MOLECULAR BIOLOGY
NEWSLETTER
Georg-August-Universität Göttingen · International Max Planck Research School
JAN 2013

# Welcome message

This annual newsletter is intended to review the research, activities, and other highlights related to our MSc/PhD Molecular Biology program during the past year. As the first students graduated from our program almost a decade ago, it is getting more and more exciting to read the reports by our alumni about their career paths inside or outside academia, how they cope with the challenges of work - (family) life - balance, and how they experience their new professions after they have left Göttingen. This month we celebrate the hundredth PhD thesis defense by our Molecular Biology program (page 27).

The two major milestones of the year 2012 were the decisions regarding the extension of our International Max Planck Research School (IMPRS) beyond the first twelve years of funding, and the renewal proposal of the Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences (GGNB) in the DFG-funded German Excellence Initiative. We have the great pleasure of informing everyone that both proposals were successful. Our program will be funded with 1.5 million Euros from the IMPRS grant until December 2018 (page 26). Likewise, a second 5-year funding phase of GGNB in the Excellence Initiative with a DFG grant of 5.6 million Euros has been approved. This will enable us not only to continue successfully implemented measures, but also to develop new measures, such as the establishment of a new career service unit, providing and coordinating support of postdoctoral research fellows on our campus (back cover of this newsletter).

We would like to express our gratitude to all present and former members of our program who contributed to the success in our bid for renewed funding.

The start of the new funding period also marks a transition in the management of the IMPRS. Marina Rodnina, director of the Department of Physical Chemistry at the MPI for Biophysical Chemistry, assumed the position of the Dean of our IMPRS in January 2013. We would like to thank Marina for taking up the additional responsibilities and welcome her as the new Dean and member of our program committee. Marina follows Reinhard Jahn, one of the co-founders of our program, who has served as a Dean of the IMPRS since its foundation. His committed work for our graduate program was certainly the key to its success. Together with other colleagues on the campus, Reinhard took a leading role in taking down the institutional barriers between the university groups and their non-university colleagues on campus (page 28).


Marina Rodnina

At the time of its implementation, the concept of our IMPRS encompassed a radical departure from the conventional curricula in Germany. Furthermore, it constituted the first formal collaboration between Max Planck Institutes and a German university with full faculty rights granted to all university and non-university faculty members. The IMPRS has also been crucial for the establishment of GGNB and its success in the Excellence Initiative. The trustful collaboration between the partner institutions that developed over the past years is evident from the fact that GGNB is led by Reinhard Jahn, making it the only graduate school in the Excellence Initiative whose leadership is entrusted by the host university to a non-university scientist. We would like to thank Reinhard for his invaluable contributions to graduate education in Göttingen and are glad that he will remain an active member of our program.


Reinhard Jahn

Jörg Stülke, Steffen Burkhardt

## CONTENT

# A novel role for H2B monoubiquitination

## Histone modification regulates differentiation of mesenchymal stem cells

Gene expression is a tightly regulated process. It is controlled at different levels, including transcription factors, splicing machinery, translation etc. One more possibility to regulate gene expression comes from the chromatin structure that can promote or inhibit transcription. Histones, the protein components of chromatin, play a key role in this regulation. Histones can undergo posttranslational modifications and gain an ability to change chromatin conformation making it more or less favorable for transcription.

Among different histone modifications our laboratory is particularly interested in monoubiquitination of histone H2B (H2Bub1), which is performed by the complex of two E3 ligases – RNF20 and RNF40. H2Bub1 is found on actively transcribed genes in the species from yeast to human. However, its function remains to be elucidated. This modification regulates elongation, plays a role in DNA repair and is implicated in tumorigenesis.

