Short Methods Courses & Method Seminars; Extended Methods Course

Mar-Aug 2010

* Course will also be offered in the next course announcement (Sep 2010 - Feb 2011)
*? Course might be offered again in the next course announcement (to be confirmed)

Department/Group	Supervisor(s)	ID	*	Title of Course	Credits	Date
Biochemistry						
Fasshauer, Dirk	Iraheta, Emilio	A 14		Protein-protein interactions in membrane traffic	1,0	Apr/May 2010
Feußner, Ivo	Göbel, Cornelia	A 16	*	Introduction to lipid analysis	1,0	23-25 Aug 2010
Fischle, Wolfgang	Schomburg, Adrian	A 74		Hydrodynamic analysis of proteins and protein complexes by analytical ultracentrifugation	1,0	1-2 Mar 2010
Görlich, Dirk	NN	A 78	*?	Ligand-receptor interactions measured by fluorescence anisotropy and related techniques	0,5	tba
Görlich, Dirk	Frey, Steffen	A 80	*?	Advanced bacterial protein expression and purification	1,0	29-30 Jul 2010
Höbartner, Claudia	Höbartner, Claudia	A 32	*	Chemical synthesis and enzymatic ligation of RNA and DNA oligonucleotides	1,0	9-10 Jun 2010
Jahn, Reinhard	van den Bogaart, Geert / Ahmed, Saheeb / Holt, Mathew	A 33	*	Biophysical analysis of SNARE-mediated membrane fusion	1,0	15-16 Mar 2010
Jahn, Reinhard	Schmitt, Hans Dieter / Schröter, Saskia	A 34	*	Molecular Biology of yeast: Applications of the “Tandem Affinity Purification” tag in yeast with wild type and mutant background	1,0	25-26 Mar 2010
Jahn, Reinhard	Chua, John / Boyken, Janina	A 35	*	Co-immunoprecipitation as a technique to study protein-protein interactions	1,0	17-19 Mar 2010
Jahn, Reinhard	Kühnel, Karin / Busse, Ricarda	A 36	*	Basic techniques in protein purification and characterization	1,0	28-30 Jun 2010
Lührmann, Reinhard	Hartmuth, Klaus	A 82		Affinity purification methods for the isolation of large heterogeneous macromolecular assemblies	1,0	16-18 Mar 2010
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	9-11 Jun 2010
Polle, Andrea	Kopka, Bernd	A 52	*	Transport processes and imaging with radionucleotides	1,5	Mar or Aug 2010
Rehling, Peter	Reinhold, Robert	A 53		Blue-native PAGE analysis of membrane protein complexes	1,0	23-24 Mar 2010

Rodnina, Marina	Milon, Pohl	A 81	*	Introduction to transient kinetic methods	1,0	Jun 10
Seiler, Stephan	Schmitz, Corinna	A 85		Fungal signal transduction - *in vitro* GDP-GTP exchange assays of Rho-type GTPases	1,0	May/Jun 2010
Seiler, Stephan	Dettmann, Anne	A 86	*	Fungal signal transduction - *in vitro* Ndr kinase assays	1,0	May/Jun 2010
Tittmann, Kai	Lüdtke, Stefan / Meyer, Danilo	A 71		Thermodynamic characterization of biomolecular interactions by isothermal titration calorimetry	1,0	9-10 Mar 2010
Urlaub, Henning	Schmidt, Carla / Hsiao, He-Hsuan / Nikolov, Miroslav / Kramer, Katharina	A 65	*	Sequence analysis of proteins and their post-translational modifications by MALDI-ToF and electrospray ionization (ESI) mass spectrometry	1,0	12-14 Apr 2010
Walter, Lutz	Walter, Lutz / NN	A 66	*	Isolation of recombinant proteins by affinity chromatography and binding studies	1,0	10-11 Mar 2010

Molecular Biology & Genetics

Brenig, Bertram	Schütz, Ekkehard	A 06	*	Genotyping using FRET on the LightCycler	1,0	Apr 10
Brenig, Bertram	Brenig, Bertram	A 07	*	Fragment analysis and Sanger DNA sequencing using the ABI3100	1,0	Apr 10
Dobbelstein, Matthias	Schulz, Ramona / Schmidt, Franziska	A 10	*?	Assessing promoter activity by luciferase assays	1,0	Apr 10
Dobbelstein, Matthias	Köpper, Frederik / Holembowski, Lena	A 11	*?	Polymerase Chain Reaction I and advanced applications	1,0	Apr 10
Görlich, Dirk	Frey, Steffen	A 77	*?	PCR: self-made enzymes, helpful additives and insights into the reactions	0,5	27. Jul 10
Jakobs, Stefan	Grotjohann, Tim / Brakemann, Tanja	A 37	*	PCR based mutagenesis strategies to evolve (photoswitchable) fluorescent proteins	1,0	13-14 Apr 2010
Johnsen, Steven	Johnsen, Steven	A 38		Use of chromatin immunoprecipitation for the analysis of transcription factor binding *in vivo* in cultured mammalian cells	1,0	14-15 & 18 Jun 2010
Walter, Lutz	Gruber, Jens	A 68	*	Mechanisms of RNA silencing	1,0	10-11 Mar 2010

Cell Biology & Microbiology, Imaging

Görlich, Dirk	NN	A 79	*?	Permeabilized cell assays for studying intracellular protein transport	0,5	tba
Kehlenbach, Ralph	Kehlenbach, Ralph	A 39		Analysis of nucleocytoplasmic transport by flow cytometry	1,0	Aug 10

Nave, Klaus-Armin	Möbius, Wiebke	A 44	*	Subcellular localization of proteins by immunoelectron microscopy of cryosections	1,0	10-11 May 2010
Olympus / Bodenschatz	Schmidt, Helge	A 46	*	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	Group I: 29 Jun & 1 Jul 2010 Group II: 30 Jun & 2 Jul 2010
Reichardt, Holger	van den Brandt, Jens	A 54	*	Analysis of T cell development by FTOC (foetal thymic organ culture) and FACS (fluorescence-activated cell sorting)	1,0	Mar 2010
Simons, Mikael	Mitkovski, Miso	A 59		GFP proteins and their application (FRAP, FRET, photo activation)	1,0	May 2010

Developmental Biology, Anatomy & Histology

Borchers, Annette	Borchers, Annette	A 04		Imaging of migrating neural crest cells	1,0	19-21 Apr 2010
Hahn, Heidi	Nitzki, Frauke	A 28		*In situ* hybridization of paraffin embedded tissue sections	1,0	12-14 Apr 2010
Shcherbata, Halyna	Shcherbata, Halyna	A 56		Introduction to basic histology techniques	1,0	1st half of Mar 2010
Stadelmann-Nessler, Christine	Schulz, Katja	A 60	*	Non-radioactive in situ hybridization	1,0	1-3 Mar 2010
Wimmer, Ernst / Bucher, Gregor	Wimmer, Ernst / Bucher, Gregor	A 69	*	Parental RNAi in *Tribolium*	1,0	12-13 & 26 Apr 2010

Vertebrate Animal Models

Bähr, Mathias	Lingor, Paul	A 01	*	Introduction to animal experiments	0,5	18 May 2010
Bayer, Thomas A.	Wirths, Oliver	A 02	*	Alzheimer's disease: Behavioural and neuropathological analysis of transgenic mouse models	1,0	1-2 Jun 2010
Brembeck, Felix	Zatula, Nathalie	A 05	*	Basic anatomy and tissue processing of genetically engineered mouse models	1,0	Apr 10

Molecular & Cellular Neuroscience, Electrophysiology

Brose, Nils	NN	A 08	*	Hippocampal neurons primary culture and transfection	1,0	tba
Fiala, Andrè / Göpfert, Martin	Fiala, Andrè / Göpfert, Martin	A 83		Drosophila neurogenetics	1,0	26-28 Apr 2010

Nave, Klaus-Armin	Roßner, Moritz	A 45	*	Microdissection combined with RNA analysis in the brain	1,0	21-23 Apr 2010
Rizzoli, Silvio	Hoopmann, Peer / Kamin, Dirk / Denker, Annette	A 89	*	High resolution microscopy in synapses	1,5	Apr 10
Stoykova, Anastassia	Paul, Vanessa	A 87		Neurosphere cultures from embryonic mouse brain	1,0	24-25 Mar 2010
Stühmer, Walter	Pardo, Luis	A 63	*	Patch clamp	1,0	Apr/May 2010

