
Place:	Dept. of Plant Biochemistry Lab 0.201, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants:	min: 4	max: 8		
Duration:	3 days	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	No			

Course description:

Beside nucleic acids, proteins and sugars, lipids form the fourth group of biomolecules. In general they can be divided into sterols, glycero- and sphingolipids. This practical course will cover basic methods of lipid analysis and is intended to students that do not regularly work with this class of molecules. Thus we will analyze lipid profiles of tissue extracts derived from different plant organs of different developmental stages.

Specifically the following experiments are planned:

- Extraction and fractionation procedures
- Separation of lipids by thin layer chromatography
- Analysis of fatty acids by gas chromatography
- Further characterization of fatty acid isomers by gas chromatography / mass spectrometry
- Structural analysis of lipids by liquid chromatography / mass spectrometry

Contact 1:	Dr. Cornelia Herrfurth	cherrfu@uni-goettingen.de	Tel. 0551-39 12110
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

Course ID:	340052	**Credits:**	1.0	**Date:**	*tba* (beginning of 2013)

Title of Course:	Non-invasive probing of brain function – Advanced methods course in psychophysics (A 18)
Group Leader / Supervisor(s):	Prof. Stefan Treue, Dr. Alexander Gail, Dr. Cliodhna Quigley
Place:	Cognitive Neuroscience Lab, Hans-Adolf-Krebs Weg 7, German Primate Center

Participants:	min: 3	max: 6

Duration:	2.0	**Time on Day 1:**	13:00 h

Preparatory Meeting:	No

Course description:

This course introduces the methodological concepts for quantifying perception and behavior with psychophysical methods in humans and non-human primates. The course includes a short introductory lecture on the theoretical backgrounds (first day). In small groups each participant will have the opportunity to conduct and perform different exemplary psychophysical experiments on visual perception and sensorimotor integration in practice. We will introduce the concepts of perceptual thresholds, sensory and sensorimotor adaptation, reaction-time measurements, non-invasive behavioral eye- and hand-movement registrations, and advanced methods for behavioral data analysis. Based on the collected data the strength, limitations, and potential pitfalls of psychophysical measurements will be discussed.

Contact 1:	Prof. Stefan Treue	treue@gwdg.de	0551-3851 118
Contact 2:	Beatrix Glaser	bglaser@gwdg.de	0551-3851 118

Comments:	Previous experience with MATLAB or the participation in the GGNB Short Method Course Introduction to Matlab in Systems Neuroscience (A 73) is helpful for participants.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	530170	**Credits:**	2.0	**Date:**	Fridays, WS 2012/13

Title of Course: (Course ID): Theoretical and Computational Neuroscience: Collective Dynamics Biological Neural Networks I (A 21)

Group Leader / Supervisor(s): Theo Geisel, Marc Timme, Fred Wolf, Demian Battaglia

Place: Physics Faculty, HS 5, E0.109, Friedrich-Hund-Platz 1, 37077 Göttingen

Participants: min: 5 max:

Duration: 2 SWS **Time on Day 1:** 14:00 h

Preparatory Meeting: No

Course description:

This lecture course offers an introduction to advanced modeling strategies for biological neural networks. After a short introduction to the biophysics of single cells and an overview of their basic firing patterns, we explain fundamental properties of networks models of neurons, starting from simple uniform connectivity and progressing to spatially extended and to arbitrarily complex interaction networks. These network models explain and predict key dynamical aspects of neural circuits, including irregular activity of cortical dynamics, feature selectivity, self-organization of neural maps, and the coordination of precisely timed spikes across networks.

Contact 1:	Dr. Marc Timme	timme@nld.ds.mpg.de	Tel. 0551-5176 440
Contact 2:	Dr. Demian Battaglia	demian@nld.ds.mpg.de	

Comments: Course unit I: Winter Semester / Fri, 14:00-16:00 (weekly). We recommend starting in the winter semester, but a start in a summer term (with course A 22) is possible as well.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No:	340168	**Credits:**	1.0	**Date:**	WiSe 2012/13

Title of Course: Introduction to molecular dynamic simulation

Group Leader / Supervisor(s): Helmut Grubmüller, Shreyas Kaptan

Place: MPI for Biophysical Chemistry, Department Grubmüller

Participants: min: 2 max: 20

Duration: 1 day **Time on Day 1:** tba

Preparatory Meeting: No

Course description:

Molecular Dynamics (MD) simulations are a method to calculate the atomistic dynamic of biomolecules. The movements of all atoms are calculated based on their respective interactions to all other atoms.

The goal of this practical course is to learn the basic handling of this method. Starting with the examination of thermodynamic properties of a simple gas system, the concepts of MD simulations are shown. Later on, the build-up and simulation of a complete protein system is performed. In that part, also various analytical methods for MD simulations are considered.

Contact 1:	Shreyas Kaptan	shreyas.kaptan@mpibpc.mpg	Tel. 0551-201 2312
Contact 2:	Antje Erdmann	Imprs-pbcs@gwdg.de	Tel. 0551-201 2322

Comments: 1 day course in groups of 2-3 students. Dates will be individually fixed.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

GGNB
Göttingen Graduate School for
Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340166	**Credits:**	1.0	**Date:**	WiSe 2012/13, Fridays

Title of Course (Course ID):	Current Topics in Biophysics – Lecture Series (A 25)
Group Leader / Supervisor(s):	Helmut Grubmüller, Christoph Schmidt
Place:	Seminar Room – Department of Prof. Schmidt, Section F, 2nd floor, room F02.125, Neue Physik, Friedrich-Hund-Platz 1

Participants:	min: 5	max: -

Duration:	WS 12/13	**Time on Day 1:**	10:15 h

Preparatory Meeting:	No

Course description:

Rotation course that offers a broad overview of the methods actively used in the program “Physics of Biological and Complex Systems (from experimental to theoretical, from spectroscopy to whole-cell manipulations, from microscopy and nanoscopy to the simulation of complex systems). This "methods in a nutshell" course provides a unique opportunity to get acquainted with several techniques, both theoretical and experimental, as taught by the experts.

Contact 1:	Antje Erdmann	imprs-pbcs@gwdg.de	Tel. 0551-201 2322
Contact 2:			

Comments:	2 SWS

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340165	**Credits:**	1.5	**Date:**	WiSe 2012/13, Mondays

Title of Course (Course ID):	Theoretical and Computational Biophysics: Introduction (A 26)
Group Leader / Supervisor(s):	Helmut Grubmüller, Bert de Groot
Place:	Physics Faculty HS3, A0.106; Physics Faculty – SR1, A1.101

Participants:	min: 3	max: 30	
Duration:	WiSe 2012/13	**Time on Day 1:**	16:00-18.00h
Preparatory Meeting:	No		

Course description:

Combined lecture and hands-on computer tutorial. Theory and computer simulations of biomolecular systems, particularly proteins. Basic knowledge in physics preferred, programing skills are not required. For interested students the subsequent lecture “Theoretical and Computational Biophysics: concepts and methods“ is recommended in the following semester.

Topics

Protein structure and function, physics of protein dynamics, relevant intermolecular interactions, principles of molecular dynamics simulations, numeric integration, influence of approximations, efficient algorithms, parallel programing, methods of electrostatics, protonation balances, influence of solvents, protein structure determination (NMR, X-ray), principal component analysis, normal mode analysis, functional mechanisms in proteins, bioinformatics: sequence comparison, protein structure prediction, homology modeling, hands-on computer simulation.

The course focuses on the basics of computational biophysics and deals with questions like “How can the particle dynamics of thousands of atoms be described precisely?” or “How does a sequence alignment algorithm function?”. The aim of the lecture is to develop a physical understanding of those “nano maschines” by using modern concepts of non-equilibrium thermodynamics and computer simulations of the dynamics on an atomistic scale. Moreover, the lecture shows (by means of examples) how computers can be used in the modern biophysics, e.g. to simulate the dynamics of biological nano maschines or to calculate or refine a protein structure. No cell could live without the highly specialized macromolecules. Proteins enable virtually all tasks in our bodies, e.g. photosynthesis, motion, signal transmission and information processing, transport, sensor system, and detection. The perfection of proteins had already been highly developed two billion years ago.

Contact 1:	Dr. Bert de Groot	bgroot@gwdg.de	Tel. 0551 – 201 2308
Contact 2:			

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ-No.:	340084	**Credits:**	1.0	**Date:**	Jan 2013

Title of Course (course ID):	*In situ* hybridization of paraffin embedded tissue sections (A 28)
Group Leader / Supervisor(s):	Heidi Hahn, Frauke Nitzki, Marco Becker
Place:	Abteilung Humangenetik, Heinrich-Düker-Weg 12, 37073 Göttingen

Participants:	min: 1	max: 4			
Duration:	3 days*	**Time on Day 1:**	09:00 h		
Preparatory Meeting:	No				

Course description:

Students will learn how to perform the mRNA expression analysis on sections of paraffin-embedded tissues. The hybridisation itself will take 3 days (the final reaction will be completed after additional 1 – 2 days).

The exact course date will be fixed with the participants. So far any week in January between the 7th and the 31st is possible. The course will start on a Monday.

Contact 1:	Marco Becker	marco-becker-email@web.de	Tel. 0551-39 14011
Contact 2:	Dr. Frauke Nitzki	fnitzki@gwdg.de	Tel. 0551-39 14013

Comments:	* 3 days (plus an additional 1-2 days to complete the final reaction)

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340005	**Credits:**	1.0	**Date:**	22 - 23 Nov 2012

Title of Course: (Course ID):	Chemical synthesis and enzymatic ligation of RNA and DNA oligonucleotides (A 32)
Group Leader / Supervisor(s):	Claudia Höbartner
Place:	MPI for Biophysical Chemistry, AG Nucleic Acid Chemistry, T2, SOG

Participants:	min: 2	max: 4

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

The course covers methods for the automated solid-phase synthesis of chemically modified oligonucleotides by phosphoramidite chemistry, purification of synthetic RNA and DNA by anion exchange and reversed-phase HPLC and by preparative denaturing PAGE, and strategies for the enzymatic ligation of RNA fragments by protein enzymes and deoxyribozymes.

Contact 1:	Dr. Claudia Höbartner	Claudia.hoebartner@mpibpc.mpg.de	Tel. 0551-201 1685
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340046	**Credits:**	1.0	**Date:**	18 - 19 Oct 2012

Title of Course: (Course ID):	Reconstitution of neuronal exocytosis (A 33)
Group Leader / Supervisor(s):	Reinhard Jahn, Yongsoo Park, Halenur Yavuz
Place:	MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants:	min: 2	max: 6		
Duration:	2 days	**Time on Day 1:**	09:30 h	
Preparatory Meeting:	No			

Course description:

SNARE proteins are essential for membrane fusion in eukaryotic cells, in processes as diverse as ER to Golgi trafficking and neurotransmitter release. We are interested in understanding the mechanisms underlying secretion from neurons. We attempt to do this using a minimalistic assay, in which SNARE proteins are incorporated into artificial lipid vesicles. The SNARE protein interactions and mixing of the lipid bilayers, which occur upon fusion, are monitored using fluorescence methods.