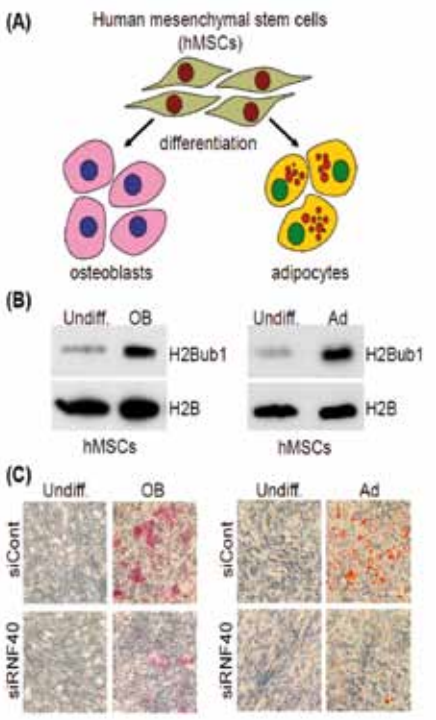


**Fig. 1:** Differentiation of hMSCs is dependent on H2Bub1 levels. (A) Schematic illustration of hMSCs differentiation. (B) Western blot analysis demonstrates that H2Bub1 levels increase during osteoblast (left panel) and adipocyte (right panel) differentiation. H2B serves as a loading control. (C) hMSCs were treated with siRNAs to RNF40 to deplete H2Bub1. Violet- (left panel) and red- (right panel) colored cells represent differentiated osteoblasts and adipocytes respectively. Samples with RNF40 knock-down are stained less intensively suggesting that differentiation was inhibited. Abbreviations: OB – osteoblasts, Ad – adipocytes, siCont - transfection with control (scrambled siRNAs), siRNF40 – transfection with siRNAs to RNF40.

Our research aimed at discovering new functions that H2Bub1 performs in the cell. We focused our attention on cellular differentiation, since this process is accompanied by a massive activation of gene expression possibly involving H2Bub1. As a model we used human mesenchymal stem cells (hMSCs) that originate from the bone marrow and can be differentiated into several cell types: osteoblasts, adipocytes and chondrocytes.

*PhD-related publications 2013 (PhD students of the Molecular Biology program in bold type)*

**Alkhaja A**, Jans D, **Nikolov M**, Vukotic M, **Lytovchenko O**, Ludewig F, Schliebs W, Riedel D, Urlaub H, Jakobs S, Deckers M (2012) MINOS1 is a conserved component of mitofilin complexes and required for mitochondrial function and cristae organization. Mol Biol Cell 23(2):247-257

**Burgalossi A**, Jung S, Man K, Nair R, Jockusch W, Wojcik S, Brose N, Rhee J (2012) Analysis of neurotransmitter release mechanisms by photolysis of caged $Ca^{2+}$ in an autaptic neuron culture system. Nat Protoc 7(7):1351-1365

**Burgalossi A**, Jung S, Meyer G, Jockusch W, Jahn O, Taschenberger H, O'Connor V, Nishiki T, Takahashi M, Brose N, Rhee J (2012) SNARE protein Recycling by alpha SNAP and beta SNAP supports synaptic vesicle priming (vol 68, pg 473, 2010). Neuron 73(3):620-620

**Gailite I**, Egger-Adam D, Wodarz A (2012) The phosphoinositide-associated protein Rush hour regulates endosomal trafficking in *Drosophila*. Mol Biol Cell 23(3):433-447

Goudarzi M, Banisch T, Mobin M, Maghelli N, **Tarbashevich K**, Strate I, van den Berg J, **Blaser H**, Bandemer S, Paluch E, Bakkers J, Tolic-Norrelykke I, Raz E (2012) Identification and regulation of a molecular module for Bleb-based cell motility. Dev Cell 23(1):210-218

We differentiated hMSCs into osteoblasts and adipocytes under laboratory conditions and observed strong accumulation of H2Bub1 in both cases. Furthermore, together with collaborating groups in the MPI-bpc and MPI-em we confirmed that H2Bub1 levels also increase during differentiation in other species like mouse and fruit fly. These data for the first time demonstrates involvement of H2Bub1 in differentiation and suggests that this regulation appeared quite early in evolution.

Our next step was to examine what happens to differentiation upon removal of H2Bub1. We used a knock-down approach to deplete RNF40, an E3 ligase for H2Bub1, which resulted in a significant decrease of H2Bub1. Upon RNF40 knock-down hMSCs failed to differentiate into osteoblasts or adipocytes and differentiation-associated gene induction was inhibited in the absence of H2Bub1. These observations suggest that H2Bub1 is required for expression of the genes, induced during differentiation.