Theoretical, Systems & Behavioral Neuroscience

Ehrenreich, Hannelore	Begemann, Martin / Bartels, Claudia	A 12	*	Translational Neuroscience: **Schizophrenia**	2.0 / module*	18-20 Jun 2010
Fiala, Andre / Göpfert, Martin / Moser, Tobias / Fred Wolf / Detlev Schild	Fiala, Andre / Göpfert, Martin / Moser, Tobias / Fred Wolf / Detlev Schild	A 42		Fundamental principles of sensory processing	0,5	6 May 2010
Fischer, Julia	Hammerschmidt, Kurt / Price, Tabitha / Kalbitzer, Urs	A 17		Introduction to bioacoustic field methods: from recording to statistics	1,0	14-16 Jul 2010
Gail, Alexander	Glaser, Beatrix	A 73	*	Introduction to Matlab in Systems Neuroscience	1,0	9/16/23 Apr 2010
Gail, Alexander / Treue, Stefan	Gail, Alexander / Treue, Stefan	A 18	*	Non-invasive probing of brain function – Advanced Methods Course in Psychophysics	1,0	10-12 Mar 2010
Geisel, Theo / Nagler, Jan / Keil, Wolfgang	Geisel, Theo / Nagler, Jan / Keil, Wolfgang	A 20		Stochastic processes in physics, biology, and finance	1,0	7 Apr - 14 Jul 2010
Geisel, Theo / Timme, Marc / Wolf, Fred	Geisel, Theo / Timme, Marc / Wolf, Fred	A 22		Theoretical and Computational Neuroscience: Collective Dynamics Biological Neural Networks II	1,0	9 Apr- 9 Jul 2010
Moser, Tobias	Antal, Andrea / Strenzke, Nicola / Hoch, Gerhard	A 41	*	Auditory and visual evoked potentials	1,0	Apr 10
Paulus, Walter	Antal, Andrea	A 48	*	Transcranial magnetic- and electrical stimulation	1,0	23-25 Feb 2010
Timme, Marc / Grabow, Carsten	Timme, Marc / Grabow, Carsten	A 95		Introduction to theoretical neuroscience	2,0	7 Apr - 7 Jul 2010

Structural Biology

Bennati, Marina	Türke, Maria Teresa / Tkach, Igor / Argirevic, Tomislav	A 03	*	EPR-Spectroscopy	1,0	17-19 Mar 2010
Grüne, Tim	Grüne, Tim	A 57		Macromolecular crystal structure determination	2,0	22-26 Mar 2010

Sheldrick, George	Sheldrick, George	A 58	*	Advanced crystal structure determination	1,5	SS 10, Thursdays
Stark, Holger	Platzmann, Florian	A 61	*	3D structure determination of macromolecular complexes by single particle cryo-EM	1,0	Apr 10

Biophysics and Bioinformatics

Grubmüller, Helmut	Lakämper, Stefan / Kappel, Christian	A 24		Introduction to molecular dynamic simulation	1,0	SS 2010
Grubmüller, Helmut / Schmidt, Christoph F.	Grubmüller, Helmut / Schmidt, Christoph F.	A 25	*	Current Topics in Biophysics – Lecture Series	1,0	SS 10, Fridays
Grubmüller, Helmut / de Groot, Bert	Grubmüller, Helmut / de Groot, Bert	A 27		Computational Biophysics II	1,5	SS 10, Mondays
Parlitz, Ulrich	Parlitz, Ulrich	A 40		Nonlinear dynamics and time series	6,0	22 Feb - 5 Mar 2010
Pfohl, Thomas	Stellamanns, Eric / Uppaluri, Sravanti / Thutupalli, Shashi	A 90	*?	Microfluidics	2,5	15-19 Mar 2010
Steinem, Claudia / Janshoff, Andreas	Mey, Ingo	A 62	*	Atomic force microscopy of surfaces: basic imaging techniques and data analysis	1,0	29-30 Mar 2010
Steinem, Claudia / Janshoff, Andreas	Lazzara, Thomas	A 72	*?	Surface Plasmon Resonance: basic principles and applications	1,0	15. Apr 10
Walter, Lutz	Brameier, Markus	A 67	*	Introduction to Bioinformatics Methods	1,0	10-11 Mar 2010

Extended Methods Courses

Hell, Stephan / Egner, Alexander	Advanced Light Microscopy	E 01		Advanced Light Microscopy	3,0	14-19 Mar 2010
Tittmann, Kai	Golbik, Ralph / Kühnel, Karin / Urlaub, Hennig / NN	E 02		Bioanalytics	4,0	26 Apr - 7 May 2010
Stühmer, Walter / Hörner, Michael / Schlüter, Oliver	Stühmer, Walter / Hörner, Michael / Schlüter, Oliver	E 03		ENI Electrophysiology Training (ENI-ELECTRAIN)	4,0	10-21 May 2010

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 01	**Credits:**	0.5	**Date:**	18 May 2010

Title of Course: Introduction to animal experiments

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 then perfuse the animals and remove the eye, optic nerve and brain to completely fix it. Then, the students can prepare the eye ball for sectioning or can remove the retina and whole mount it for immediate examination. Finally, we will discuss the methods to evaluate the experimental results obtained.

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

Comments:

GGNB Short Methods Courses: March– August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 02	**Credits:**	1.0	**Date:**	1-2 Jun 2010

Title of Course:	Alzheimer's disease: Behavioural and neuropathological analysis of transgenic mouse models
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: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 03	**Credits:**	1.0	**Date:**	17-19 Mar 2010

Title of Course:	EPR-Spectroscopy
Group Leader / Supervisor(s):	Marina Bennati, Maria Teresa Türke, Igor Tkach, Tomislav Argirevic
Place:	Max-Planck-Institut für biophysikalische Chemie, AG Elektronenspinresonanz-Spektroskopie, Am Fassberg 11

Participants:	min: 2	max: 6		
Duration:	2.5 d	**Time on Day 1:**	13:00 h	
Preparatory Meeting:	No			

Course description:

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

Contact 1:	Maria Teresa Türke	mtuerke@gwdg.de	Tel 201-1380 / 1762
Contact 2:	Dr. Igor Tkach	igor.tkach@mpibpc.mpg.de	Tel. 0551-201 1004

Comments:	Basic knowledge in spectroscopy is required

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 04	**Credits:**	1.0	**Date:**	19-21 Apr 2010

Title of Course: Imaging of migrating neural crest cells

Group Leader / Supervisor(s): Annette Borchers

Place: Dept. of Developmental Biochemistry, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants: min: 2 max: 2

Duration: 2.5 d **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

In this course *Xenopus laevis* embryos will be injected with RNA coding for fluorescently labeled proteins. Neural crest migration will be analyzed by transplanting fluorescent neural crest cells into control embryos and monitoring their migration. In addition we will also explant neural crest cells on fibronectin to monitor migration by time-lapse imaging. Time permitting we will use gain- and loss-of-function approaches to manipulate neural crest migration.

Contact 1:	Dr. Annette Borchers	annette.borchers@gmail.com	Tel. 0551-39 14615
Contact 2:			

Comments: http://www.uni-goettingen.de/en/57917.html

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 05	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course:	Basic anatomy and tissue processing of genetically engineered mouse models
Group Leader / Supervisor(s):	Felix H. Brembeck, Nathalie Zatula
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 have the opportunity to perform a complete necropsy of genetically engineered mice. They will gain insight in the gross anatomy of internal organs and how to dissect, fix and prepare them for subsequent analysis.

In addition, we will perform basic protocols using tissue sections, including hematoxylin-eosin stainings and immunohistochemistry on selected organ sections. The stainings will be evaluated for the morphology and the presence of (pre-)malignant transformations.

Contact 1:	Prof. Dr. Felix H. Brembeck	brembeck@med.uni-goettingen.de	Tel. 0551-39 10568
Contact 2:	Nathalie Zatula	zatula@med.uni-goettingen.de	Tel. 0551-39 10568

Comments:	

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 06	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: Genotyping using FRET on the LightCycler

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: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 07	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: Fragment analysis and Sanger DNA sequencing using the ABI3100

Group Leader / Supervisor(s): Bertram Brenig

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

Participants: min: 2 max: 4

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

Preparatory Meeting: No

Course description:

Fragment analysis is an important methodology in spieces identification, parentage control, forensic medicine, and other applications, e.g. QTL studies. In most cases highly variable regions of a genome (microsatellite, SRS) are amplified and then subjected to gel-/or capillary electrophoresis.