Contact 1:	Dr. Yongsoo Park	yongsoo.park@mpibpc.mpg.de	Tel. 0551-201 1624
Contact 2:	Halenur Yavuz	halenur.yavuz@mpibpc.mpg.de	

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340015	**Credits:**	1.0	**Date:**	Oct 2012

Title of Course: (Course ID):	BiFC (bimolecular fluorescence complementation) in yeast and image analysis with CellProfiler (A 34)
Group Leader / Supervisor(s):	Hans Dieter Schmitt, Saskia Schröter
Place:	MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants:	min: 1	max: 4			
Duration:	2 days	**Time on Day 1:**	09:00 h		
Preparatory Meeting:	Yes*				

Course description:

Bimolecular fluorescence complementation (BiFC) is used to visualize protein-protein interactions *in vivo.* Two fragments of a “split up” fluorescent protein (in our case YFP) are introduced at the N- or C-terminus of proteins of interest. These fragments do not associate unless the proteins carrying the tag come into close proximity of each other. Fluorescence is only emitted from the reconstituted YFP, not from its fragments. However, BiFC may cause artifacts, as BiFC actually represents an irreversible “YFP fragment assembly trap”. In fact, introducing BiFC tags may have negative effects on the growth of the cells probably due to this phenomenon.
Our group studies the interaction between vesicle coats and tethering complexes at the ER of yeast cells. We have constructed various genomically tagged BiFC strains with YFP fragments fused to coat proteins (COP-I and COP-II), tethering factor subunits, and a COP-I cargo protein.
During the course we will construct split-YFP strains, image and compare them and quantitatively analyze the fluorescent images using the open source software CellProfiler. Along the way, some methods specific for yeast genetics will be demonstrated (e.g. tetrad analysis with the micromanipulator).
Special attention will be given to the drawbacks and problems arising with the BiFC method, as well as how to overcome them.
If time permits, BiFC strains can be used to demonstrate a live cell imaging method allowing for time lapse imaging of proliferating cells.
The course focus can be adapted to the specific interests of the participants.

Recommended reading:
Zink S, Wenzel D, Wurm CA, Schmitt HD. Dev Cell. 2009
Kerppola TK. Chem Soc Rev. 2009
Kodama Y, Hu CD. Biotechniques. 2010

Contact 1:	Dr. Hans-Dieter Schmitt	hschmit@gwdg.de	Tel. 0551-201 1652
Contact 2:	Saskia Schröter	sschroe4@gwdg.de	Tel. 0551-201 1714

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340006	**Credits:**	1.0	**Date:**	9 - 10 Oct 2012

Title of Course (Course ID):	Co-immunoprecipitation as a technique to study protein-protein interactions (A 35)
Group Leader / Supervisor(s):	Reinhard Jahn, John Chua, Beyenech Binotti
Place:	MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants:	min: 2	max: 4		
Duration:	2 days	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	Yes			

Course description:

Physical interactions between biological molecules are pivotal to the workings of many biological processes. Identification of molecules binding to an individual protein not only sheds light on its function but also provides valuable information on the cellular process or pathways with which it is associated.

While many approaches are available to identify or verify protein-protein interactions, co-immunoprecipitation remains a valuable *in vitro* method for this purpose. Nevertheless, the technique should be carefully implemented in order that the results may be reliably interpreted.

Contact 1:	Dr. John Chua	jchua@gwdg.de	Tel. 0551-201 1663
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340004	**Credits:**	1.0	**Date:**	15 – 16 Nov 2012

Title of Course (Course ID):	Protein purification and characterization (A 36)
Group Leader / Supervisor(s):	Reinhard Jahn, Karin Kühnel
Place:	MPI for Biophysical Chemistry, Department of Neurobiology, Kühnel Group, T6, 1st Floor

Participants:	min: 2	max: 5

Duration:	2 days	**Time on Day 1:**	09:30 h

Preparatory Meeting:	No

Course description:

This course is meant for students who have so far little or no experiences in protein purification. We will purify proteins from *E.coli* extracts using high affinity, ion exchange and size exclusion chromatography with an Äkta-FPLC system. The purity of proteins will be analyzed by SDS-PAGE. You will also learn how to determine protein concentrations, how to dialyze proteins and how to concentrate them.

Contact 1:	Dr. Karin Kühnel	kkuehne@gwdg.de	Tel. 0551-201 1795
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340026	**Credits:**	1.0	**Date:**	9 - 10 Oct 2012

Title of Course (Course ID):	PCR based mutagenesis strategies to evolve (photoswitchable) fluorescent proteins (A 37)
Group Leader / Supervisor(s):	Stefan Jakobs
Place:	MPI for Biophysical Chemistry, Department of NanoBiophotonics, T2, 2nd floor

Participants:	min: 2	max: 4			
Duration:	2 days	**Time on Day 1:**	09:15 h		
Preparatory Meeting:	No				

Course description:

GFP-like fluorescent proteins are powerful tools to study protein dynamics in living cells. The actual properties of the fluorescent proteins may be dramatically altered by slight changes in their amino acid sequences. This practical course will cover several basic methods for targeted and random mutagenesis based on PCR. We will use the coding sequences of switchable fluorescent proteins as templates. The mutagenized proteins will be screened for variants exhibiting different properties.

Contact 1:	Prof. Stefan Jakobs	sjakobs@gwdg.de	Tel. 0551-201 2531
Contact 2:	Tim Grotjohann	tgrotjo@gwdg.de	Tel. 0551-201 2510

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No:	340081	**Credits:**	0.5	**Date:**	18 Sep 2012

Title of Course: (Course ID):	Analysis of nucleocytoplasmic transport by flow cytometry (A 39)
Group Leader / Supervisor(s):	Ralph Kehlenbach
Place:	Dept. of Biochemistry I, Humboldtallee 23, 37073 Göttingen

Participants:	min: 2	max: 4		
Duration:	1 d	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	No			

Course description:

This course will provide a brief introduction into the concepts of nucleocytoplasmic transport. Nuclear import and export of fluorescent reporter proteins can be analyzed in parallel by flow cytometry. The principles of flow cytometry and its applications will be discussed.

Contact 1:	Dr. Ralph Kehlenbach	rkehlen@gwdg.de	Tel. 0551-39 5950
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	531725	**Credits:**	1.5	**Date:**	Thursdays, WS 2012/13

Title of Course: (Course ID):	Computer simulation methods in statistical physics (A 43)
Group Leader / Supervisor(s):	Richard Vink & Claus Heussinger
Place:	SR3 – Inst. Theor. Phys. (3rd floor of physics building), end of hallway, Friedrich-Hund-Platz 1, 37077 Göttingen

Participants:	min:10	max:20		
Duration:	15 days à 1.5 hrs	**Time on Day 1:**	10:15h	
Preparatory Meeting:	no			

Course description:

The use of computers to solve problems in statistical physics is well established and extremely useful in cases where exact solutions are not available. In this course, the Monte Carlo and Molecular Dynamics simulation methods will be presented (with the main focus on Monte Carlo), whose applications are widespread, and include the field of biology. Starting with the basic Metropolis algorithm for the Ising model, this course will gradually move on to consider more complex systems, and show how the simulation methods can be used to model system properties with relative ease.

Literature:

- M. Newman and G. Barkema, Monte Carlo methods in statistical physics (Clarendon Press, Oxford, 1999).
- D. Frenkel and B. Smit, Understanding Molecular Simulation (Academic Press, 2002).

Contact 1:	Dr. Richard Vink	vink@theorie.physik.uni-goettingen.de	Tel. 0551-39 7684

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340025	**Credits:**	1.0	**Date:**	12 - 13 Nov 2012

Title of Course: (Course ID):	Subcellular localization of proteins by immunoelectron microscopy of cryosections (A 44)
Group Leader / Supervisor(s):	Klaus-Armin Nave, Wiebke Möbius
Place:	MPI for Experimental Medicine, Dept. of Neurogenetics

Participants:	min: 2	max: 3
Duration:	2 days	**Time on Day 1:** 09:30 h
Preparatory Meeting:	No	

Course description:

Immunoelectron microscopy (IEM) is an important method to study the intracellular distribution of a protein of interest at high resolution. By IEM, the precise localization of a protein can be studied directly in its cellular environment, which is identified by morphological criteria. Here, we use chemically fixed tissue for ultrathin cryosectioning that was cryoprotected with 2.3 M sucrose and frozen in liquid nitrogen. Sections are labelled with antibodies and protein-A coupled to colloidal gold and viewed in the electron microscope.

Day 1: Introduction and cryosectioning

Day 2: Immunolabeling and electron microscopy

Contact 1:	Dr. Wiebke Möbius	moebius@em.mpg.de	Tel. 0551-3899 736
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340037	**Credits:**	1.0	**Date:**	18 - 20 Sep 2012

Title of Course: (Course ID): Microdissection combined with RNA analysis in the brain (A 45)

Group Leader / Supervisor(s): Moritz Rossner

Place: MPI for Experimental Medicine, Dept. of Neurogenetics, Hermann-Rein-Str. 3

Participants: min: 2 max: 3

Duration: 3 days **Time on Day 1:** 11:00 h

Preparatory Meeting: No

Course description:

Day 1: Introduction, Cryosectioning and staining of mouse brain on glass and membrane slides, microdissection, collection of samples

Day2: RNA preparation, Quality control using the Agilent Bioanalyzed, cDNA synthesis

Day3: qRT-PCR with cell-type specific primers to assess the purity of the samples

Contact 1:	Dr. Moritz Rossner	rossner@em.mpg.de	Tel. 0551-3899 781
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340027	**Credits:**	1.0	**Date:**	February 2013

Title of Course (Course ID):	Theory and basics of fluorescence microscopy and imaging / Introduction to life science research applications FRET, FRAP, FLIM, caging – uncaging, GFP, Fluorescence microscopy of living cells (A 46)
Group Leader / Supervisor(s):	Olympus (Bodenschatz lab)
Place:	Fluid Dynamics, Pattern Formation, and Nanobiocomplexity Research Group, headed by Prof. Bodenschatz, at the MPI for Dynamics and Self-Organisation, provisionally accommodated at the MPI for Biophysical Chemistry

Participants:	min: 3	max: 10

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

This course will show how:

- to set up a microscope and camera for fluorescence observation with different illuminations settings and their correct alignment.
- to find the appropriate filter combination for a given fluorochrome and application.
- to describe the benefit of different possible filter combinations.
- to describe the benefit of different light sources.
- to create digital images of fluorescence specimen.
- to describe the special needs for microscope, camera and software according to main applications.