So how does H2Bub1 regulate transcription of these genes? The exact mechanism remains to be understood, but we do know that H2Bub1 interacts with other histone modifications to perform this function. In stem cells many genes, which are induced upon differentiation carry histone marks that inhibit their transcription in the absence of a corresponding signal, preventing premature activation. In undifferentiated hMSCs differentiation-induced genes also possess an inhibitory mark (trimethylation of histone H3 at lysine 27, H3K27me3), which is removed upon differentiation. However, we observed that in the absence of H2Bub1 this modification remained on the gene inhibiting its transcription. In other words, H2Bub1 regulates H3K27me3 removal which leads to activation of differentiation-induced genes.

Overall, our studies indicate that H2Bub1 accumulation during differentiation is evolutionary conserved and is required for correct execution of this process.

**Oleksandra Karpiuk** did her PhD under the supervision of Steven Johnsen at the Department of Molecular Oncology, University of Göttingen Medical Center. She graduated from the Molecular Biology program in November 2012.

These results were published in Mol Cell, 2012, 46(5):705-713.

**Hannemann M**, Sasidharan N, Hegermann J, Kutscher L, Koenig S, Eimer S (2012) TBC-8, a putative RAB-2 GAP, regulates dense core vesicle maturation in *Caenorhabditis elegans*. PLoS Genet 8(5)

**Hoopmann P**, Rizzoli S, Betz W (2012) Imaging synaptic vesicle recycling by staining and destaining vesicles with FM dyes. Cold Spring Harb Protoc 2012(1):77-83

Jaspers M, Nolde K, Behr M, Joo S, Plessmann U, **Nikolov M**, Urlaub H, Schuh R (2012) The Claudin Megatrachea Protein Complex. J Biol Chem 287(44):36756-36765

**Kardash E**, Bandemer J, Raz E (2012) Imaging protein activity in live embryos using fluorescence resonance energy transfer biosensors. Nat Protoc 6(12):1835-1846

**Karpiuk O**, Najafova Z, Kramer F, Hennion M, Galonska C, Koenig A, Snaidero N, Vogel T, **Shchebet A**, Begus-Nahrmann Y, Kassem M, Simons M, Shcherbata H, Beissbarth T, Johnsen S (2012) The histone H2B monoubiquitination regulatory pathway is required for differentiation of multipotent stem cells. Mol Cell 46(5):705-713

# The cascade of spliceosome activation

## RNA helicase Brr2: A molecular motor required for catalytic activation of the spliceosome

A crucial step in the processing of newly transcribed eukaryotic pre-mRNAs is the removal of long non-coding intervening sequences (introns) and ligation of coding regions (exons), a process called splicing. Splicing is catalyzed by the spliceosome, a multi-megaDalton and highly dynamic ribonucleoprotein machine. Each cycle of splicing involves the assembly of the spliceosome on pre-mRNA, its catalytic activation, and subsequently two transesterification reactions, followed by spliceosome disassembly. The spliceosome undergoes specific structural and compositional rearrangements during each step. Spliceosomal RNA helicases serve as molecular motors to drive these rearrangements. These conserved enzymes utilize the free energy of ATP to catalyze the unwinding of stable RNA-RNA duplexes or to remodel the ribonucleoprotein complexes. Since these enzymes function in numerous metabolic pathways, they have acquired significant attention over the past years.