Participants will be introduced to and perform PCR protocols for the amplification of microsatellite markers (multiplex reactions). Amplicons will be analysed on an ABI3100 Genetic Analyzer and profiles evaluated.

Contact 1:	Prof. Bertram Brenig	bbrenig@gwdg.de	Tel. 0551-39 3383
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 08	**Credits:**	1.0	**Date:**	tba

Title of Course:	Hippocampal neurons primary culture and transfection
Group Leader / Supervisor(s):	Nils Brose, NN
Place:	MPI for Experimental Medicine, Dept. of Molecular Neurobiology

Participants:	min: 2	max: 3		
Duration:	1.5 d	**Time on Day 1:**	09:00 h	
Preparatory Meeting:	No			

Course description:

Day 1: Preparation of hippocampal neurons from newborn rats. Lipofectamine transfection with fluorescently tagged constructs.

Day 2 (half): Observation of transfected neurons

Contact 1:	Prof. Dr. Nils Brose	brose@em.mpg.de	Tel. 0551-3899 725
Contact 2:			

Comments:	

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 10	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: Assessing promoter activity by luciferase assays

Group Leader / Supervisor(s): Matthias Dobbelstein, Ramona Schulz, 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:	Ramona Schulz	mbug@gwdg.de	Tel. 0551-39 3574
Contact 2:	Franziska Schmidt	fschmid1@gwdg.de	Tel. 0551-39 10373

Comments: 2 days, each time in the morning

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 11	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: Polymerase Chain Reaction I and advanced applications

Group Leader / Supervisor(s): Matthias Dobbelstein, Frederik Köpper, Lena Holembowski

Place: Department of Molecular Oncology, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants: min: 4 max: 6

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

Preparatory Meeting: No

Course description:

Polymerase chain reaction and applications, trouble shooting, reverse transcription, oligonucleotide-directed mutagenesis, first steps towards quantitative PCR, DNA sequencing.

Contact 1:	Frederik Köpper	f.koepper@web.de	Tel. 0551-39 13950
Contact 2:	Lena Holembowski	lena.holembowski@online.de	Tel. 0551-39 3574

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 12	**Credits:**	2.0 / module*	**Date:**	18-20 Jun 2010

Title of Course:	Translational Neuroscience: **Schizophrenia**
Group Leader / Supervisor(s):	Hannelore Ehrenreich, Martin Begemann, Claudia Bartels
Place:	MPI for Experimental Medicine, Division of Clinical Neuroscience

Participants:	min: 6	max: 18		
Duration:	3 x 3 d*	**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 3 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; (3) Amyotrophic Lateral Sclerosis (ALS) as an example of a rapidly fatal degenerative disease of the nervous system. *More blocks are under planning (Affective Disorders, Autism, Addiction)*

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), behavioural battery focussing 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 comborbidities 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.
Content Block 3: Amyotrophic Lateral Sclerosis: This course will not be offered in 2010!

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

Comments:

* 3 blocks of 3 days each in June, November, and January, 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, behavioural studies etc.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 14	**Credits:**	1.0	**Date:**	Apr/May 2010

Title of Course: Protein-protein interactions in membrane traffic

Group Leader / Supervisor(s): Dirk Fasshauer, Emilio Iraheta

Place: MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants: min: 2 max: 4

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

Preparatory Meeting: No

Course description:

The aim of the course is to give an introduction into biophysical methods (isothermal titration calorimetry, fluorescence spectroscopy and CD spectroscopy) to study protein-protein interactions in detail. As an example, we study the assembly of syntaxin 1a, SNAP-25, and synaptobrevin 2 into a tight SNARE complex. This reaction is thought to be the driving force for neurotransmitter release. In addition, we investigate the tight interaction of the SM protein Munc18 with syntaxin. In addition, to shed light on the conservation of this interaction, homologous proteins are being investigated

Contact 1:	Emilio Iraheta	R.-Emilio.Iraheta@mpibpc.mpg.de	Tel. 0551-201 1935
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 16	**Credits:**	1.0	**Date:**	23-25 Aug 2010

Title of Course: Introduction to lipid analysis

Group Leader / Supervisor(s): Ivo Feußner, Cornelia Göbel

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 Göbel	cgoebel@uni-goettingen.de	Tel. 0551-39 14438
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 17	**Credits:**	1.0	**Date:**	14-16 Jul 2010

Title of Course: Introduction to bioacoustic field methods: from recording to statistics

Group Leader / Supervisor(s): Julia Fischer, Kurt Hammerschmidt, Tabitha Price, Urs Kalbitzer

Place: German Primate Center, Seminar room B2.12

Participants: min: 2 max: 5

Duration: 2.5 d **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

This short methods course will provide a brief introduction into the basic steps of bioacoustic research.

We will begin with an introduction into the physics of sound, the mechanisms of sound production, and acoustic analyses. A mini-project will then be conducted with acoustic recordings in the field, selection of sounds for further analyses, and an overview of standard measures used in the analyses of animal and human sounds.

Research carried out within the German Primate Center will be presented to demonstrate the practical application of acoustic analyses including important statistical tools to answer relevant questions in the field of animal and human communication.

The course will last 2.5 days and will be held at the German Primate Center.

Contact 1:	Tabitha Price	tprice@dpz.eu	Tel. 0551-3851 475
Contact 2:	Urs Kalbitzer	urs.k@gmx.de	Tel. 0551-3851 475

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 18	**Credits:**	1.0	**Date:**	10-12 Mar 2010

Title of Course: Non-invasive probing of brain function – Advanced methods course in psychophysics

Group Leader / Supervisor(s): Prof. Stefan Treue, Dr. Alexander Gail

Place: Cognitive Neuroscience Lab, Hans-Adolf-Krebs Weg 7, German Primate Center

Participants: min: 3 max: 6

Duration: 2.5 **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:	Dr. Alexander Gail	agail@gwdg.de	0551-3851 118

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 20	**Credits:**	1.0	**Date:**	7 Apr - 14 Jul 2010

Title of Course: Stochastic Processes in Physics, Biology, and Finance

Group Leader / Supervisor(s): Theo Geisel, Jan Nagler, Wolfgang Keil etc.

Place: Max Planck Institute for Dynamics and Self-Organization, Seminar Room, House 2, 4th floor

Participants: - -

Duration: 2 SWS **Time on Day 1:** 10:15 h

Preparatory Meeting: No

Course description:

Stochastic Processes are used to describe a large variety of physical, biological and economic systems ranging from disease spreading, spiking of cortical neurons, temperature fluctuations of climate, and stock market price evolution. In this seminar we will introduce the mathematical tools needed to describe and analyze such processes and discuss various applications. After a short recapitulation of basic probability theory, we will introduce the fundamental concepts of stochastic processes i.e. Brownian motion, Markov processes, stochastic differential equations, Langevin equations, Fokker-Planck formalism and master equations. Furthermore, concepts like first passage time/hitting probability, fluctuation-dissipation theorem and anomalous diffusion will be treated. Depending on the audience we would like to discuss more recent and advanced techniques in the field of stochastic processes such as complex hulls, Doi-Peleti formalism for reaction diffusion systems, Schramm-Loewner evolutions, and the Feynman-Kac formula.
Alternatively, there is the possibility to focus on applications of various techniques in scientific fields ranging from physics to finance.

Prerequisites for the course is a Bachelor's degree in physics or an equivalent degree.
Each participant is highly encouraged to give one of the talks, but those who just want to listen and learn are also welcome.

Literature:
- L. E. Reichl, "A Modern Course in Statistical Physics", Wiley-VCH, 2009
- C.W. Gardiner, "Handbook of Stochastic Methods", Springer, 2003
- N.G. Van Kampen, "Stochastic Processes in Physics and Chemistry", Elsevier, 2007
- H. Risken, "The Fokker-Planck Equation: Methods of Solutions and Applications", Springer, 1996

Contact 1:	Wolfgang Keil	wolfgang@nld.ds.mpg.de	Tel. 0551-5176-551
Contact 2:			

Comments: Credits: Participants wishing to receive credits need to attend the first meeting where topics for talks will be distributed. 2.0 credits for attendance and oral presentation.