Furthermore the course gives an introduction to life science research applications:

- Principles of confocal microscopy; TIRF confocal microscopy
- FRET, FRAP, FLIM, caging – uncaging, GFP
- Fluorescence microscopy of living cells
- Types of applications (e.g. ion sensitive dyes, GFP)

Exact dates *tba*

Contact 1:	Dr. Helge Schmidt	helge.schmidt@olympus.de	Tel 0160-7178732
Contact 2:	Marco Tarantola	marco.tarantola@ds.mpg.de	Tel 0551-5176 316

Comments:	The course will be offered to two groups of up to 5 participants per group.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340056	**Credits:**	1.0	**Date:**	19 - 21 Feb 2013

Title of Course: (Course ID):	Transcranial magnetic- and electrical stimulation (A 48)
Group Leader / Supervisor(s):	Andrea Antal, Walter Paulus
Place:	Universitätsklinikum Göttingen, Robert-Koch Straße 40, Hörsaal 542

Participants:	min: 5	max: 50

Duration:	3 days	**Time on Day 1:**	10:00 h

Preparatory Meeting:	No

Course description:

The course is aimed at introducing the theoretical background and practical applications of TMS and tDCS, tACS, tRNS to young researchers from all fields of neuroscience. Every effort will be taken to cover the broad spectrum of the areas involved in non-invasive brain stimulation, and to highlight recent developments in this field. Several invited lectures will be presented by world renowned scientists, followed by practical exercises in order to emphasize the technical backgrounds.
The course consists of a mixture of lectures (first day, and in the morning of day 2 and 3) and practical exercises (afternoon of day 2 and 3).

Contact 1:	Prof. Dr. Andrea Antal	aantal@gwdg.de	Tel. 0551-39 8461
Contact 2:			

Comments:	Registration fee waived for GGNB students

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340120	**Credits:**	1.0	**Date:**	5-7 Nov 2012

Title of Course: (Course ID):	Microinjection in *Xenopus* embryos (A51)
Group Leader / Supervisor(s):	Tomas Pieler, Kristine Henningfeld
Place:	Dept. of Developmental Biochemistry, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11, 37077 Göttingen

Participants:	min: 1	max: 4
Duration:	2.5 d	**Time on Day 1:** 09:00 h
Preparatory Meeting:	No	

Course description:

There are several advantages why the amphibian, *Xenopus laevis,* continues to be widely used as a model system to study vertebrate embryonic development. This includes the relatively fast and external development allowing direct accessibility to the developing embryo and the ease of microinjection (mRNA, DNA, antisense oligos …) into early cleavage stage embryos.

In this course the student will learn how to perform microinjection experiments of mRNA into *Xenopus* embryos. This includes obtaining eggs, in vitro fertilization, *in vitro* transcription of capped sense RNA and finally microinjection and cultivation of the embryos. The injected embryos will be evaluated for phenotype and influence of gene expression using luciferase reporter assays.

Our laboratory will supply the gene of interest or alternatively the student could prepare in advance their gene of interest in the appropriate expression vector (please discuss in advance).

Contact 1:	Dr. Kristine Henningfeld	khennin1@gwdg.de	Tel. 0551-39 5970
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ-No.:	340074	**Credits:**	1.0	**Date:**	5 - 6 Mar 2013

Title of Course: Blue-native PAGE analysis of membrane protein complexes (A 53)

Group Leader / Supervisor(s): Peter Rehling, Bettina Bareth

Place: Department of Biochemistry II, Humboldtallee 23

Participants: min: 2 max: 4

Duration: 2 days **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

By using a specialized native gel system, referred to as Blue-Native PAGE, membrane protein complexes of up to 1.5 MDa can be separated. Here we will focus on the analysis of mitochondrial membrane protein complexes such as the respiratory chain complexes. Upon solubilization the complexes can be separated and their higher oligomeric states, so called supercomplexes, can be visualized.

Contact 1:	Robert Reinhold	rreinho@gwdg.de	Tel. 0551-39 10132
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340057	**Credits:**	2.0	**Date:**	3 - 7 Dec 2012

Title of Course: (Course ID):	Macromolecular crystal structure determination (A 57)
Group Leader / Supervisor(s):	Tim Grüne
Place:	Lectures: Seminar Room 0.233 at the Ernst-Caspari-Haus / GZMB Building, Justus-von-Liebig-Weg 11, ground floor. Practicals: tba

Participants:	min: 5	max:20		
Duration:	4 days lecture 5 days practical	**Time on Day 1:**	10:00 h	
Preparatory Meeting:	no			

Course description:

Content of Course:
Symmetry and space groups. X-ray diffraction by single crystals. Solution and refinement of macromolecular structures. Crystallographic databases. Practical aspects, computer programs and synchrotron applications.

Recommended literature:
Rupp, Bernhard (2009) Biomolecular Crystallography: Principles, Practice and Application to Structural Biology. Garland Science, Taylor & Francis group, ISBN 978-0-8153-4081-2

Place and Time:
The lecture takes place at the Seminar Room 0.233 at the Ernst-Caspari-Haus / GZMB Building, Justus-von-Liebig-Weg 11, ground floor.
Lectures are held Monday, Tuesday, Thursday, and Friday, 10:00-12:00 h.

Practicals:
A one week practical is offered following the lecture with the aspect of better understanding the terms and contents of the lecture by hands-on exercises.

There are 10 students per practical, ideally working in groups of two; depending on demand we can offer up to two weeks. Practicals will run from 13:30 17:30 h every day.

Contact 1:	Dr. Tim Grüne	tg@shelx.uni-ac.gwdg.de	Tel. 0551-39 22149

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340114	**Credits:**	1.0	**Date:**	8 - 9 Oct 2012

Title of Course (Course ID):	GFP proteins and their application (FRAP, FRET, photo activation) (A 59)
Group Leader / Supervisor(s):	Mikael Simons, Mišo Mitkovski
Place:	MPI for Experimental Medicine, AG Simons, Hermann Rein Str. 3

Participants:	min: 2	max: 8

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

Fluorescent proteins such as green fluorescent protein (GFP) from the can be fused to any protein of interest to analyze protein dynamics in living cells.

The fluorescent proteins have provided an important new approach for understanding protein function and they have been used as tools in numerous applications, for example as probes to monitor protein-protein interactions, as photo-modulatable proteins to study the dynamics of specific protein populations, and as biosensors to monitor biological processes and signals.

We will discuss the possibilities of how to use GFP in experiments and demonstrate three examples of their application (acceptor-photobleaching FRET, FRAP and photoactivation of a fluorescent protein). Image analysis will be performed using open source software.

Contact 1:	Prof. Dr. Mikael Simons	msimons@gwdg.de	Tel. 0551-3899 533
Contact 2:	Dr. Mišo Mitkovski	mitkovski@em.mpg.de	Tel. 0551-3899 620

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340033	**Credits:**	1.0	**Date:**	5 - 7 Nov 2012

Title of Course (Course ID): Non-radioactive *in situ* hybridization (A 60)

Group Leader / Supervisor(s): Christine Stadelmann-Nessler, Jasmin Reichl

Place: Klinikum, Dept. of Neuropathology, Robert-Koch-Str. 40

Participants: min: 2 max: 3

Duration: 3 d **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

- Non-radioactive *in situ* hybridization: The students will perform non-radioactive *in situ*-hybridization for myelin proteins on brain sections of mice and rats.
- Immunohistochemistry for light microscopy. The students will perform immunohistochemistry for myelin proteins on brain and spinal cord tissue from mice with experimental autoimmune encephalomyelitis.

Contact 1:	Prof. Dr. C. Stadelmann-Nessler	cstadelmann@med.uni-goettingen.de	Tel. 0551-39 12610
Contact 2:	Jasmin Reichl (née Held)	Jasmin_Held@web.de	Tel. 0551-39-14133

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340060	**Credits:**	1.0	**Date:**	tba

Title of Course: (Course ID):	3D structure determination of macromolecular complexes by single particle cryo-EM (A 61)
Group Leader / Supervisor(s):	Holger Stark
Place:	MPI for Biophysical Chemistry, 3D-Cryo Electron Microscopy lab

Participants:	min: 2	max: 2		
Duration:	2 days	**Time on Day 1:**	10:00 h	
Preparatory Meeting:	No			

Course description:

The course covers sample preparation procedures for studying large macromolecular complexes by electron cryo-microscopy. Macromolecules will be imaged in the electron microscope. A set of noisy two-dimensional projection images is obtained which can be used to compute the 3D reconstruction of the macromolecular complex making use of advanced computational image processing strategies.

Contact 1:	Prof. Holger Stark	holger.stark@mpibpc.mpg.de	Tel. 0551-201 1305
Contact 2:			

Comments:

The exact date will be individually arranged with the participants.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340065	**Credits:**	1.0	**Date:**	8 - 9 Nov 2012

Title of Course (Course ID):	Scanning Ion Conductance Microscopy, a versatile tool to study surfaces and surface properties (A 62)
Group Leader / Supervisor(s):	Claudia Steinem, Andreas Janshoff / Ingo Mey, Christoph Saßen
Place:	Institut für Organische und Biomolekulare Chemie, Tammannstr. 2, 37077 Göttingen

Participants:	min: 2	max: 3
Duration:	2 days	**Time on Day 1:** 09:00 h
Preparatory Meeting:	No	

Course description:

The basic principles of Scanning Ion Conductance Microscopy will be taught. The participants will have the chance to operate the instrument and, if they are interested, image samples they are bringing. In the end the participants will be able to operate a SICM by themselves.

Contact 1:	Ingo Mey	imey@gwdg.de	Tel. 0551-39 3095
Contact 2:	Christoph Saßen	csassen@gwdg.de	Tel: 0551-39 3208

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340040	**Credits:**	1.0	**Date:**	21 - 23 Jan 2013

Title of Course: (Course ID):	Patch clamp (A 63)
Group Leader / Supervisor(s):	Walter Stühmer, Luis Pardo
Place:	MPI for Experimental Medicine, Molecular Biology of Neuronal Signals, Labs C203/C207

Participants:	min: 2	max: 6
Duration:	2.5 d	**Time on Day 1:** 09:00 h
Preparatory Meeting:	No	

Course description:

General introduction to the patch clamp technique with emphasis on whole cell recording of potassium voltage gated and ligand gated P2X ion channels.