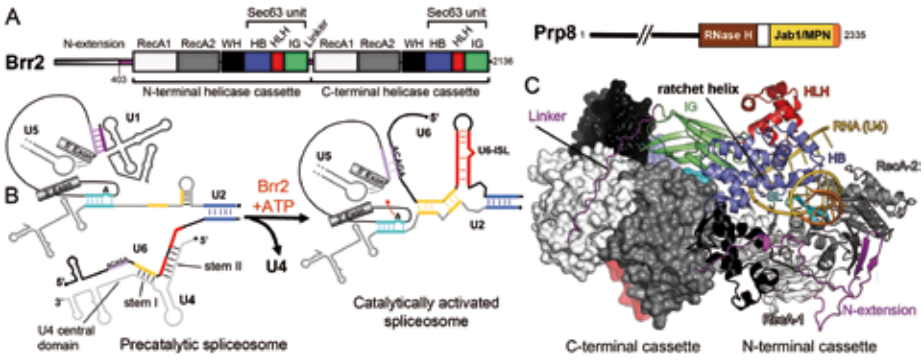


**Fig. 1:** A) Domain organization of Brr2 and the C-terminal region of Prp8. B) Schematic representation of the network of RNA/RNA interactions within the precatalytic and catalytically activated spliceosome. C) Crystal structure of the helicase region of human Brr2 with a modeled RNA (in gold). HLH-helix-loop-helix; HB-helical-bundle; IG-immunoglobulin-like domain.

Brr2 is the largest (ca. 250 kDa) RNA helicase of the spliceosome with an exceptional architecture, encompassing two tandem helicase units, each comprised of dual RecA-like domains, a winged-helix (WH) domain and a Sec63-homology unit (Fig.1A). Brr2 plays a key role in initiating the catalytic activation step of splicing by unwinding the snRNA U4/U6 duplex found within the spliceosome. This liberates the U6 snRNA, allowing it to fold into a catalytically important structure (U6-ISL) and to form additional interactions with U2 snRNA (Fig.1B). Our biochemical studies have shown that the N-terminal helicase cassette of Brr2 (Brr2NC) is the active helicase unit that hydrolyzes ATP and unwinds U4/U6 in isolation. Strikingly, the C-terminal cassette (Brr2CC) binds but does not hydrolyze ATP, and acts as an intra-

**Khoshnevis S**, **Hauer F**, Milon P, Stark H, Ficner R (2012) Novel insights into the architecture and protein interaction network of yeast eIF3. RNA 18(12):2306-2319

Lipstein N, Schaks S, **Dimova K**, Kalkhof S, Ihling C, Koelbel K, Ashery U, Rhee J, Brose N, Sinz A, Jahn O (2012) Nonconserved $Ca^{2+}$/Calmodulin binding sites in Munc13s differentially control synaptic short-term plasticity. Mol Cell Biol 32(22):4628-4641

Mäder U, Schmeisky A, **Flórez L**, Stülke J (2012) SubtiWiki - a comprehensive community resource for the model organism *Bacillus subtilis*. Nucleic Acids Res 40 (Database issue) (D1278-87)

Maritzen T, Zech T, **Schmidt M**, Krause E, Machesky L, Haucke V (2012) Gadkin negatively regulates cell spreading and motility *via* sequestration of the actin-nucleating ARP2/3 complex. Proc Natl Acad Sci USA 109(26):10382-10387

**Mozaffari Jovin S**, Santos K, Hsiao H, Will C, Urlaub H, Wahl M, Luehrmann R (2012) The Prp8 RNase H-like domain inhibits Brr2-mediated U4/U6 snRNA unwinding by blocking Brr2 loading onto the U4 snRNA. Genes Dev 26(21):2422-2434

Munari F, Soeroes S, Zenn H, **Schomburg A**, Kost N, Schroeder S, Klingberg R, Rezaei-Ghaleh N, Stuetzer A, Gelato K, Walla P, Becker S,

molecular cofactor that strongly stimulates Brr2NC helicase activity. This biochemical behavior could be reconciled by the extensive inter-cassette contacts observed in the crystal structure (Fig.1C). Brr2 is of medical interest because a number of mutations in this protein lead to a severe type of retinitis pigmentosa (RP33), a degenerative eye disease. We have localized these mutations on the ratcheting device (HB domain) and on the RecA domains of Brr2NC, and showed that they weaken Brr2 helicase activity and thus can slow-down the process of spliceosome activation.