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 22	**Credits:**	1.0	**Date:**	9 Apr – 9 Jul 2010

Title of Course:	Theoretical and Computational Neuroscience: Collective Dynamics Biological Neural Networks II
Group Leader / Supervisor(s):	Theo Geisel, Marc Timme, Fred Wolf
Place:	Max Planck Institute for Dynamics and Self-Organization, Seminar Room, House 2, 4th floor

Participants:	min: 5	max: 15

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:			

Comments:	Course unit II: Summer Semester / Fri, 14:00-16:00 (weekly). We recommend to start in the winter semester (with course A 21), but a start in a summer term is possible as well.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 24	**Credits:**	1.0	**Date:**	SS 2010

Title of Course: Introduction to molecular dynamic simulation

Group Leader / Supervisor(s): Helmut Grubmüller, Stefan Lakämper, Christian Kappel

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:	Christian Kappel	ckappel1@gwdg.de	Tel. 0551-201 2336
Contact 2:			

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

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 25	**Credits:**	1.0	**Date:**	SS 2010, Fridays

Title of Course: Current Topics in Biophysics – Lecture Series

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: SS 10 **Time on Day 1:** 09:15 h

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 simulation method will be presented, 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 Monte Carlo method can be used to extract thermodynamic limit 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:	Antje Erdmann	imprs-pbcs@gwdg.de	Tel. 0551-201 2322
Contact 2:			

Comments: 2 SWS

GGNB Short Methods Courses: March - August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 27	**Credits:**	1.5	**Date:**	SS 10, Mondays

Title of Course:	Computational Biophysics II
Group Leader / Supervisor(s):	Helmut Grubmüller, Bert de Groot
Place:	Physics Faculty HS4, A0.106; Physics Faculty – CIP Pool1, CO.110

Participants:	min: 3	max: -

Duration:	SS 2010	**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. Proteins enable virtually all tasks in our bodies, on the molecular level. Goal is an understanding of these 'nano-machines' on an atomistic scale. Basic knowledge in Physics essential.

"Computational biophysics II"
Advanced topics in computational biophysics.
Contents: Enzymatic catalysis, chemical reactions in proteins, free energy calculations, thermodynamics, Poisson-Boltzmann calculations, Transition State Theory, Jarzynski-equation, sequence and structure bioinformatics, protein structure prediction, hands-on computer simulation.

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

Comments:	

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 28	**Credits:**	1.0	**Date:**	12-14 Apr 2010

Title of Course: *In situ* hybridization of paraffin embedded tissue sections

Group Leader / Supervisor(s): Heidi Hahn, Frauke Nitzki

Place: Abteilung Humangenetik, Heinrich-Düker-Weg 12

Participants: min: 2 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).

Contact 1:	Dr. Frauke Nitzki	fnitzki@gwdg.de	Tel. 0551-39 14013
Contact 2:			

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

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 32	**Credits:**	1.0	**Date:**	9-10 Jun 2010

Title of Course: Chemical synthesis and enzymatic ligation of RNA and DNA oligonucleotides

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: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 33	**Credits:**	1.0	**Date:**	15-16 Mar 2010

Title of Course: Biophysical analysis of SNARE-mediated membrane fusion

Group Leader / Supervisor(s): Reinhard Jahn, Geert van den Bogaart, Saheeb Ahmed, Matthew Holt

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. Mathew Holt	mholt@gwdg.de	Tel. 0551-201 1670
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 34	**Credits:**	1.0	**Date:**	25-26 Mar 2010

Title of Course: Molecular Biology of yeast: Applications of the "Tandem Affinity Purification" tag in yeast with wild type and mutant background

Group Leader / Supervisor(s): Reinhard Jahn, Hans Dieter Schmitt, Saskia Schröter

Place: MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants: min: 2 max: 2

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

Preparatory Meeting: Yes*

Course description:

The bakers' yeast *Saccharomyces cerevisiae* was the first eukaryote whose whole genome has been sequenced. In bakers' yeast homologous recombination works with very high fidelity, making genetic manipulations very easy. This allowed genome wide analysis of gene function by fusing all putative genes with tags that can be used for many different purposes. We use collections of strains carrying individually tagged genes and various mutations for the analysis of protein complexes. The following techniques will be applied during the course.

- Using simple pull-down experiments (one step) the effect of mutations on interactions within subunits in a protein complex will be analyzed.
- Tandem affinity purification (two step procedure) will be employed to identify new subunits of a large protein complex by mass spectroscopy.

Recommended reading:

Kraynack BA, Chan A, Rosenthal E, Essid M, Umansky B, Waters MG, Schmitt HD (2005) Ds11p, Tip20p, and the novel Ds13(Sec39) protein are required for the stability of the Q/t-SNARE complex at the endoplasmic reticulum in yeast. Mol Biol Cell 16: 3963-3977.

Ghaemmaghami S, Huh WK, Bower K, Howson RW, Belle A, Dephoure N, O'Shea EK, Weissman JS (2003) Global analysis of protein expression in yeast. Nature 425: 737-741

Puig O, Caspary F, Rigaut G, Rutz B, Bouveret E, Bragado-Nilsson E, Wilm M, Seraphin B (2001) The tandem affinity purification (TAP) method: a general procedure of protein complex purification. Methods 24:218-229

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: *Preparatory meeting: approx. one week before the course.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 35	**Credits:**	1.0	**Date:**	17-19 Mar 2010

Title of Course: Co-immunoprecipitation as a technique to study protein-protein interactions

Group Leader / Supervisor(s): Reinhard Jahn, John Chua, Janina Boyken

Place: MPI for Biophysical Chemistry, Department of Neurobiology, T6, 1st Floor

Participants: min: 2 max: 6

Duration: 3 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.

Day 1: Cell lysis and co-immunoprecipitation

Day 2: Washing of co-immunoprecipiates, SDS-PAGE and Western blot

Day 3: Development of Western blot

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

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 36	**Credits:**	1.0	**Date:**	28-30 Jun 2010

Title of Course: Basic techniques in protein purification and characterization

Group Leader / Supervisor(s): Reinhard Jahn, Karin Kühnel, Ricarda Busse

Place: MPI for Biophysical Chemistry, Department of Neurobiology, Kühnel Group, T6, 1st Floor

Participants: min: 2 max:6

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

Preparatory Meeting: No

Course description:

In this course we want to cover the important aspects concerning the expression, purification and characterization of proteins. 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. We will also cover basic techniques in handling proteins, for example try different methods for determining protein concentrations, the dialysis of proteins and how to concentrate proteins through ultrafiltration.

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

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 37	**Credits:**	1.0	**Date:**	13-14 Apr 2010

Title of Course: PCR based mutagenesis strategies to evolve (photoswitchable) fluorescent proteins

Group Leader / Supervisor(s): Stefan Jakobs, Tim Grotjohann, Tanja Brakemann

Place: MPI for Biophysical Chemistry, Department of NanoBiophotonics, T2, 2nd floor

Participants:	min: 2	max: 4

Duration:	2 days	**Time on Day 1:**	09:00 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:	PD Dr. Stefan Jakobs	sjakobs@gwdg.de	Tel. 0551-201 2531
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 38	**Credits:**	1.0	**Date:**	14-15 & 18 Jun 2010

Title of Course: Use of chromatin immunoprecipitation for the analysis of transcription factor binding *in vivo* in cultured mammalian cells

Group Leader / Supervisor(s): Steven Johnsen

Place: Dept. of Molecular Oncology, Johnsen lab, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants: min: 5 max: 16

Duration: 2-3 d **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Chromatin immunoprecipitation (ChIP) is a technique that allows one to investigate the binding or recruitment of specific proteins to a given DNA sequence *in vivo*. In addition, the technique can be used to determine changes in transcription factor binding, covalent histone modifications, or other protein modifications directly on an endogenous gene following a specific treatment.

This course will provide the participants with hands-on experience in performing quantitative qChIP analyses on cultured mammalian cells. As a model system we will investigate the binding of p53, RNAPII and other transcriptional regulatory factors or histone modifications to the p21 gene following activation of p53 by chemotherapeutic agents. We will specifically look at the binding of these different proteins to specific sites on the gene (i.e., promoter, transcriptional start site and transcribed region).

In addition to learning the methodology, particular emphasis will be given on the analyses and interpretation of the data. A basic understanding of real-time PCR technology is expected.