Contact 1:	Prof. Walter Stühmer	ws@em.mpg.de	Tel. 0551-3899 646
Contact 2:	Dr. Luis Pardo	pardo@em.mpg.de	Tel. 0551-3899 643

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340018	**Credits:**	1.0	**Date:**	13 - 14 Nov 2012

Title of Course (Course ID):	Principles and methods of protein purification by chromatography (A 64)
Group Leader / Supervisor(s):	Kai Tittmann, Stefan Schneider, Alexander Piontek
Place:	Ernst-Caspari-Haus / GZMB building, ground floor, Dept. of Bioanalytics

Participants:	min: 4	max: 6

Duration:	2 days	**Time on Day 1:**	10:00 h

Preparatory Meeting:	No

Course description:

The purification of recombinant proteins or proteins from native sources is a routine technique in modern biochemistry. In this course, participants will be trained in operating the most-commonly utilized protein chromatography system Äkta with an emphasis on hardware operation and maintenance, software programming and data evaluation. General strategies and principles of gel filtration, ion exchange and affinity chromatography will be experimentally demonstrated.

Contact 1:	Prof. Kai Tittmann	ktittma@gwdg.de	Tel. 0551-39 14430
Contact 2:	Stefan Schneider	sschnei2@gwdg.de	Tel. 0551-39 14000

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.::	340020	**Credits:**	1.0	**Date:**	24 - 26 Oct 2012

Title of Course: (Course ID):	Sequence analysis of proteins and their post-translational modifications by MALDI-ToF and electrospray ionization (ESI) mass spectrometry (A 65)
Group Leader / Supervisor(s):	Henning Urlaub, Ilian Atanassov, Romina Hofele, Samir Karaca, Saadia Qamar, Sunit Mandad
Place:	MPI for Biophysical Chemistry, Mass Spectrometry Group

Participants:	min: 2	max: 4		
Duration:	3 d	**Time on Day 1:**	10:00 h	
Preparatory Meeting:	No			

Course description:

Day 1: Theory: Mass spectrometry (MALDI vs. ESI) and Proteomics. Practical work: In-gel-digestion of phosphorylated and non-phosphorylated proteins.

Day 2: Extraction of peptides, Peptide mass fingerprint analysis in MALDI-ToF, Nano sequencing of peptides in ESI mass spectrometer.

Day 2 and 3: Nano sequencing of peptides in ESI mass spectrometer. Identification of phosphorylation sites in MALDI and ESI mass spectrometers.

The PhD students will not obtain any information what kind of protein they have to analyze and where the modification site is located. It will be their task to identify the protein and its modification site. SDS gels with already stained proteins will be provided.

Contact 1:	Prof. Henning Urlaub	henning.urlaub@mpibpc.mpg.de	Tel. 0551-201 1060
Contact 2:	Ilian Atanassov	ilian.atanassov@mpibpc.mpg.de	Tel. 0551-201 1500

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340011	**Credits:**	1.0	**Date:**	17 - 18 Oct 2012

Title of Course: (Course ID):	Isolation of recombinant proteins by affinity chromatography and binding studies (A 66)
Group Leader / Supervisor(s):	Lutz Walter Meike Hermes
Place:	Dept. of Primate Genetics, German Primate Center (DPZ), Kellnerweg 4

Participants:	min: 1	max: 2

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

We will prepare eukaryotic fusion proteins consisting of killer cell immunoglobulin-like receptors (KIR) of natural killer cells and the Fc portion of human IgG1. Fc-KIR fusion proteins will be collected from supernatant of transiently or stably transfected cells and isolated by affinity chromatography using protein A sepharose columns. Fc-KIR proteins are then multimerised and fluorescently labeled and will be used to test specific interactions with MHC class I molecules by FACS analysis.

Contact 1:	Prof. Dr. Lutz Walter	lwalter@gwdg.de	Tel. 0551-3851 161
Contact 2:	Meike Hermes	mhermes@dpz.eu	

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340068	**Credits:**	1.0	**Date:**	Oct 2012

Title of Course (Course ID):	Introduction to Bioinformatics Methods (A 67)
Group Leader / Supervisor(s):	Lutz Walter, Markus Brameier
Place:	Dept. of Primate Genetics, German Primate Center (DPZ), Kellnerweg 4

Participants:	min: 2	max: 4

Duration:	2 days	**Time on Day 1:**	10:00 h

Preparatory Meeting:	No

Course description:

The course is designed for graduate or undergraduate students. The first part (on day 1) will introduce into basic computational methods and databases in bioinformatics with a focus on genome analysis. This will be communicated by practical exercises, besides seminar discussions. In the second part (on day 2) the participants will be introduced into basic script programming (in Perl).

There is no need to bring your own computer. There will be two desktop computers available so that two students each are supposed to share one computer and work together.

Exact date *tba.*

Contact 1:	Dr. Markus Brameier	brameier@dpz.gwdg.de	Tel. 0551-3851 481
Contact 2:	Prof. Dr. Lutz Walter	lwalter@gwdg.de	Tel. 0551-3851 161

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340022	**Credits:**	1.0	**Date:**	15 - 16 Nov 2012

Title of Course (Course ID):	Mechanisms of RNA silencing (A 68)
Group Leader / Supervisor(s):	Lutz Walter, Jens Gruber
Place:	Dept. of Primate Genetics, German Primate Center (DPZ), Kellnerweg 4

Participants:	min: 3	max: 6		
Duration:	2 days	**Time on Day 1:**	09:30 h	
Preparatory Meeting:	No			

Course description:

The course is designed for graduate students and addresses fundamental questions in the field of RNA interference (RNAi). RNA silencing will be discussed as (I) an endogenous mechanism for gene regulation via microRNAs and (II) as a tool for efficient functional gene characterization in reverse genetics approaches.

The practical part of the course will cover RNAi techniques such as siRNA transfection and gene knockdown detection as well as miRNA expression analysis via multi-reporter gene constructs.

After having completed the course the participants should be able to plan and perform simple RNAi experiments, including functional genetics and miRNA analysis

Contact 1:	Dr. Jens Gruber	jgruber@dpz.eu	Tel. 0551-3851 481
Contact 2:	Prof. Dr. Lutz Walter	lwalter@gwdg.de	Tel. 0551-3851 161

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340077	**Credits:**	1.0	**Date:**	15 - 16 Nov 2012

Title of Course (Course ID):	Thermodynamic characterization of biomolecular interactions by isothermal titration calorimetry (A 71)
Group Leader / Supervisor(s):	Kai Tittmann, Michael Tietzel, tba
Place:	Ernst-Caspari-Haus / GZMB building, ground floor, Dept. of Bioanalytics

Participants:	min: 4	max: 6
Duration:	2 days	**Time on Day 1:** 09:00 h
Preparatory Meeting:	No	

Course description:

Isothermal titration calorimetry (ITC) has emerged as one of the most sensitive and powerful techniques for a rigorous thermodynamic characterization of biomolecular interactions such as protein-protein or protein-ligand interactions. Thus far, ITC is the only technique that determines directly the key thermodynamic parameters of a given interaction including the dissociation constant *K*D, the Gibbs free energy of binding Δ*G* and its individual enthalpic (Δ*H*) and entropic contributions (Δ*S*), the stoichiometry *n* and the heat capacity Δ*c*p.

This course is aimed to provide the theoretical background of microcalorimetry as well as practical training for planning and performing ITC experiments. The binding interaction of several binding partners as well as steady state-kinetics will be thermodynamically studied by the participants using the most advanced isothermal titration microcalorimeter iTC200 manufactured by Microcal.

Contact 1:	Prof. Kai Tittmann	ktittma@gwdg.de	Tel. 0551-39 14430
Contact 2:	Michael Tietzel	Mtietze1@gwdg.de	Tel. 0551-39 14000

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340113	**Credits:**	1.0	**Date:**	15 - 16 Oct 2012

Title of Course (Course ID):	Hydrodynamic analysis of proteins and protein complexes by analytical ultracentrifugation (A 74)
Group Leader / Supervisor(s):	Dr. Wolfgang Fischle Dr. Samrat Dutta
Place:	Max Planck Institute for Biophysical Chemistry Laboratory of Chromatin Biochemistry, Tower IV, 1st floor

Participants:	min: 3	max: 5

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

Target group: Students with general interest in protein characterization and computational analysis.

Outline: During the course, two basic types of experiments will be conducted. First, a protein will be characterized by its sedimentation behavior in a sedimentation velocity experiment. Using state of the art analysis methods the students will determine the molecular weight as well as the shape factors of the protein. In a second experiment, the protein will be centrifuged until it is at equilibrium. From the resulting concentration gradient, the molecular weight will be determined, which is in this case independent on the shape of the protein. By combining these two experiments, the oligomerization state of the protein and the overall shape can be derived. Also, the purity of the protein preparation will be examined. By analyzing mixtures of the protein and a binding partner in the same way, the binding constant of the interaction will be calculated from the sedimentation behavior.

Contact 1:	Wolfgang Fischle	wfischl@gwdg.de	Tel. 0551-201 1340
Contact 2:	Samrat Dutta	sdutta@gwdg.de	

Comments:	If possible, students should bring a windows-based laptop computer

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340044	**Credits:**	1.0	**Date:**	18 - 19 Oct 2012

Title of Course (Course ID):	Chromatin Immunoprecipitation (CHiP) (A 75)
Group Leader / Supervisor(s):	Dr. Wolfgang Fischle, Dr. Kyoko Hamada
Place:	Laboratory of Chromatin Biochemistry, Max PIanck Institute for Biophysical Chemistry, Tower 4, 1st story

Participants:	min: 2	max: 4		
Duration:	2.5 days	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	No			

Course description:

Chromatin immunoprecipitation is a widely used technique to identify the sides of specific histone modifications and/or the association of transcription factors with specific genomic regions. In its basic form (how it is performed in this course) the precise distribution of a histone modification or the position of a protein of interest in context of a known genomic locus can be monitored. The resolution of the method for histone modification ChIP is a single nucleosome (~200bp). The position of a given DNA binding protein can be determined with even higher accuracy.

In this course the phosphorylation status of H3S10 of the HDAC 1 gene promotor region in response to an environmental stimulus will be examined and compared to control cells that lack that stimulus. Goal of this course is the communication of basic cell culture techniques and of the single steps of a regular CHiP experiment. Typical pitfalls that corrupt CHiP experiments will be discussed. After this course each student should be capable of setting up her/his own CHiP experiment. In detail, the students will be shown how to treat eukaryotic cells prior to the preparation of nuclear extract. They will learn how to prepare the nuclear extract in order to perform the chromatin immunoprecipitation. The procedure of protein:DNA immunoprecipitation along with the recovery of the precipitated DNA will be taught. Polymerase Chain Reaction will be used to analyse the purified genomic DNA.