Brr2's substrate, U4/U6 snRNA, is the most thermodynamically stable duplex in the spliceosome which harbors a three-way-junction structure flanked by single-stranded overhangs (Fig.1B). Our findings suggest that the pathway of spliceosome activation involves Brr2 loading onto the U4 snRNA and its translocation along the U4 central domain in a 3'-5'direction that unwinds U4/U6 stem I before stem II. Spliceosome activation is regulated by the largest scaffolding protein of the spliceosome, Prp8, which interacts with Brr2 through its C-terminus. This region is comprised of an RNase H-like domain, which lacks a full set of catalytic residues, followed by a Jab1/MPN-like domain that has lost its deubiquitinase activity (Fig.1A). We have demonstrated that the Prp8 RNase H domain interacts specifically with U4/U6, while the Jab1 domain directly binds Brr2 helicase. Thus, Prp8 bridges Brr2 and its RNA substrate. UV-induced RNA-protein crosslinking combined with RNA structural probing showed that U4 and U6 single-stranded regions adjacent to stem I are bound by the RNase H domain, and mapped their binding sites on the RNase H. Furthermore, we demonstrate that RNase H binding to U4/U6 prevents Brr2 loading on U4, and that it negatively regulates Brr2-mediated U4/U6 unwinding. Thus, our data reveal a potential mechanism whereby Prp8 may prevent premature activation of the spliceosome.

Strikingly, we also revealed that the Jab1 domain of Prp8 is the main Brr2 cofactor that interacts with Brr2NC and modulates its helicase activity. This Prp8 domain is of medical interest, as several mutations in its C-terminal tail give rise to a form of RP (RP13). In recent experiments we have focused on uncovering the mechanism underlying regulation of Brr2 enzymatic activity by the Prp8 Jab1 domain
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**Sina Mozaffari Jovin** did his PhD under the supervision of Reinhard Lührmann at the Department of Cellular Biochemistry, Max Planck Institute for Biophysical Chemistry. The defense of his doctoral thesis is in February 2013.

These results were published in Genes Dev, 2012, 26:2422-34 and in PNAS, 2012,109:17418-23.

Schwarzer D, Zimmermann B, Fischle W, Zweckstetter M (2012) Methylation of lysine 9 in histone H3 directs alternative modes of highly dynamic interaction of heterochromatin protein hHP1 beta with the nucleosome. J Biol Chem 287(40):33756-33765

**Nikolov M**, Schmidt C, Urlaub H (2012) Quantitative mass spectrometry-based proteomics: an overview. Methods Mol Biol 893:85-100

**Peradziryi H**, Tolwinski N, Borchers A (2012) The many roles of PTK7: A versatile regulator of cell-cell communication. 524(1):71-76

**Petroi D**, Popova B, Taheri-Talesh N, Irniger S, Shahpasandzadeh H, Zweckstetter M, Outeiro T, Braus G (2012) Aggregate clearance of alpha-synuclein in *Saccharomyces cerevisiae* depends more on autophagosome and vacuole function than on the proteasome. J Biol Chem 287(33):27567-27579

Poulopoulos A, **Soykan T**, Tuffy L, Hammer M, Varoqueaux F, Brose N (2012) Homodimerization and isoform-specific heterodimerization of neuroligins. Biochem J 446:321-330

Rasche N, **Dybkov O**, Schmitzova J, **Akyildiz B**, Fabrizio P, Luehrmann R (2012) Cwc2 and its human homologue RBM22 promote an active conformation of the spliceosome catalytic centre. EMBO J 31(6):1591-1604

# *C. elegans* and its role in neuroscience

## A neuronal RAB GAP regulating dense core vesicle maturation in *Caenorhabditis elegans*

The nematode *C. elegans* was introduced in 1963 by Sydney Brenner as a new multicellular model organism particularly for neurobiological studies. Due to its small size (1 mm) it can easily be cultivated and its short reproductive cycle (3 days) allows elaborate genetic manipulations. The *C. elegans* genome is very compact and was the first multicellular organism to be sequenced (see www.wormbase.org).