Contact 1:	Prof. Steven Johnsen	sjohnse@gwdg.de	Tel. 0551-39 10373
Contact 2:			

Comments: Course (2 days) plus second meeting 2 – 3 days later (14:00 – ca. 17:00) to discuss the results.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 39	**Credits:**	1.0	**Date:**	Aug 2010

Title of Course: Analysis of nucleocytoplasmic transport by flow cytometry

Group Leader / Supervisor(s): Ralph Kehlenbach

Place: Dept. of Biochemistry I, Humboldtallee 23, 37073 Göttingen

Participants: min: 2 max: 4

Duration: 2 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 and its analysis by flow cytometry. We will express a transport factor in bacteria, purify it and test its activity in permeabilized cells. 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: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 40	**Credits:**	6.0	**Date:**	22 Feb – 5 Mar 2010

Title of Course: Nonlinear Dynamics and Time Series

Group Leader / Supervisor(s): Ulrich Parlitz

Place: Seminar room SR16 /F.02.125), Faculty of Physics, Friedrich-Hund-Platz 1*

Participants: min: 4 max: 10

Duration: 2 weeks **Time:** 9-18 h

Preparatory Meeting: Yes

Course description:

In lectures and hands-on computer experiments, the participants learn fundamental terms of nonlinear dynamics and relevant properties of nonlinear, deterministic chaotic systems.

Numerical simulations are used to explore nonlinear dynamics of selected nonlinear systems. The course covers (among others) the following topics: periodic orbits, bifurcations, nonlinear time series analysis, sensitive dependence on initial conditions, control and synchronization of chaotic systems, modeling and prediction.

Link to courses of the 3rd Physics Institute:
http://www.dpi.physik.uni-goettingen.de/praktika/nldkurs.html

UniVZ link:
http://univz.uni-goettingen.de/qisserver/rds?state=verpublish&status=init&vmfile=no&publishid=47893&moduleCall=webInfo&publishConfFile=webInfo&publishSubDir=veranstaltung

Contact 1:	Prof. Ulrich Parlitz	parlitz@physik3.gwdg.de	Tel. 0551-39 7716

Comments: **Advanced notification mandatory!** Preparatory meeting: Monday 11 January 2010, 16.15 h, Seminar room SR16 (F.02.125), Faculty of Physics, Friedrich-Hund-Platz 1. If you are interested in taking part and have not signed up yet please contact Prof. Ulrich Parlitz (Parlitz@physik3.gwdg.de , T.397716) before **January 6th**.
(the course was announced by GGNB on 7 Dec 2009)

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 41	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: Auditory and visual evoked potentials

Group Leader / Supervisor(s): Tobias Moser, Andrea Antal, Nicola Strenzke, Gerhard Hoch

Place: University Medical Center, Robert Koch Strasse 40. Dept. of Otolaryngology, level 3, room 687

Participants: min: 2 max: 10

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

Preparatory Meeting: No

Course description:

Summary:

Potentials arising from neuronal population responses to sensory stimuli such as light flashes and tone bursts offer a affordable and quantitative test of peripheral and central sensory processing. Analysis of sensory function has become an essential part of mouse phenotyping. In this 2 days practical course we will cover the biological basis, technical implementation, practical realization and data analysis of auditory and visual evoked potentials in the mouse.

Covered Topics and Methods:

Auditory Physiology: otoacoustic emissions, auditory evoked potentials: click and tone burst auditory brainstem responses, auditory steady state responses.

Visual Physiology: Scotopic and photopic electroretinogram (ERG), visual evoked cortical potentials (VEP), visual cognitive evoked potentials.

Contact 1:	Prof. Tobias Moser	tmoser@gwdg.de	Tel. 0551-39 8968
Contact 2:	PD Dr. med. Andrea Antal	aantal@gwdg.de	Tel. 0551-39 8192

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 42	**Credits:**	0.5	**Date:**	6 May 2010

Title of Course: Fundamental Principles of Sensory Processing

Group Leader / Supervisor(s): André Fiala, Martin Göpfert, Tobias Moser, Detlev Schild, Fred Wolf

Place: tba

Participants: min: 20 max: 50

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

Preparatory Meeting: No

Course description:

Symposium and methods workshop with prominent speakers in sensory neuroscience.

How are sensory stimuli detected, encoded, and processed? The advanced theoretical training course 'Fundamental Principles in Sensory Processing' will review and discuss principles in the decoding of sensory information by nervous systems. The course, which mainly targets PhD students, includes a variety of lectures that will be presented by experts in the field. Various sensory modalities will be covered, with topics ranging from the transduction of stimuli by sensory receptor cells to higher-order stimulus processing. Presentations will invite lively interactions with the class, and there will be plenty of room for discussions.

Topics:

- Transduction of sensory stimuli: Signal transduction in somatic senses, audition, mechanosensation, chemical senses and vision
- Encoding of sensory information: Signal propagation and coding principles from primary to secondary neurons of the retina, the inner ear, electroreceptive organs and the olfactory system.
- Processing of sensory information by central networks: Higher-order processing of olfactory, auditory, somatic and visual senses

Further details will follow in a separate announcement.

Contact 1:	Prof. André Fiala	afiala@gwdg.de	Tel. 0551-39 3356
Contact 2:	Prof. Tobias Moser	tmoser@gwdg.de	Tel. 0551-39 8968

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 44	**Credits:**	1.0	**Date:**	10-11 May 2010

Title of Course: Subcellular localization of proteins by immunoelectron microscopy of cryosections

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: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 45	**Credits:**	1.0	**Date:**	21-23 Apr 2010

Title of Course:	Microdissection combined with RNA analysis in the brain
Group Leader / Supervisor(s):	Klaus-Armin Nave, 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: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 46	**Credits:**	1.0	**Date:**	Group I: 29 Jun & 1 Jul 2010 Group II: 30 Jun & 2 Jul 2010

Title of Course: 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

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)

Contact 1:	Dr. Helge Schmidt	helge.schmidt@olympus.de	Tel. 0160-7178732
Contact 2:	Barbara Kasemann	barbara.kasemann@ds.mpg.de	Tel. 0551-5176 310

Comments:

GGNB Short Methods Courses: February – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 48	**Credits:**	1.0	**Date:**	23-25 Feb 2010

Title of Course: Transcranial magnetic- and electrical stimulation

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. Additionally, there is a possibility for all participants to present a poster of their work during the poster sessions.

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

Comments: Registration fee waived for GGNB students.
This course was already announced by the GGNB office on 27 Nov 2009.

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 52	**Credits:**	1.5	**Date:**	Mar or Aug 2010

Title of Course: Transport processes and imaging with radionucleotides

Group Leader / Supervisor(s): Andrea Polle, Bernd Kopka

Place: Institute for Forest Botany, Radioisotope Lab, Büsgenweg 2 (http://www.radioisotope.de/)

Participants: min: 3 max: 10

Duration: 5 days* **Time on Day 1:** 09:00 h

Preparatory Meeting: No

Course description:

Part I: Basics of radioactivity and measurement techniques.

Part II: Applications to DNA hybridization, dot blots with radioactively marked substances, split-root experiment or soil experiment.

Contact 1:	Bernd Kopka	bkopka@gwdg.de	Tel. 0551-39 8115
Contact 2:			

Comments: * Shorter course of 2-3 days also possible.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 53	**Credits:**	1.0	**Date:**	23-24 Mar 2010

Title of Course: Blue-native PAGE analysis of membrane protein complexes

Group Leader / Supervisor(s): Peter Rehling, Robert Reinhold

Place: Department of Biochemistry II, Humboldtallee 23

Participants: min: 2 max: 3

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: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 54	**Credits:**	1.0	**Date:**	Mar 2010

Title of Course: Analysis of T cell development by FTOC (foetal thymic organ culture) and FACS (fluorescence-activated cell sorting)

Group Leader / Supervisor(s): Holger Reichardt, Jens van den Brandt

Place: Dept. Cellular and Molecular Immunology, Humboldtallee 34

Participants: min: 1 max: 2

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

Preparatory Meeting: Yes

Course description:

Analysis of lymphocyte development and its underlying mechanisms is one of the most absorbing fields in immunology. In this short course the participants will gain insight into two basic immunological techniques that allow studying thymocyte differentiation ex vivo. Besides isolation of the foetal thymus and its cultivation as an intact organ, the participants get acquainted with the analysis of lymphocytes by flow cytometry. This includes a detailed introduction into the methodological background of FACS as well as hands-on experience in the simultaneous analysis of up to six different surface proteins using a FACS Canto II device.

Contact 1:	Dr. Jens van den Brandt	jbrandt@med.uni-goettingen.de	Tel. 0551-39 22027
Contact 2:			

Comments: * 3 individual days within a 10-day period: 18.03.10 (Thursday); 24.03.10 (Wednesday); 30.03.10 (Tuesday)

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 56	**Credits:**	1.0	**Date:**	1st or 2nd week of March 2010

Title of Course: Introduction to basic histology techniques

Group Leader / Supervisor(s): Halyna R. Shcherbata

Place: Max-Planck Institute for Biophysical Chemistry, Tower 6, 2nd floor

Participants: min: 2 | max: 6

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

Preparatory Meeting: No

Course description:

Although histological methods are one of the oldest methods in biology, in a modern world they are still widely used to investigate disease etiology, progression, and manifestation in humans and in animal models and for the newest tissue engineering methods.