Contact 1:	Dr. Kyoko Hamada	khamada@gwdg.de	Tel. 0551-201 1341
Contact 2:	Dr. Wolfgang Fischle	wfischle@gwdg.de	Tel. 0551-201 1340

Comments:	none

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340078	**Credits:**	0.5	**Date:**	16 Oct 2012

Title of Course: (Course ID): PCR: self-made enzymes, helpful additives and insights into the reactions (A 77)

Group Leader / Supervisor(s): Dirk Görlich/ Steffen Frey

Place: MPI for Biophysical Chemistry, Department of Cellular Logistics, T3, 3rd floor

Participants: min: 6 max: 10

Duration: 1 day **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Polymerase chain reactions reactions (PCRs) require a thermostable DNA polymerase. In the first part of the course, we will discuss how helper enzymes and low molecular additives can greatly boost the efficiency of the reaction. Also, we will discuss of how to arrive at a PCR reaction with a very low error rate (there is more to say than "use a proof-reading enzyme"!). The second (practical) part provides the opportunity of preparing a high-end PCR enzyme yourself. The preparation utilizes some very efficient protein purification tricks.

Note: This course is scheduled as an intense, one-day-programme. It assumes that you are already familiar with transforming and culturing *Escherichia coli*. For those, who lack this experience, the course can also be offered as an extended version.

Contact 1:	Dr. Steffen Frey	sfrey@gwdg.de	Tel. 0551-201 2460
Contact 2:	Prof. Dirk Görlich	goerlich@mpibpc.mpg.de	Tel. 0551-201 2400

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340184	**Credits:**	0.5	**Date:**	*tba*

Title of Course: Permeabilized cell assays for studying intracellular protein transport (A79)

Group Leader / Supervisor(s): Dirk Görlich, Broder Schmidt

Place: MPI for Biophysical Chemistry, Department of Cellular Logistics, T3, 3rd floor

Participants: min: 3 max: 4

Duration: 1 day **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Permeabilized cells are prepared by perforating the cholesterol-rich plasma membrane of cultured mammalian cells with low concentrations of digitonin. This releases soluble factors and allows entry of fluorescent probes into the cells. Transport of these fluorescent probes into cell nuclei can then easily be followed, either by direct fluorescent or by indirect immunofluorescence. We will teach how to label proteins with fluorescent dyes and how to perform permeabilized cell assays.

Note: This course is scheduled as an intense, one-day-program. It assumes that you are already familiar with culturing mammalian cells and seeding them onto coverslips. For those who lack this experience, the course can also be offered as an extended version.

Contact 1:	Dirk Görlich	goerlich@mpibpc.mpg.de	Tel. 0551-201 2400
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340010	**Credits:**	1.0	**Date:**	29 - 30 Oct 2012

Title of Course (Course ID):	Introduction to transient kinetic methods (A 81)
Group Leader / Supervisor(s):	Marina Rodnina / Pohl Milon
Place:	Max Planck Institute for Biophysical Chemistry, Department of Physical Biochemistry, Am Fassberg 11, Tower 4, 2.OG

Participants:	min: 2	max: 4
Duration:	2 days	**Time on Day 1:** 09:30 h
Preparatory Meeting:	None	

Course description:

Biological events are rapid and often take place within msec-sec time range. These processes can be investigated by means of transient kinetics, which is an essential method to study the mechanisms of enzymes, protein-ligand and protein-protein interactions. Detailed transient kinetics complements high resolution structural studies and together the two methods can give a molecular explanation of biological function. In this course we will explain the basic principles of transient kinetics, make experiments using rapid kinetics instrumentations, and discuss the data analysis, including numerical integration and global fit. Each full day will consist of 2 h seminar, 4 h hands-on practical work, and finish with a 1 h evaluation/feedback tutorial.

The following experiments are planned:
Kinetics of enzyme-catalyzed reactions in msec range using quench-flow technique.
Protein-ligand binding using stopped-flow technique.

Contact 1:	Prof. Dr. Marina V. Rodnina	rodnina@mpibpc.mpg.de	0551 201-2901
Contact 2:	Dr. Pohl Milon	pohl.milon@mpibpc.mpg.de	0551 201-2939

Comments:

Participants can bring their protein of interest.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340087	**Credits:**	1.0	**Date:**	10 - 12 Oct 2012

Title of Course: (Course ID):	*Drosophila* neurogenetics (A 83)
Group Leader / Supervisor(s):	Prof. André Fiala, Prof. Martin Göpfert
Place:	Georg-August-University of Goettingen, Dept. of Molecular Neurobiology of Behavior, Dept. of Cellular Neurobiology (tba)

Participants:	min: 3	max: 6
Duration:	3 days	**Time on Day 1:** 9:00 h
Preparatory Meeting:	No	

Course description:

The fruit fly *Drosophila* represents a key model organism in modern neuroscience due to the genetic techniques by which neuronal circuits and genes can be manipulated. In this course a background in state-of-the-art genetic techniques used to investigate the function of neuronal circuits for behavior will be provided. Neuroanatomical, physiological, optogenetic and behavioral approaches will be exemplified both theoretically and in hands-on experiments. Topics include germ-line transformation, cell-type specific gene expression, optical calcium imaging, optogenetic manipulation of neuronal activity, genetic tools for neuronal silencing, behavioral and physiological studies.

Contact 1:	Prof. André Fiala	afiala@gwdg.de	0551 – 39 3356
Contact 2:	Prof. Martin Göpfert	mgoepfe@gwdg.de	0551 - 3899 437

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340119	**Credits:**	1.0	**Date:**	18 - 20 Sep 2012

Title of Course (Course ID):	Analysis of protein-DNA interaction *in vitro* by electrophoretic mobility shift assay (EMSA) (A 88)
Group Leader / Supervisor(s):	Anastassia Stoykova / Tran Cong Tuoc
Place:	Max Planck Institute for Biophysical Chemistry, Department of Molecular Cell Biology / Turm 5 / 1st floor, Am Fassberg 11, 37077 Göttingen

Participants:	min: 3	max: 4
Duration:	2.5 days	**Time on Day 1:** 9.30 h
Preparatory Meeting:	No	

Course description:

EMSA is a sensitive affinity electrophoresis technique to study protein-DNA or protein-RNA interactions in vitro. This procedure can determine if a protein or mixture of proteins is capable of binding to a given DNA or RNA. For the reason of the safety regulation to work with Radioactive reagents, we will provide theoretical introduction of the method with experimental observations.

During this course, the participants will learn and use following methods:

- Day1: Radioactive labeling of DNA probe (observation), Preparation of polyacrylamide gel, *in vitro* protein synthesis
- Day 2: Protein-DNA binding reaction (observation)
- Day 3: Autoradiographic exposure and data discussion

Contact 1:	Tran Cong Tuoc	tcong@gwdg.de	0551 - 201 1469
Contact 2:			
Comments:			

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340002	**Credits:**	0.5	**Date:**	11 Dec 2012

Title of Course: Activity measurements of respiratory chain enzymes (A 91)

Group Leader / Supervisor(s): Peter Rehling, Jonathan Melin

Place: Biochemistry II, Humboldtallee 23

Participants: min: 2 max: 4

Duration: 1 day **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Enzyme activity can be analyzed spectrophotometrically and polarographically. Here, we will focus on the analysis of respiratory chain complexes in isolated mitochondria.

Contact 1:	Jonathan Melin	jonathan.melin@med.uni-goettingen.de	Tel. 0551-39 5976
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340021	**Credits:**	0.5	**Date:**	5 - 9 Nov 2012

Title of Course (Course ID):	Subcellular fractionation (A 92)
Group Leader / Supervisor(s):	Peter Rehling, Markus Deckers
Place:	Biochemistry II, Humboldtallee 23

Participants:	min: 2	max: 2		
Duration:	1 day	**Time on Day 1:**	8:00 h	
Preparatory Meeting:	No			

Course description:

In this course we will isolate functional organelles from cultured cells via subcellular fractionation.

Contact 1:	Markus Deckers	mdecker@gwdg.de	Tel. 0551-39 5983
Contact 2:			

Comments: The course takes place on one day in the week of 05-09 Nov 2012

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340075	**Credits:**	1.0	**Date:**	23 - 25 Jan 2013

Title of Course: (Course ID):	The application of RNA structure determination methodology to the analysis of RNA-protein interactions in RNP complexes (A 93)
Group Leader / Supervisor(s):	Reinhard Lührmann / Klaus Hartmuth
Place:	MPI for Biophysical Chemistry, Seminar room, Tower III/1st floor

Participants:	min: 3	max: 5
Duration:	3 days	**Time on Day 1:** 9:30 a.m.
Preparatory Meeting:	No	

Course description:

The course will provide an in depth presentation of current methods used in RNA structure determination. This will include a theoretical introduction to chemical RNA modification and hands-on introduction to the experimental procedures. These are: (i) handling of RNA; (ii) chemical modification of RNA using DMS and kethoxal, and the SHAPE methodology; (iii) analysis of the modified RNA by primer extension.

In a second part, current procedures of RNA modification as applied to the analysis on RNA-protein interactions will be discussed. Experimentally, we will use hydroxyl radical footprinting and we will focus on the analysis of defined RNA-protein interactions from the field of spliceosome research.

Contact 1:	Prof. Reinhard Lührmann	reinhard.luehrmann@mpi-bpc.mpg.de	0551 201 1407
Contact 2:	Dr. Klaus Hartmuth	khartmu@gwdg.de	0551 201 1650

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340063	**Credits:**	1.0	**Date:**	7 - 9 Feb 2013

Title of Course (Course ID):	Introductory biostatistics with R (A 94)
Group Leader / Supervisor(s):	Katharina Hoff
Place:	tbc: Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11, CIP pool (basement)

Participants:	min: 5	max: 18

Duration:	2.5 d	**Time on Day 1:**	9:00 h

Preparatory Meeting:	No

Course description:

R is a freely available programming language for statistics and graphics. This course covers the application of R on biostatistic problems. The following topics will be discussed and applied:
- descriptive statistics
- graphics
- t-test
- wilconxon test
- chi square test
- correlation analysis
- regression analysis
- ANOVA
- parametric and nonparametric multiple comparisons

Contact 1:	Dr. Katharina Hoff	Katharina.hoff@gmail.com	03834-864624
Contact 2:			

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340038	**Credits:**	1.0	**Date:**	24 - 25 Sep 2012

Title of Course (Course ID):	Nerve cell culture and patch-clamp recordings from nerve cells (A 96)
Group Leader / Supervisor(s):	Dr. Jeong Seop Rhee
Place:	Neurophysiology Group, MPI for Experimental Medicine, Hermann-Rein-Str. 3

Participants:	min: 2	max: 6

Duration:	2 d	**Time on Day 1:**	9:00 h

Preparatory Meeting:	No

Course description:

Keywords describing the course contents / lecture & exercises / target group

To study synaptic transmission mechanisms, my lab takes advantage of the single cell autaptic neuron culture system. This model system is ideally suitable for understanding the most important parameters underlying synaptic communication in a quantitative fashion. It is unique, as all synapses originate from a single axon. Thus different synaptic release modes can be quantified.