*C. elegans* is completely transparent at all developmental stages facilitating the microscopic study of cells and processes in a living animal. Due to its hermaphroditic reproduction, *C. elegans* mutants can easily be generated and maintained, which would be lethal in other model organisms. Particularly, mutations in the nervous system or muscle lead to severe locomotion defects or paralysis, phenotypes which can be used to screen for new genes required for neuronal function. Accordingly, *rab-2* mutant worms were selected by their slow and uncoordinated locomotion. In our lab we could demonstrate

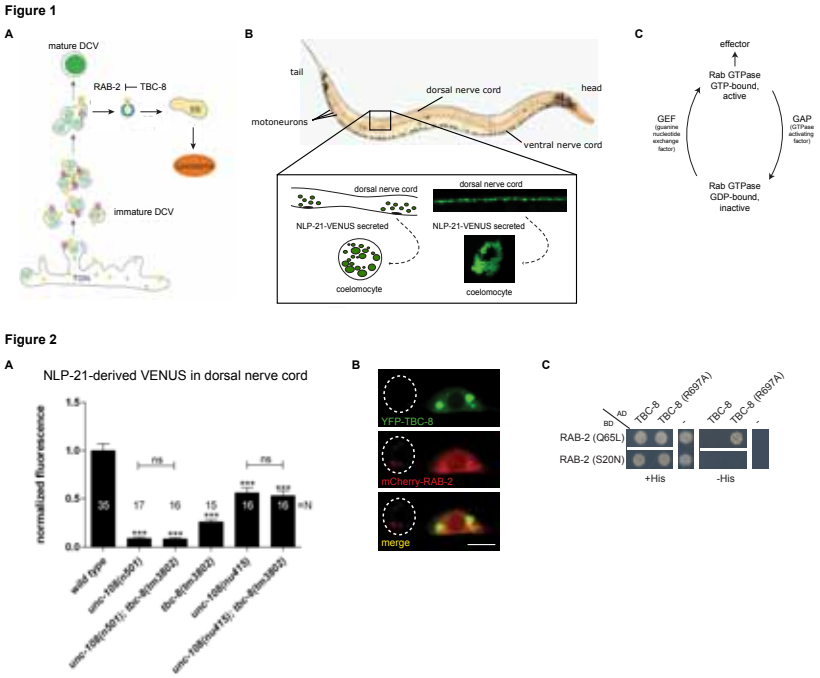



Fig. 1: (A) DCV maturation is a multi-step process. (B) Rab GTPases cycle between active and inactive states regulated by GEF and GAP proteins. (C) Neuropeptide-NLP-21-VENUS assay to detect DCV trafficking and secretion defects. Labeled DCVs are transported to the DNC where VENUS is secreted into the body cavity and taken up by coelomocytes. Fig. 2: (A) TBC-8 is involved in the same pathway as RAB-2 (=UNC-108). (B) When TBC-8 is overexpressed in neuronal cell bodies, RAB-2 is redistributed to the cytosol (right). (C) Constitutively active RAB-2 (Q65L) interacted with the catalytically inactive form of TBC-8(R697A) but not with wild type TBC-8 in a yeast-two hybrid system.

Reinhold R, Krueger V, Meinecke M, **Schulz C**, Schmidt B, Grunau S, Guiard B, Wiedemann N, van der Laan M, Wagner R, Rehling P, Dudek J (2012) The channel-forming Sym1 protein is transported by the TIM23 complex in a presequence-independent manner. Mol Cell Biol 32(24):5009-5021

Sabo T, **Carneiro M**, Koharudin L, Ban D, Mazur A, Griesinger C, Gronenborn A, Lee D (2012) N-glycan recognition by the cyanobacterial *Oscillatoria aghardii* lectin. Protein Sci 21

**Saka S**, Rizzoli S (2012) Super-resolution imaging prompts re-thinking of cell biology mechanisms. BioEssays 34(5):386-395

Santos KF, **Mozaffari Jovin S**, Weber G, Pena V, Lührmann R, Wahl MC (2012) Structural basis for functional cooperation between tandem helicase cassettes in Brr2-mediated remodeling of the spliceosome. Proc Natl Acad Sci USA 109:17418-23

Sasidharan N, Sumakovic M, **Hannemann M**, Hegermann J, Liewald J, Olendrowitz C, Koenig S, Grant B, Rizzoli S, Gottschalk A, Eimer S (2012) RAB-5 and RAB-10 cooperate to regulate neuropeptide release in *Caenorhabditis elegans*. Proc Natl Acad Sci USA 109(46):18944-18949

Schulz S, Chachami G, **Kozaczkiewicz L**, Winter U, Stankovic-Valentin N, Haas P, Hofmann K, Urlaub H, Ovaa H, Wittbrodt J, Meulmeester E, Melchior F (2012) Ubiquitin-specific protease-like 1 (USPL1) is a SUMO isopeptidase with essential, non-catalytic functions. EMBO Rep 13(10):930-938

that RAB-2 has an impact on synaptic activity in *C. elegans*.