This laboratory course is designed to introduce graduate students to the fundamentals of histological analysis. Students will gain practical experience with fixation, paraffin embedding, microtome sectioning, H&E and immunofluorescent antibody staining and basics of histological analysis. We will use *Drosophila* as a model for muscular dystrophy, since we have previously shown that *Drosophila* mutants show age-dependents muscle degeneration. Various animal models have been widely used in the life sciences and medical research with hope to be eventually used to study disease prevention and treatment. Analysis in *Drosophila* helps us to better understand the origin of muscular dystrophy and mechanisms of muscle degeneration.

Students will analyze and compare at the fluorescent microscope level the physical appearance of the normal versus abnormal degenerated tissue and evaluate the levels of muscle degeneration.

Contact 1:	Dr. Halyna Shcherbata	hshcher@gwdg.de	Tel. 0551-201 1656
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 57	**Credits:**	2.0	**Date:**	22-26 Mar 2010

Title of Course: Macromolecular crystal structure determination

Group Leader / Supervisor(s): Tim Grüne

Place: Hodgkin seminar room (MN26, Tammannstr. 4)

Participants: min: 3 max: 8

Duration: 5 days **Time on Day 1:** 9:00 h

Preparatory Meeting: Yes

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

Contact 1:	Dr. Tim Grüne	tg@shelx.uni-ac.gwdg.de	Tel. 0551-39 22149
Contact 2:			

Comments: On each day: 2 h lecture in the morning, 3-4 h computer practical in the afternoon. Preparatory meeting: second half of Feb 2010 (date tba).

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 58	**Credits:**	1.5	**Date:**	SS 2010

Title of Course: Advanced crystal structure analysis

Group Leader / Supervisor(s): George Sheldrick

Place: Hodgkin seminar room (MN26, Tammannstr. 4)

Participants: min: 5 max: -

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

Preparatory Meeting: No

Course description:

Content of Course:
Advanced aspects of X-ray data collection, data processing, phasing, crystal structure refinement and verification.

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

Expected background knowledge:
This course assumes adequate knowledge in crystallography, which can be acquired, for example, in the former MCII, the GGNB course A 57 (Macromolecular crystal structure determination), or a lab rotation project in the department of Prof. Sheldrick.

Contact 1:	Prof. George Sheldrick	gsheldr@shelx.uni-ac.gwdg.de	Tel. 0551-39 3021/2
Contact 2:			

Comments: Weekly on Thursdays. For questions concerning the course I have a “Sprechstunde” each Tuesday from 8:30 to 9:30 am.

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 59	**Credits:**	1.0	**Date:**	May 2010

Title of Course: GFP proteins and their application (FRAP, FRET, photo activation)

Group Leader / Supervisor(s): Mikael Simons, Miso 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. Miso Mitkovski	mitkovski@em.mpg.de	Tel. 0551-3899 620

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 60	**Credits:**	1.0	**Date:**	1-3 Mar 2010

Title of Course: Non-radioactive *in situ* hybridization

Group Leader / Supervisor(s): Christine Stadelmann-Nessler, Katja Schulz

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:	Katja Schulz	kschulz@med.uni-goettingen.de	0551-39-22959

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 61	**Credits:**	1.0	**Date:**	Apr 2010

Title of Course: 3D structure determination of macromolecular complexes by single particle cryo-EM

Group Leader / Supervisor(s): Holger Stark, Florian Platzmann

Place: MPI for Biophysical Chemistry, 3D-Cryo Electron Microscopy lab

Participants: min: 2 max: 2

Duration: 2 days **Time on Day 1:** 09:00 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:	Florian Platzmann	fplatzm@gwdg.de	Tel. 0551-201 1302

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 62	**Credits:**	1.0	**Date:**	29-30 Mar 2010

Title of Course: Atomic force microscopy of surfaces: basic imaging techniques and data analysis

Group Leader / Supervisor(s): Claudia Steinem, Andreas Janshoff / Ingo Mey

Place: Institut für Organische und Biomolekulare Chemie, Tammannstr. 2

Participants: min: 2 | max: 3

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

Preparatory Meeting: No

Course description:

The basic principles of the AFM technique will be taught. Different surfaces will be imaged with the main emphasis on biological samples such as membranes and cells.

Contact 1:	Ingo Mey	imey@gwdg.de	Tel. 0551-39 22390
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 63	**Credits:**	1.0	**Date:**	Apr/May 2010

Title of Course: Patch clamp

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: One of the following course dates would be possible: week 15 (April 12-16), week 17 (April 26-30) or week 19 (May 10-14)

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 65	**Credits:**	1.0	**Date:**	12-14 Apr 2010*

Title of Course: Sequence analysis of proteins and their post-translational modifications by MALDI-ToF and electrospray ionization (ESI) mass spectrometry

Group Leader / Supervisor(s): Henning Urlaub, Carla Schmidt, He-Hsuan Hsiao, Miroslav Nikolov, Katharina Kramer

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:	Dr. Henning Urlaub	henning.urlaub@mpibpc.mpg.de	Tel. 0551-201 1060
Contact 2:	Carla Schmidt	carla.schmidt@mpibpc.mpg.de	Tel. 0551-201 1500

Comments: * 12-14 April 2010: provisional date

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 66	**Credits:**	1.0	**Date:**	10-11 Mar 2010

Title of Course: Isolation of recombinant proteins by affinity chromatography and binding studies

Group Leader / Supervisor(s): Lutz Walter

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. After isolation Fc-KIR proteins are multimerised and fluorescently labeled and will be used to test specific interactions with MHC class I molecules by FAC analysis.

Contact 1:	Prof. Dr. Lutz Walter	lwalter@gwdg.de	Tel. 0551-3851 161
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 67	**Credits:**	1.0	**Date:**	10-11 Mar 2010

Title of Course: Introduction to Bioinformatics Methods

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:** 09:00 h

Preparatory Meeting: No

Course description:

The course is designed for graduate or undergraduate students and will introduce into basic computational methods and databases in bioinformatics with a focus on genome analysis. Besides seminar discussions there will be practical exercises. By the end of the course participants should be able to access genomic and genetic data from the internet and process data by using the relevant web servers. While this is not compulsory, participants are encouraged to bring their own (virus free) computer.

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

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 68	**Credits:**	1.0	**Date:**	10-11 Mar 2010

Title of Course: Mechanisms of RNA silencing

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:** 09:00 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	0551-3851 161

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 69	**Credits:**	1.0	**Date:**	12-13 & 26 Apr 2010

Title of Course: Parental RNAi in *Tribolium*

Group Leader / Supervisor(s): Ernst Wimmer, Gregor Bucher

Place: Dept. of Developmental Biology, Ernst-Caspari-Haus / GZMB building, Justus-von-Liebig-Weg 11

Participants: min: 3 max: 6

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

Preparatory Meeting: No

Course description:

On the first day we will produce double stranded RNA from PCR templates and learn to inject female *Tribolium* (red flour beetle) pupae (one day). The next day we will inject the dsRNA into pupae (half a day). Approximately 13 days later, we will collect the offspring for you and prepare the cuticles. Together, we will analyze them for RNAi phenotypes. A short introduction to RNAi and systemic RNAi will be given (half a day) as well as an introduction into the power and caveats of RNAi experiments. You are welcome to knock-down the ortholog or your favourite gene (you just have to clone the gene before - we will help you with the identification and cloning of the ortholog).

- Parental RNAi: Production of dsRNA
- Parental RNAi: Microinjection of dsRNA in female *Tribolium* pupae
- Cuticula preparations of *Tribolium* larvae
- Analysis of the cuticula preparations for RNAi-induced phenotypes

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

Comments: * 1.5 days and a half day two weeks later.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 71	**Credits:**	1.0	**Date:**	9-10 Mar 2010

Title of Course: Thermodynamic characterization of biomolecular interactions by isothermal titration calorimetry

Group Leader / Supervisor(s): Kai Tittmann, Stefan Lüdtke, Danilo Meyer

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 trypsin and soybean trypsin inhibitor 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:	Dipl.-Biochem. Stefan Lüdtke	sluedtk@gwdg.de	Tel. 0551-39 14000

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 72	**Credits:**	1.0	**Date:**	15-Apr 2010

Title of Course: Surface Plasmon Resonance: basic principles and applications

Group Leader / Supervisor(s): Claudia Steinem, Andreas Janshoff / Thomas Lazzara

Place: Institut für Organische und Biomolekulare Chemie, Tammannstr. 2

Participants: min: 2 max: 3

Duration: 2 days **Time on Day 1:** 7:00 h

Preparatory Meeting: No

Course description:

The principles of Surface Plasmon Resonance (SPR) will be presented. The optical response that is used in SPR based bio-sensors will be experimentally demonstrated with a few basic experiments. Afterwards, we will investigate the spreading of lipid vesicles and protein binding on planar surfaces.