Step 1. Preparing autaptic neuron cultures
The autaptic preparation is defined by a single neuron that resides on an island of astrocytes with limited size, called a microisland culture. First, course participants will learn how the micoisland astrocyte culture is made and developed. Second, course participants will learn how to grow single neurons on the astrocyte islands. The applicants will learn to dissociate neurons from target areas of the mouse brain and to culture them on the astrocyte feeder culture.

Step 2. Measuring evoked synaptic transmission in autaptic cultures
In autaptic neuron cultures, all synapses that contact the dendrite of the neuron are formed by a single axon of the same neuron. Thus, all synapses can be stimulated to release transmitter at once by brief somatic depolarization. To understand the evoked synaptic responses, my lab uses a basic application of the patch clamp technique. Course participants will learn the basics of the measurement and quantification of synaptic responses in autaptic neuron cultures.

This course is intended for students who want to explore projects concerned with synaptic function in neurons.

Contact 1:	Dr. JeongSeop Rhee	rhee@em.mpg.de	0551-3899 694
Contact 2:			

Comments:

Basic theoretical knowledge of nerve cell and synapse function and of patch clamp methodology is desirable.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

GGNB
Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340066	**Credits:**	1.0	**Date:**	15 - 16 Nov 2012

Title of Course (Course ID):	Introduction to image processing in biology with ImageJ and Fiji (A 98)
Group Leader / Supervisor(s):	Dr. Mišo Mitkovski
Place:	MPI for Experimental Medicine, Hermann-Rein-Str. 3, 37077 Göttingen (meet at main entrance area)

Participants:	min: 5	max: 10

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

An ever-increasing amount of biological events can be quantified by means of microscopy. A well-designed experiment may yield spatiotemporal information with regard to events taking place at the cellular or molecular level. A proper evaluation thereof requires understanding of what an image is, how it is generated and what subsequent processing methods are available.

Therefore, the underlying motivation for the course is the quantification of biological events through analysis of images generated with a microscope. The freely available “ImageJ” (http://rsbweb.nih.gov/ij/) and its “Fiji” variant (http://pacific.mpi-cbg.de/wiki/index.php/Fiji) are some of the several open-source applications that will be introduced towards this goal.

In particular, the components of an image will be discussed, as well as frequently used image types within their appropriate context. Basic concepts such as “lookup tables”, “image calibration” or the creation of multi-channel (overlay) images will be explained along with several standard situations that a microscope user is faced with on the road toward a publication.

More advanced topics will include the modification of ImageJ installs to suit the respective need. Moreover, examples of basic image arithmetic and further image processing related to image stacks (i.e. time series), 3D reconstruction and automated image processing will be discussed.

Students attending the course may suggest topics they wish to have covered.

Contact 1:	Mišo Mitkovski	mitkovski@em.mpg.de	0551-3899 504
Contact 2:			

Comments:	The date for the course can be changed. It is preferable if students have their own laptops. Alternatively, a computer lab will be necessary. The course will last 6 h/day.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

GGNB
Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340061	**Credits:**	1.0	**Date:**	8 & 11 & 15 & 18 Oct 2012

Title of Course: (Course ID):	Basic statistics for graduate students in the life sciences (A 100)
Group Leader / Supervisor(s):	Prof. Tim Friede / Dr. Frank Konietschke / Dr. Katharina Lange
Place:	Department of Medical Statistics, Humboldtallee 32, Computer Room (CIP)

Participants:	min: 5	max: 20
Duration:	4 days à 3.5 hrs	**Time on Day 1:** 14:00 h
Preparatory Meeting:	No	

Course description:

This course is an introduction to the fundamental statistical concepts used in design and analysis of experiments in the life sciences. The course covers the following topics:

- *A primer in data management*
  - *How to set up a suitable spreadsheet for my experiment?*
  - *Being aware of data quality: How to conduct effective quality checks?*
  - *How to import data to R?*
- *Basic statistics for the design and analysis of experiments*
  - *Descriptive statistics and data visualization*
  - *Fundamental concepts of statistical inference: hypothesis testing and confidence intervals*
  - *Comparing two groups (considering various types of endpoints)*
  - *Basic designs*
    - *one-way factorial designs*
    - *two-way factorial designs*
    - *split-plot designs*
    - *cross-over designs*
  - *Sample size calculation: How many subjects or replications do I need?*
- *Interpretation of results*
- *The course will include applications in the statistical software package R (www.r-project.org).*

Contact 1:	Prof. Tim Friede	Tim.Friede@med.uni-goettingen.de	Phone: 0551-39 4991
Contact 2:	Dr. Frank Konietschke	fkoniet@gwdg.de	Phone: 0551-39 4989

Comments:

Basic knowledge of programming in R is an advantage. Lecture and exercises on four afternoons from 14:00-17:30h.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340036	**Credits:**	1.5	**Date:**	Feb 2013

Title of Course: Introduction to laboratory animal science (A 101)

Group Leader / Supervisor(s): Dr. Verena Reupke

Place: European Neuroscience Institute Göttingen, Grisebachstr. 5, 37077 Göttingen

Participants: min: n.a. max: 2 participants reserved for GGNB

Duration: 5 days **Time on Day 1:** 13-18h

Preparatory Meeting: No

Course description:

Legislation: Survey of the national legislation regarding animal use for scientific purposes; licensing; inspection

Biology and husbandry of laboratory animals

Biology and handling of laboratory animals (comparative anatomy and physiology of mice, rats, and rabbits); care and housing; reproduction and breeding; animal well being and stress

Genetic standardization; genotype - environment interactions; inbred strains; outbred strains; creation and breeding of transgenic animals; genetic characterization; genetic quality control

Recognition, assessment and control of pain and suffering in laboratory animals

Standardization in laboratory animal facilities
Alternatives to animal use: Examples for alternatives to animal use

Anesthesia, analgesia, and experimental procedures; Effectiveness of different methods of anesthesia; narcotics and analgesics

Introduction to surgery; Experimental procedures - demonstration and practice: non-surgical procedures such as injections, oral dosing, collection of blood, urine and feces

Euthanasia; chemical and physical methods of killing

Contact 1:	Dr. Verena Reupke	Verena.reupke@med.uni-goettingen.de	0551-39 13904
Contact 2:	Prof. Michael Hörner	gpneuro@gwdg.de	0551-39 12307

Comments: 13-15h: Lectures; 15-18h: Practical work (each day)
The exact dates will be announced in due course.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340059	**Credits:**	1.0	**Date:**	21 - 22 Jan 2013

Title of Course: (Course ID):	Crystallization of biological macromolecules (A 102)
Group Leader / Supervisor(s):	Vlad Pena, Jana Schmitzova, Ulrich Steuerwald, Inessa De, Tales de Moura, Jürgen Wawrzinek, Markus Matthes
Place:	Max Planck Institute for Biophysical Chemistry, X-Ray Crystallography group, tower 3, 37077 Göttingen

Participants:	min: 2	max: 5	
Duration:	2 days	**Time on Day 1:**	09:00 h
Preparatory Meeting:	No		

Course description:

X-ray crystallography is the most powerful tool for the structure determination of macromolecules at atomic resolution. This practical course will provide a comprehensive introduction to state-of-the-art methodology applied in the field of macromolecular crystallography.

One part of the course will cover methods of sample preparation and characterization required prior to crystallization. Topics: bioinformatics for target selection, baculoviral recombinant expression, thermal shift assays and limited proteolysis.

The second part is dedicated to crystallographic methods themselves. Topics: high-throughput screening, storage and imaging of the plates, automated and manual optimization, crystals manipulation and cryo-protection, X-ray data collection.

Contact 1:	Vlad Pena, PhD	vpena@gwdg.de	Tel. 0551-201 1046
Contact 2:			

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340086	**Credits:**	1.0	**Date:**	Nov 2012

Title of Course (Course ID):	Tissue processing and immunohistochemistry on tissue sections of genetically engineered mouse models (A 107)
Group Leader / Supervisor(s):	Felix H. Brembeck, Jens Bunzendahl
Place:	UMG, University Hospital, Research Laboratory "Tumor Biology and Signal Transduction", Dep. Hematology/Oncology, Room 1D4 681

Participants:	min: 2	max: 6		
Duration:	2 days	**Time on Day 1:**	10:00 h	
Preparatory Meeting:	No			

Course description:

Genetic mouse models are widely used to study gene function during development or in the initiation or progression of tumors. Our laboratory is analyzing different genetic tumor models to analyze early organ development and the development of intestinal and breast cancer.

Participants of this course will perform basic protocols, including hematoxylin-eosin stainings and immunohistochemistry. We will analyze and compare selected markers for differentiation and proliferation on tissue sections of our genetically engineered mouse models. The stainings will be evaluated for the morphology, the presence of (pre-)malignant transformations and the expression pattern of the selected markers.

Contact 1:	Prof. Dr. Felix H. Brembeck	brembeck@med.uni-goettingen.de	Tel. 0551-39 10568
Contact 2:	Jens Bunzendahl	jbunzendahl@med.uni-goettingen.de	Tel. 0551-39 10568

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340083	**Credits:**	0.5	**Date:**	*tba*

Title of Course (Course ID):	Homologs and Paralogs – how they evolve and how to distinguish them (A 108)
Group Leader / Supervisor(s):	Gregor Bucher, Ernst Wimmer
Place:	Dept. of Developmental Biology, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants:	min: 3	max: 8			
Duration:	1 day*	**Time on Day 1:**	09:00 h		
Preparatory Meeting:	No				

Course description:

The comparison of gene function across species requires that the respective true orthologs are compared. These can be identified by sequence analysis.

- In the introductory lecture I will introduce to the evolution of genes and sequences with focus on the different origin of orthologs and paralogs.
- In the practical in silico work you will determine orthologs and paralogs of a given gene by performing blast searches, alignments and the calculation of phylogenetic trees.
- Subsequently, you are invited to identify orthologs of your favorite gene.

Exact date *tba.*

Contact 1:	Prof. Gregor Bucher	gbucher1@gwdg.de	Tel. 0551-39 5426
Contact 2:			

Comments:

9:00-15:00
If you wish you may bring the protein sequence of your favorite gene

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340131	**Credits:**	1.0	**Date:**	11 - 12 Oct 2012

Title of Course (course ID):	Protein family analysis as basis for experiments and experimental data interpretation (A 116)
Group Leader / Supervisor(s):	Martin Kollmar
Place:	Computer room of the GWDG, Am Fassberg 11, 37077 Göttingen

Participants:	min: 2	max: 10

Duration:	2 days	**Time on Day 1:**	9:00 h

Preparatory Meeting:	No

Course description:

Protein family analyses are the basis for many subsequent experiments, in the wet-lab as well as in silico:

- Phylogenetic analyses
- Differentiation between orthologs and paralogs
- Is your model protein/gene really a model?
- Identification of conserved domains => protein expression, biochemical analyses
- Reconstruction of genes for the generation of knock-outs

In the course you will learn how to identify, assemble, and annotate protein sequences, especially of those species for which mRNA and gene prediction data is not available. This includes the usage of the various genome sequence databases and sequence search tools. Subsequent to the identification of potential protein family members, the candidates are assembled with the help of comparative genomics and multiple sequence alignments. For the subfamily classification you will learn how to use basic and advanced phylogenetic analysis methods. Protein domains will be characterized and gene structures reconstructed. If time remains, alternative splice forms will be analysed.