Synaptic transmission is mainly mediated by the triggered release of neurotransmitters from synaptic vesicles (SVs). However, to regulate synaptic transmission and neuronal activity, neurons also release neuropeptides from dense core vesicles (DCVs). While SVs can be recycled, DCVs have to be newly synthesized in the neuronal cell body after release. The formation of new DCVs requires a multi-step maturation process (Fig. 1A). During this maturation, the neuropeptides are processed into their active form and factors that would disturb DCV release are removed. Only properly matured DCVs are able to undergo efficient release at synapses after stimulation.

By utilizing fluorescently labeled DCVs (Fig. 1B) through a fusion of neuropeptide NLP-21 with the yellow fluorescent protein (VENUS), we could show that RAB-2 is involved in the retention of soluble cargo in DCVs during the maturation process. RAB-2 belongs to the family of small GTPases that act as molecular switches. Rab GTPases cycle between an active, GTP-bound and an inactive, GDP-bound state (Fig. 1C). To further characterize RAB-2 and its function in DCV maturation, we performed a screen for molecules that regulate RAB-2 activity, such as GTPase activating proteins (GAPs). GAPs facilitate the hydrolysis of GTP to GDP leading to the inactivation of GTPases (Fig. 1C).

During this screen we identified the RAB GAP, TBC-8. Although, we were unable to perform an *in vitro* GAP assay to show activity of TBC-8 towards RAB-2, we demonstrated that TBC-8 might act as a RAB-2 specific GAP *in vivo* (Fig. 2): First, the analysis of the double mutants of *tbc-8* and *rab-2* revealed that both proteins are involved in the same pathway. Second, in a yeast two-hybrid system, the GTP-bound form of RAB-2 specifically interacted with the catalytically inactive form of TBC-8(R697A). Third, TBC-8 influenced the membrane localization of its binding partner RAB-2 when over-expressed in neurons. All these findings strongly indicate that TBC-8 functions as an active Rab GAP during RAB-2 dependent DCV maturation in *C. elegans* motoneurons.

Our results show that DCV maturation is a highly regulated process to guarantee properly matured DCVs required for synaptic activity.

**Mandy Hannemann** did her PhD with Stefan Eimer at the European Neuroscience Institute Göttingen. She graduated from the Molecular Biology program in April 2012 and will start her postdoctoral position at the Technical University Munich in February 2013.

These results were published in PLoS Genet, 2012, 8(5):e1002722.

**Shchebet A**, **Karpiuk O**, Kremmer E, Eick D, Johnsen S (2012) Phosphorylation by cyclin-dependent kinase-9 controls ubiquitin-conjugating enzyme-2A function. Cell Cycle 11(11):2122-2127

Simons M, Snaidero N, **Aggarwal S** (2012) Cell polarity in myelinating glia: From membrane flow to diffusion barriers. Biochim Biophys Acta 1821(8):1146-1153

Tirard M, Hsiao H, **Nikolov M**, Urlaub H, Melchior F, Brose N (2012) *In vivo* localization and identification of SUMOylated proteins in the brain of His6-HA-SUMO1 knock-in mice. Proc Natl Acad Sci USA 109(51):21122-7

Tischbirek C, Wenzel E, Zheng F, Huth T, Amato D, Trapp S, **Denker A**, Welzel O, Lueke K, Svetlitchny A, Rauh M, Deusser J, Schwab A, Rizzoli S, Henkel A, Mueller C, Alzheimer C, Kornhuber J, Groemer T (2012) Use-dependent inhibition of synaptic transmission by the secretion of intravesicularly accumulated antipsychotic drugs. Neuron 74(5):830-844