Contact 1:	Prof. Claudia Steinem	csteine@gwdg.de	Tel. 0551-39 3294
Contact 2:	Thomas Lazzara	thomas.lazzara@gmail.com	Tel. 0551-39 10645

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 73	**Credits:**	1.0	**Date:**	9/16/23 Apr 2010

Title of Course:	Introduction to Matlab in Systems Neuroscience
Group Leader / Supervisor(s):	Dr. Alexander Gail, Beatrix Glaser
Place:	Sensorimotor Group, Cognitive Neuroscience Lab, Hans-Adolf-Krebs Weg 7, German Primate Center

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

Course description:

This course will provide a short introduction to the Matlab programming environment as a versatile tool in system neuroscience research. The course will be held on 3 days in consecutive weeks. You will be first introduced to the basic principles in Matlab programming, as introduced in the tutorial chapter of the course book. Course days will consist of a mixture of tutorial presentations and own practical exercises under supervision. During the exercises the new course material can be explored in small groups of two or three participants and discussed with the supervisor. Practical exercises will include analysis and graphical processing of test data. Exercises are chosen to address typical topics of system neuroscience, e.g. signal detection theory, neural encoding/curve fitting, correlation analysis, and spectral analysis.

Contact 1:	Dr. Alexander Gail	agail@gwdg.de	0551-3851 118
Contact 2:	Beatrix Glaser	bglaser@gwdg.de	0551-3851 118

Comments:	Course book: Matlab for Neuroscientists, by Wallisch et al., Academic Press, 2009 (excerpts available as PDF for course participants)

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 74	**Credits:**	1.0	**Date:**	1-2 Mar 2010

Title of Course:	Hydrodynamic analysis of proteins and protein complexes by analytical ultracentrifugation
Group Leader / Supervisor(s):	Dr. Wolfgang Fischle / Adrian Schomburg
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	201-1340
Contact 2:	Adrian Schomburg	aschomb@gwdg.de	201-1447

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

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 77	**Credits:**	0.5	**Date:**	27 Jul 2010

Title of Course: PCR: self-made enzymes, helpful additives and insights into the reactions

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

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

Participants: min: 5 max: ?

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

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 78	**Credits:**	0.5	**Date:**	tba

Title of Course: Ligand-receptor interactions measured by fluorescence anisotropy and related techniques

Group Leader / Supervisor(s): Dirk Görlich, NN

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

Participants: min: 5 max: ?

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

Preparatory Meeting: No

Course description:

Fluorescence anisotropy can be used to quantify receptor-ligand interactions precisely. Compared to bead-binding assays, it yields "real numbers" and avoids the shifting of the binding equilibrium by washing steps. The technique is suitable for high through put applications. It exploits the fact that the rotational diffusion of a fluorescent ligand decreases upon binding a larger partner. In the first part of the course, we will discuss the experimental design as well as the acquisition and evaluation of the data. The second part will provide a hands-on experience of the technique.

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

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 79	**Credits:**	0.5	**Date:**	tba

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

Group Leader / Supervisor(s): Dirk Görlich, NN

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

Participants: min: 5 max: ?

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: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 80	**Credits:**	1.0	**Date:**	29-30 Jul 2010

Title of Course: Advanced bacterial protein expression and purification

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

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

Participants: min: 5 max: ?

Duration: 1 day **Time on Day 1:** 09:00 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. We will discuss strategies, such as codon optimization, usage of special *E.coli* strains and growth conditions and the use of tags to amend such problem. The course will also provide a hands-on experience for the use of cleavable affinity tags.

Note: This course is scheduled as an intense, one-day-program. 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:	Prof. Dirk Görlich	goerlich@mpibpc.mpg.de	Tel. 0551-201 2400
Contact 2:	Dr. Steffen Frey	sfrey@gwdg.de	Tel. 0551-201 2460

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 81	**Credits:**	1.0	**Date:**	Jun 2010

Title of Course: Introduction to transient kinetic methods

Group Leader / Supervisor(s): Marina Rodnina / Pohl Milon

Place: Max Planck Institute for Biophysical Chemistry, Department of Physical Biochemistry, Am Fassberg 11

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 hours of seminars 4 hours of hands-on practical work and finish with a 1 hour evaluation/feedback tutorial.

The following experiments are planned:
Kinetics of enzyme-catalyzed reactions in msec range using quench-flow technique.
Protein-ligand binding using stipped-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 201-2934

Comments: Participants can bring their protein of interest.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 82	**Credits:**	1.0	**Date:**	16-18 Mar 2010

Title of Course:	Affinity purification methods for the isolation of large heterogeneous macromolecular assemblies
Group Leader / Supervisor(s):	Reinhard Lührmann / Klaus Hartmuth
Place:	MPI for Biophysical Chemistry, Seminar room, Tower III/1st floor

Participants:	min: 2	max: 4		
Duration:	3 days	**Time on Day 1:**	9 a.m.	
Preparatory Meeting:	No			

Course description:

One of the most powerful methods in present-day biochemical purifications is affinity purification. The practical will introduce the students to procedures in which we employ a molecular tag on the pre-mRNA substrate to isolate spliceosomes. We make use of a pre-mRNA tagged with three MS2 RNA aptamers. This is incubated with the MS2-MBP fusion protein, which interacts (i) with the pre-mRNA by binding strongly to the MS2 hairpins; and (ii) with an amylose affinity matrix through the MBP (maltose-binding protein) portion of the protein. The latter interaction is fully reversible, under mild conditions, by competition with maltose. Experimentally, the introduction to our affinity purification procedure consists of (i) preparation of a tagged pre-mRNA, (ii) assembly of spliceosomes on the tagged pre-mRNA, (iii) size fractionation of the spliceosomes by gradient sedimentation, and finally (iv) affinity selection of the spliceosomes.

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: March– August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 83	**Credits:**	1.0	**Date:**	26-28 Apr 2010

Title of Course:	Drosophila Neurogenetics
Group Leader / Supervisor(s):	Prof. André Fiala, Prof. Martin Göpfert
Place:	Max-Planck-Institute for Experimental Medicine, European Neuroscience-Institute

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: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 85	**Credits:**	1.0	**Date:**	May/Jun 2010

Title of Course: Fungal signal transduction – in vitro GDP-GTP exchange assays of Rho-type GTPases

Group Leader / Supervisor(s): Stephan Seiler / Corinna Schmitz

Place: Inst. f. Microbiology and Genetics, Grisebachstr. 8
Lab # 0.105

Participants: min: 2 max: 3

Duration: 2-3 days **Time on Day 1:** 9:30 h

Preparatory Meeting: No

Course description:

Polarized growth is a multifactorial property, which is coordinated by numerous signaling pathways, and monomeric GTPases of the Ras super family have been identified as key regulators of cell polarity. They act as molecular switches that cycle between an active GTP bound and an inactive GDP bound form. Transition between these two forms is achieved through GTPase-activating proteins (GAPs) leading to the inactive form and GDP-GTP-exchange factors (GEFs) that activate the small G-protein. This course is aiming at determining the specificity of fungal GEFs for their cognate G-proteins by expressing and purifying all components from *E. coli* and performing in vitro exchange assays using modified GTP-analogs.

Contact 1:	Stephan Seiler	sseiler@gwdg.de	0551-39 3777
Contact 2:	Corinna Schmitz	cschmit@gwdg.de	0551-39 3809

Comments:

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 86	**Credits:**	1.0	**Date:**	May/Jun 2010

Title of Course: Fungal signal transduction – in vitro Ndr kinase assays

Group Leader / Supervisor(s): Stephan Seiler / Anne Dettmann

Place: Inst. f. Microbiology and Genetics, Grisebachstr.8
Lab # 0.105

Participants: min: 2 max: 3

Duration: 2-3 days **Time on Day 1:** 9:30 h

Preparatory Meeting: No

Course description:

Ndr kinases and associated proteins are recognized as a conserved signaling network involved in the regulation of eukaryotic cell polarity and differentiation processes, yet their specific function and their integration into a cellular signaling context is still elusive. This course is aiming at purifying native and modified Ndr kinase variants from *Neurospora crassa* by immunoprecipitation experiments and determining their in vitro kinase activities using a radioactive assay.