We will use databases and tools available as webservice in the internet, thus the only requirement for the course is being able to use a web browser. Multiple sequence alignments and some comparative genomics will be done with BioEdit, a free and simple to use software.

Contact 1:	PD Dr. Martin Kollmar	mako@nmr.mpibpc.mpg.de	Tel.: 0551-2012260
Contact 2:	Klas Hatje	hakl@nmr.mpibpc.mpg.de	Tel.: 0551-2012260

Comments:	Every student gets an own computer for optimal training.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340134	**Credits:**	0.5	**Date:**	4 Oct & 12 Nov 2012

Title of Course (Course ID):	Introduction to Cardiac Electrophysiology and Heart Optical Mapping (A 120)
Group Leader / Supervisor(s):	Prof. Stefan Luther, Nour Raad M.D.
Place:	Georg-August University Medical Center, Department of Cardiology & Pneumology, Robert-Koch Str. 40, Room 4 D2 336 (4th floor, D2 section, room number 336)

Participants:	min: 3	Max: 5	
Duration:	1 day	**Time on Day 1:**	9:30 h
Preparatory Meeting:	No		

Course description:

This one-day course will be given twice this semester on two different dates: 4 October 2012 and 8 November 2012.

The course will be divided into 2 parts: in the morning, the participants will join for a hands-on application where they will learn to extract, isolate and cannulate a mouse heart.

In the afternoon, the participants will have a general overview of basic cardiac electrophysiology and the state-of-the-art technique of whole heart optical mapping. It will deal with the following:

A- Cardiac electrophysiology
   a. Cellular electrophysiology / Excitable media
   b. Normal / Abnormal heart electrical conduction (pathophysiology of heart disease)

B- Optical Mapping of the heart
   a. General principles
   b. Progress done in the technique
   c. Mapping transgenic/mutant hearts for the study of electrical diseases.

Meeting at the location mentioned above.

Contact 1:	Nour Raad	nour.raad@med.uni-goettingen.de	0551/ 39 10815

Comments:	The course will be suitable for non-biology majors.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340136	**Credits:**	1.0	**Date:**	11 - 12 Oct 2012

Title of Course: (Course ID):	Basics of electrophysiological measurements in slice preparations and cell cultures (A 122)
Group Leader / Supervisor(s):	Prof. Tobias Moser, Tomoko Oshima-Takago, Maria Magdalena Picher
Place:	InnerEarLab, UMG Göttingen Robert-Koch-Str. 40, Room: 0D3 626 (main lab on ground level)

Participants:	min: 1	max: 6

Duration:	2 days	**Time on Day 1:**	09:00 h

Preparatory Meeting:	No

Course description:

This course will provide basic knowledge and skills on performing electrophysiological measurements in slice and culture preparations.
Participants will get insights into:

- a saggital slice preparation of the cochlear nucleus and a coronal slice preparation of the MNTB
- the auditory brainstem circuits
- the basics of whole cell voltage clamp
- the typical spontaneous obtained from post-synaptic recordings
- parameters that can be read out from the traces and what they tell about presynaptic and postsynaptic function (e.g. amplitude and kinetics of events, short term plasticity,...)

The two target nuclei, the cochlear nucleus and the medial nucleus of the trapezoid body (MNTB) reside in the auditory pathway and harbor the Endbulb and the Calyx of Held, respectively. These synapses, especially the latter one, are famous models for the study of synaptic transmission in general and part of an auditory circuit involved in sound-source localization.
However, considerations for slice preparation and voltage clamp recordings that apply here are probably valid to most slice preparations across the brain.

In a parallel approach, electrophysiological recordings of transiently transfected HEK cells will be performed. In this part participants will get insight into:

- method for transient transfection of HEK cells with Ca_v 1.3 Calcium channels
- Basic knowledge of Total internal reflection microscopy as imaging technique

Contact 1:	Tomoko Oshima-Takago	toshima@gwdg.de	Tel. 0551-39 22834
Contact 2:	Maria Magdalena Picher	m.picher@stud.uni-goettingen.de	Tel. 0551-39 22837

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340163	**Credits:**	1.0	**Date:**	17 - 18 Sep 2012

Title of Course: (Course ID):	Live imaging and laser ablation (A124)
Group Leader / Supervisor(s):	Jörg Großhans, Mahesh Gummalla
Place:	Dept. Developmental Biochemistry, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11, 37077 Göttingen

Participants:	min: 2	max: 4		
Duration:	2 days	**Time on Day 1:**	10:00 h	
Preparatory Meeting:	No			

Course description:

We will perform time-lapse recordings of Drosophila embryos that express proteins tagged with fluorescent proteins and demonstrate image analysis. Furthermore we will perform ablation experiments with a pulsed UV laser for centrosomes, microtubules and cell borders. If requested, students may bring and record their own samples.

Contact 1:	Prof. Jörg Großhans	joerg.grosshans@medizin.uni-goettingen.de	Tel. 0551-39 14613

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences and Molecular Biosciences

UniVZ No.:	340169	**Credits:**	1.0	**Date:**	5 - 7 Dec 2012

Title of Course: (Course ID):	Introduction to R and microarray analysis (A 126)
Group Leader / Supervisor(s):	Tim Beißbarth, Michaela Bayerlová
Place:	Department of Medical Statistics, Humboldtallee 32, CIP-Room 150/151, 37073 Göttingen

Participants:	Min: 4	Max: 10
Duration:	3 days	**Time on Day 1:** 9:00h
Preparatory Meeting:	No	

Course description:

- Introduction to R – installation, libraries, bioconductor
- Data – data types and structures, transformation, manipulation
- Basic statistics in R
- Introduction to microarrays
- Pre-processing of microarray data – quality control, normalization
- Differential expression analysis and pathway analysis

Contact 1:	Michaela Bayerlova	michaela.bayerlova@med.uni-goettingen.de	Tel. 0551-39-10710

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340178	**Credits:**	0.5	**Date:**	23 Oct 2012

Title of Course:	Mask Drawing for Microfluidic application (A 127)
Group Leader / Supervisor(s):	Say Hwa Tan, Philipp Gruner
Place:	Max Planck Institute for Dynamics and Self-Organization, Am Fassberg 17, 37077 Göttingen

Participants:	min: 2	max:10			
Duration:	1 day	**Time on Day 1:**	9:00h		
Preparatory Meeting:	No				

Course description:

Mask drawing is an essential skill in microfluidics. This course is aimed at understanding the basics of mask drawing and using a free software efficiently in order to be able to draw different designs. In the first half of the course, participants will be introduced to the underlying principles and demonstrations will be given. In the second half, participants will experience a hands-on session, where they will be able to draw and optimize a microfluidic design of their choice.

Contact 1:	Say Hwa Tan	sayhwa.tan@ds.mpg.de	
Contact 2:	Philipp Gruner	Philipp.gruner@ds.mpg.de	

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ-No.:	340179	**Credits:**	2.5	**Date:**	15 - 19 Oct 2012

Title of Course:	Introduction to Microfluidics (A 128)
Group Leader / Supervisor(s):	Say Hwa Tan, Philipp Gruner, Jose Negrete, Hsin-Fang Hsu
Place:	Max Planck Institute for Dynamics and Self-Organization, Am Fassberg 17, 37077 Göttingen

Participants:	min:3	max:9		
Duration:	5 days	**Time on Day 1:**	9:00h	
Preparatory Meeting:	No			

Course description:

Microfluidics is an attractive tool for experimental biology to chemistry, and physics. This introductory course will equip participants with the basic theory and skills for experimental applications and micro-fabrication. Participants will experience and enjoy hands-on sessions specially tailored to learn and master the required skills. Distinguished speakers will be invited to share the state-of-the-art technology with the participants. At the end of the course, a get-together barbeque session will also be organized to mark the finale of the course.

Outline:

1. Performing Photo-lithography in the clean room.
2. Fabrication of PDMS microfluidic devices
3. Experimental session 1 – Making and controlling droplets.
4. Experimental session 2 – Biological studies in microfluidics
5. Fabrication of micro-electrodes/heaters in PDMS.

Contact 1:	Say Hwa Tan	sayhwa.tan@ds.mpg.de	
Contact 2:	Jose Negrete	jose.negrete@ds.mpg.de	

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340172	**Credits:**	1.0	**Date:**	Oct 2012

Title of Course: (Course ID):	Preparation of mouse embryonic fibroblasts (culture of primary cells) (A 129)
Group Leader / Supervisor(s):	Matthias Dobbelstein, Muriel Lizé
Place:	Department of Molecular Oncology (third floor), Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11, 37077 Göttingen

Participants:	min: 3	max: 6			
Duration:	2.5 days	**Time on Day 1:**	08:00 h		
Preparatory Meeting:	No				

Course description:

The preparation of primary cells from animal tissues, in this case the preparation of mouse embryonic fibroblasts (MEFs) is a very common method in cell biology. However, it is not totally trivial.

The course will take place over 2 full days and 2h on the last day.

Day 1: sacrifice of the mouse, preparation of the embryos and the cells in the morning (4h), preparation of genomic DNA for genotyping and PCR after lunch (3h)

Day 2: analysis of the results of the genotyping PCR using agarose gels (2h), background theory & discussion (2h) in the morning and cell culture in the afternoon: change the medium and assess the quality of the prepared cells (2h)

Day 4: How to freeze cells for cryoconservation (2h)

Contact 1:	Muriel Lizé	mlize@gwdg.de	Tel. 0551-39 13843
Contact 2:			

Comments: The exact date for the course will be discussed with the participants after registration.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340171	**Credits:**	1.0	**Date:**	Oct 2012

Title of Course: (Course ID):	Mouse preparation and histology (A 130)
Group Leader / Supervisor(s):	Matthias Dobbelstein, Muriel Lizé
Place:	Department of Molecular Oncology (third floor), Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11, 37077 Göttingen

Participants:	min: 3	max: 6		
Duration:	3 days	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	No			

Course description:

There are several popular methods for the analysis of whole animal tissues. In the course we will prepare lungs from mice and process them for sectioning and later immunostaining or histology analysis.

Day 1: preparation of the lungs for cryo-embedding or paraffin-embedding (6h), including theory about lung histology and functions

Day 2: sectioning of the parrafin- and cryo-blocks (3h), immunofluorescence staining of the obtained sections with markers for different cell types or H&E staining for histology (3h)

Day 3: secondary antibodies (2h), analysis of the results of histology and immunofluorescence by microscopy and discussion (4h)

Contact 1:	Muriel Lizé	mlize@gwdg.de	Tel. 0551-39 13843
Contact 2:			

Comments: The exact date for the course will be discussed with the participants after registration.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

GGNB
Göttingen Graduate School for
Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340180	**Credits:**	0.5	**Date:**	18 Oct 2012

Title of Course (Course ID): Methods in bacterial protein expression and purification (A 131)

Group Leader / Supervisor(s): Dirk Görlich, Steffen Frey

Place: MPI for Biophysical Chemistry, Department of Cellular Logistics, T3, 3rd floor

Participants: min: 5 | max: 20

Duration: 0.5 day **Time on Day 1:** 9:00 h

Preparatory Meeting: No

Course description:

Recombinant protein expression in *Escherichia coli* is a key technology for biochemistry and structural biology. Expression of eukaryotic proteins, however, often results in low yield and poor solubility. Here, we describe modern methods that help to optimize the yield and solubility of recombinant proteins in *E. coli*. We will then discuss standard and advanced techniques that can be used to purify proteins from *E. coli* lysates. Special attention will be drawn to cleavable fusion tags that allow for the efficient production of proteins with authentic N- and C-termini.

Note: This lecture is intended for PhD students at all stages. We will cover basic aspects of protein expression and purification as well as advanced techniques. We, however, will NOT introduce basic biological knowledge. For example, we will assume that you know what proteins are and what their physiological role is. The lecture is especially intended for PhD students intending to purify recombinant proteins during their thesis and wishing to get an introduction from an expert lab. Attendance of this lecture is a prerequisite for the following practical course (A 132).

Contact 1:	Dr. Steffen Frey	sfrey@gwdg.de	Tel. 0551-201 2460
Contact 2:	Prof. Dirk Görlich	goerlich@mpibpc.mpg.de	Tel. 0551-201 2400

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340181	**Credits:**	1.0	**Date:**	18 - 19 Oct 2012

Title of Course (Course ID): Purification of recombinant proteins from *E. coli* (A 132)

Group Leader / Supervisor(s): Dirk Görlich, Steffen Frey

Place: MPI for Biophysical Chemistry, Department of Cellular Logistics, T3, 3rd floor

Participants: min: 5 max: 7

Duration: 1.5 days **Time on Day 1:** 12:00 h

Preparatory Meeting: No

Course description:

Recombinant protein expression in *Escherichia coli* is a key technology for biochemistry and structural biology. Expression of eukaryotic proteins, however, often results in low yield and poor solubility. In this practical course we will purify a protein from *E. coli* using modern chromatographic techniques like IMAC, gel filtration and ion-exchange chromatography. The course will also provide a hands-on experience for the use of cleavable affinity tags.

Note: This course is scheduled as an intense program. It assumes that you are already familiar with transforming and culturing *Escherichia coli*. The course is especially intended for PhD students intending to purify recombinant proteins during their thesis and wishing to get hand-on experience from an expert lab.

All participants need to attend the theoretical introduction in protein expression and purification, which we offer as course A 131.

Contact 1:	Dr. Steffen Frey	sfrey@gwdg.de	Tel. 0551-201 2460
Contact 2:	Prof. Dirk Görlich	goerlich@mpibpc.mpg.de	Tel. 0551-201 2400

Comments:

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340067	**Credits:**	0.5	**Date:**	20 Sep 2012

Title of Course: (Course ID):	Using biosensors to study analyte-ligand interactions: basic principles and applications (A 133)
Group Leader / Supervisor(s):	Claudia Steinem, Andreas Janshoff, Corinna Kramer
Place:	Institut für Organische und Biomolekulare Chemie, Tammannstr. 2

Participants:	min: 2	max: 3

Duration:	1 day	**Time on Day 1:**	7:00 h

Preparatory Meeting:	No

Course description:

The principles of different biosensor techniques such as surface plasmon resonance (SPR), reflectrometric interference spectroscopy (RIfS) and quartz crystal microbalance (QCM) will be presented. The response that is used in SPR, RIfS and QCM based biosensors will be experimentally demonstrated with the spreading of lipid vesicles and protein binding on planar surfaces. Also the analysis and interpretation of the biosensor data will be discussed.

Contact 1:	Prof. Claudia Steinem	csteine@gwdg.de	Tel. 0551-39 3294
Contact 2:	Daniela Behn	dbehn@gwdg.de	Tel: 0551-39 3209

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340182	**Credits:**	1.0	**Date:**	25-26 Sept 2012

Title of Course (Course ID):	Imaging Mitochondria in Eukaryotic Cells (A 134)
Group Leader / Supervisor(s):	Stefan Jakobs , Susann Kummer
Place:	MPI for Biophysical Chemistry, Department of NanoBiophotonics, T2, 2nd floor, Am Fassberg 11, 37077 Göttingen

Participants:	min: 2	max: 4

Duration:	2 days	**Time on Day 1:**	09:15 h

Preparatory Meeting:	No

Course description:

Mitochondria, the powerhouses of eukaryotic cells, are key factors in numerous diseases including cancer, metabolic diseases and several devastating neurological disorders.

This short practical course will provide an introduction into several labeling techniques for living and chemically fixed mitochondria. The labeled mitochondria will be imaged before and after stress induction by live cell microscopy as well as by super-resolution STED microscopy. This course is designed for microscopy beginners and provides a brief overview of live cell and super-resolution microscopy.

Contact 1:	Dr. Susann Kummer	skummer@gwdg.de	Tel. 0551-201 2613
Contact 2:			

Comments:	

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVZ No.:	340183	**Credits:**	2	**Date:**	*tba*

Title of Course (course ID):	Practical synchrotron on site course in modern x-ray techniques and crystallography at DESY / Hamburg (A 135)
Group Leader / Supervisor(s):	Simone Techert
Place:	At the German synchrotron DESY campus side in Hamburg. Travel and guest house costs will be covered (3 overnight stays at DESY).

Participants:	5	15	
Duration:	3-4 days	**Time on Day 1:**	9:00
Preparatory Meeting:	Yes		

Course description:

The practical method course will give an introduction into modern x-ray science at state of the art synchrotron facilities. What are synchrotrons and how do the work? For which kind of structural molecular science can one apply synchrotron radiation?
The course addresses GGNB PhD students with background in physics, chemistry or molecular biology.

The course is divided into morning lectures followed by afternoon practical courses at the x-ray synchrotron storage ring facility.

At the first day, a comprehensive overview about modern synchrotron research will be given.
In the afternoon, the student will be trained in setting up crystals or solution samples at synchrotron beamlines. They will learn how to collect crystallographic data sets of macromolecular crystals like lysozyme at a storage ring.
The morning afterwards will be used for training to solve the collected crystal structures.

According to a similar scheme, the second day addresses the collection of x-ray scattering data sets of fibril like systems and a short training in basic structure refinement procedures. At the third day x-ray spectroscopy experiments on metal containing macromolecules like cytochrome will be performed and an overview of data analysis procedures will be given.

For attending the course, basic knowledge of the physical meaning of x-rays is of advantage.

Contact 1:	Simone Techert	stecher@gwdg.de	0551-2011268
Contact 2:	Inge Dreger	idreger@gwdg.de	0551-2011263

Comments:	The 3-4 days course will be held at DESY campus site in Hamburg and includes the stay in the guest house over night. The costs will be covered. Preparation meeting begin of October 2012. Contact via email.

GGNB Short Methods Courses: Sep 2012 – Feb 2013

Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences

UniVz No.:	340187	**Credits:**	0.5	**Date:**	3 Dec 2012

Title of Course: (Course ID):	Neurobiology of *C. elegans* (A 137)
Group Leader / Supervisor(s):	Henrik Bringman, Jan Spies, Michael Turek, Juliane Schwarz
Place:	Max-Planck-Institute for biophysical Chemistry, Am Fassberg 11, 37077 Göttingen, Tower 4, level 1

Participants:	min: 3	max: 6			
Duration:	1 day	**Time:**	09:00 – 17:00 h		
Preparatory Meeting:	No				

Course description:

In this one-day course we will give an introduction into the neurobiology of C. elegans. We will show basic C. elegans handling techniques, behavioral assays, Calcium imaging, optogenetics. The main focus will be on sleep.

Contact 1:	Jan Spies	j.spies@gwdg.de	Tel. 0551-2011359
Contact 2:			

Comments:

E 02 - GGNB Extended Methods Course 2012

BIOANALYTICS

UniVZ No.: 340186

Date: **October 2012**

Participants: **8**
Preference in the course assignment will be given to students interested in the entire course (2 weeks). It is possible though to participate in sub-segments of the course, if the number of participants allows for it.

Preliminary course schedule:

Week 1

Day 1-3 Dr. Henning Urlaub, MPI for Biophysical Chemistry
Topic: Quantitative analysis of proteins and protein complexes
Techniques: Advanced protein mass spectrometry

Lecture: Day 1, 9 – 10 h, MPI-bpc
Training: Day 1, 10:30 – 16 h, MPI-bpc
Day 2, 9 – 16 h, MPI-bpc
Day 3, 9 – 16 h, MPI-bpc

Day 4-5 Dr. Adam Lange, MPI for Biophysical Chemistry
Topic: Solid-state NMR as a modern tool in structural biology
Techniques: Solid-state NMR spectroscopy

Lecture: Day 4, 9 – 10 h, MPI-bpc
Training: Day 4, 10:30 – 16 h, MPI-bpc
Day 5, 9 – 16 h, MPI-bpc

Week 2

Day 1 Dr. Karin Kühnel, MPI for Biophysical Chemistry
Topic: Protein crystallography
Techniques: Robot-assisted protein crystallization, crystal mounting, data collection

Lecture: Day 6, 9 – 10 h, MPI-bpc
Training: Day 6, 10:30 – 16 h, MPI-bpc

Day 2-3 Tittmann group
Topic: Rapid reaction techniques and kinetic analysis of biochemical processes

Techniques: Single mixing and sequential mixing stopped-flow absorption spectroscopy using diode array and photomultiplier detection, chemical quenched-flow

Lecture: Day 7, 9 – 10 h, GZMB
Training: Day 7, 10 – 16 h, GZMB
Day 8, 09 – 16 h, GZMB

Day 4-5 Tittmann group & PD Dr. Ralph Golbik, Halle University
Topic: Thermodynamics and kinetics of protein folding
Techniques: Fluorescence spectroscopy, circular dichroism spectroscopy, stopped-flow fluorescence

Lecture: Day 9, 9 – 10 h, GZMB
Training: Day 9, 10 – 16 h, GZMB
Day 10, 9 – 16 h, GZMB