Contact 1:	Stephan Seiler	sseiler@gwdg.de	0551-39 3777
Contact 2:	Anne Dettmann	adettma@gwdg.de	0551-39 3809

Comments: The same course could be offered, once again, in fall 2010.

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for
Neurosciences and Molecular Biosciences

Course ID:	A 87	**Credits:**	1.0	**Date:**	24-25 Mar 2010

Title of Course: Neurosphere cultures from embryonic mouse brain

Group Leader / Supervisor(s): Group Leader / Supervisor(s): Anastassia Stoykova / Vanessa Paul

Place: Max-Planck-Institute for biophysical Chemistry, Department of Molecular Cell Biology / Turm 5 / 1st Floor, Am Fassberg 11, 37077 Göttingen

Participants:	min: 2	max: 4

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

Preparatory Meeting: No

Course description:

The neurogenesis is a multistep process that includes proliferation of stem/progenitor cells, cell cycle exit, cell fate decisions in acquiring multiple neuronal versus glia cell fates, migration, and terminal differentiation. The specification of neural stem/progenitor cells is guided by extrinsic signals as well as by intrinsic mechanisms, including regulated expression of sets of transcription factors. Cell cultures provide a powerful tool to test hypothesis on *in vivo* properties of cells.

Two methods commonly used to culture stem/progenitor cells are neurospheres (NS) and monolayer cultures. In neurosphere cultures, mixed population of primary cortical cells are taken under non-proliferative condition and they generate free-floating spherical clusters. The regular passage of the NSs allows the enrichment of the dividing cells to achieve an almost homogeneous population. This allows for studying the effect of various factors on a defined population of progenitors with regard to their proliferation. To study differentiation properties of NS, the clusters are singularized and plated on polyD-lysine coated dishes for several days. Under non-proliferative conditions, progenitors differentiate into distinct cell types identified by immunohistochemistry with specific antibodies (cellular composition of a clonal NS cluster). By using nucleofection of NS cells with plasmid-DNA or siRNA one can study gene gain-of-function or gene-knock-down effects in-vitro on stem/progenitor proliferation and differentiation.

Day1: - Preparation of cortical cells from embryonic mouse brains for culturing under proliferative NS conditions

Day 2: - Set up of a differentiation assay of NSs from an advanced passage on pD-lysine coated dishes
- Observation of immunocytochemical stained NS with fluorescence microscope

Contact 1:	Vanessa Paul	vpaul@gwdg.de	0551-201 1469
Contact 2:			

Comments:

GGNB Short Methods Courses: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 89	**Credits:**	1.5	**Date:**	Apr 2010

Title of Course: High resolution microscopy in synapses

Group Leader / Supervisor(s): Silvio Rizzoli / Peer Hoopmann, Dirk Kamin, Annette Denker

Place: STED Microscopy of Synaptic Function
European Neuroscience Institute, Grisebachstr. 5, Göttingen, 37077

Participants: min: 2 max: 5

Duration: 3 days **Time on Day 1:** 9:00 h

Preparatory Meeting: No

Course description:

Summary:
Conventional fluorescence microscopy is limited by diffraction to spots of ~200 nm in diameter. The real size of smaller objects cannot be distinguished. Also, objects found closer to each other than the diffraction limit cannot be distinguished. This limitation in imaging resolution can be overcome by several approaches:
One of the most successful is stimulated emission depletion (STED) microscopy, in which the excitation laser beam is overlapped with a second, doughnut-shaped beam, which quenches the excited molecules by stimulated depletion. As a consequence, fluorescence is generated selectively in the center of the excitation spot, where the quenching beam has its lowest intensity, close to zero. The resulting focal area is narrower than the diffraction limit, and therefore provides higher resolution.
A second approach is to take advantage of the exquisite resolution of electron microscopy. The fluorescently labeled preparation is fixed and illuminated in presence of di-amino-benzidine, which induces the formation of a dense precipitate in the immediate vicinity of the dye molecules (photo-oxidation). The precipitate can be easily observed in electron microscopy, and indicates the exact position and morphology of the fluorescent objects.
In the course days we will cover the theoretical basis of both techniques. Experiments involving synaptic vesicle function in both cultured cells and neuromuscular junctions will be performed for the two techniques.
Covered Topics and Methods:
Technical: fluorescence microscopy, resolution limitations, STED microscopy, basic electron microscopy, oxidation imaging.
Biological: pre-synaptic function, synaptic vesicle recycling, neuromuscular physiology.

Contact 1:	Silvio Rizzoli	srizzol@gwdg.de	0551-39 3630
Contact 2:	Peer Hoopmann	phoopma@gwdg.de	0551-39 13955

Comments: The main techniques presented in the course can be learned in less than ~10 laboratories in Germany.

GGNB Short Methods Courses: March - Aug 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 90	**Credits:**	2,5	**Date:**	15-19 Mar 2010

Title of Course:	Microfluidics
Group Leader / Supervisor(s):	Eric Stellamanns, Sravanti Uppaluri, Shashi Thutupalli
Place:	MPI for Dynamic and Self Organization, Bunsenstr. 10

Participants:	min: 3	max: 8

Duration:	5 days	**Time on Day 1:**	09:30 h

Preparatory Meeting:	nein

Course description:

Microfluidics is not only an interesting field of research but has also become a powerful tool in scientific research and industry. In this course we want to give a brief overview about the theory of microfluidics and its applications. We will produce microfluidic devices using soft lithography techniques and demonstrate their versatility through experiments in physics, chemistry and biology.

Contact 1:	Sravanti Uppaluri	sravanti.uppaluri@ds.mpg.de	0551 5176 241

Comments:	The course is provisionally scheduled for 15-19 March 2010 but may have to be postponed.

GGNB Short Methods Courses: March – August 2010

Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 93	**Credits:**	1.0	**Date:**	9-11 Jun 2010

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

Participants:	min: 2	max: 4

Duration:	3 days	**Time on Day 1:**	9 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; (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: March – August 2010

GGNB
Göttingen Graduate School for Neurosciences and Molecular Biosciences

Course ID:	A 95	**Credits:**	2.0	**Date:**	7 Apr - 7 Jul 2010

Title of Course: Introduction to Theoretical Neuroscience

Group Leader / Supervisor(s): Marc Timme, Carsten Grabow

Place: A0.105, Neues Physik Gebäude, Friedrich-Hund-Platz 1, 37077 Göttingen

Participants: - -

Duration: SS, weekly, Wed, 14-16 **Time on Day 1:** 14-16 h

Preparatory Meeting: No

Course description:

This seminar will explore the fundamental biophysical principles underlying neuronal information processing in the brain. Introductory presentations by researchers of the Bernstein Center for Computational Neuroscience (BCCN Göttingen) will alternate with short talks prepared by the students to deepen theoretical aspects or to focus on applications to specific neuroscience problems. A non exhaustive list of the covered topics include: generation and propagation of action potentials, synaptic transmission and neuromodulation, coding and decoding of sensory information, neuronal synchrony and oscillations, memory and learning, analysis of brain connectivity, etc.

The course is open to students with a Bachelor's degree in Physics, Mathematics, Biology or equivalent. Participants are highly encouraged to present an application talk, but occasional listeners will also be welcome.

Language: English

Literature:
- L. Abbott & P. Dayan, "Theoretical Neuroscience", The MIT Press, 2001
- E.M Izhikevich, "Dynamical Systems in Neuroscience: The Geometry of Excitability and Bursting", The MIT press, 2007
- W. Gerstner & W.M. Kistler, "Spiking neuron models: single neurons, populations, plasticity", Cambridge University Press, 2002
- D. Amit, "Modelling Brain Function: The World of Attractor Neural Networks", Cambridge University Press, 1992

Contact:	Carsten Grabow	grabow@nld.ds.mpg.de	Tel. 0551-5176-549

Comments: **Credits**: Participants wishing to receive credits need i) to attend at 7 out of 14 planned meetings; ii) to present a short talk about a specific application. Topics for student presentations will be distributed during the first seminar meeting. 2.0 credits will be given for attendance and oral presentation. A grade can also be assigned by passing a multiple-choice questionnaire in July.