**Werner A**, Disanza A, Reifenberger N, Habeck G, Becker J, Calabrese M, Urlaub H, Lorenz H, Schulman B, Scita G, Melchior F (2013) SCF(Fbxw5) mediates transient degradation of actin remodeller Eps8 to allow proper mitotic progression. Nat Cell Biol, Jan 13 [Epub ahead of print]

Xu H, **Kardash E**, Chen S, Raz E, Lin F (2012) G beta gamma signaling controls the polarization of zebrafish primordial germ cells by regulating Rac activity. Development 139(1):57-62

# New Students

# Master's class 2012/13

**Toni Bäumler**, Germany
BSc from Friedrich Schiller University of Jena

**Nora Cascante Estepa**, Spain
MSc from Autonomous University of Madrid (UAM)

**Aleksandar Chernev**, Bulgaria
BSc from Sofia University "St. Kliment Ohridski"

**Constantin Cretu**, Moldova
MSc from Moldova State University

**Stefan-Sebastian David**, Romania
BSc from Jacobs University Bremen, Germany

**Anne-Sophie Ernst**, Germany
BSc from Georg-August-Universität Göttingen

**Shrutee Jakhanwal**, India
MSc from University of Delhi

**Tahere Kalantary Dehaghi**, Iran
BSc from University of Tehran

**Mohammad Karami Nejad Ranjbar**, Iran, BSc from University of Tehran

**Goran Kokic**, Croatia
BSc from University of Zagreb

**Stefanie Krinner**, Germany
BSc from LMU Munich

**Gustavo Nicolás Lemus Díaz**, Colombia, MD from Universidad Nacional de Colombia

**Manuel Maidorn**, Germany
BSc from Free University of Berlin

**Nataliia Naumenko**, Ukraine
BSc from Taras Shevchenko National University of Kiev

**Navaneethan Palanysamy**, India
MMedSci from Uppsala University, Sweden

**Alexander Schendzielorz**, Germany
BSc from Georg-August-Universität Göttingen

**Susanne Schlick**, Germany
BSc from University of Jyväskylä, Finland

**Daryna Tarasenko**, Ukraine
BSc from Taras Shevchenko National University of Kiev

**Ahmed Warda**, Egypt
BSc from The German University in Cairo

**Oleksandr Yagensky**, Ukraine
BSc from Jagiellonian University in Krakow, Poland

## Applications 2012

In the year 2012, the Molecular Biology program received 532 applications from 68 countries.

Germany 37
other Western Europe 12
Eastern Europe 43
North America 21
Central/South America 17
North Africa 44
Central/South Africa 49
Asia, Near East 38
Asia, Far East 270
Australia 1

# PhD projects started in 2012

**Irena Andreeva**
Ribosome dynamics during translation in bacteria.
*M. Rodnina, H. Neumann, H. Stark*

**Kolja Eckermann**
Genetic engineering of a killing-sperm system to improve the sterile insect technique. *E. Wimmer, A. Wodarz, R. Dosch*

**Bernard Freytag**
Functional and structural characterization of importin complexes with polycationic cargoes.
*D. Görlich, C. Griesinger, D. Doenecke*

**Christoffer Hitzing**
Mechanisms and functions of B cell receptor-intrinsic co-stimulation in class-switched B cells.
*J. Wienands, L. Walter, A. Wodarz*

**Dragomir Milovanovic**
Nanoscale organisation and dynamics of neuronal membranes.
*R. Jahn, S. Hell, A. Janshoff*

**Lena Musiol**
Handling of liver-specific tail-anchored and short secretory proteins by the mammalian Get pathway.
*B. Schwappach, A. Janshoff, R. Jahn*

**Tino Pleiner**
Structural and functional characterization of engineered nuclear pore complexes. *D. Görlich, P. Rehling, R. Lührmann*

**Michael Ratz**
Novel labelling strategies for nanoscopic imaging of living cells. *S. Jakobs, P. Rehling, S. Hell*

**Katja Rust**
Analysis and characterization of potential Bazooka interactors in *Drosophila* stem cells. *A. Wodarz, T. Pieler, H. Shcherbata*

**Evgeniia Samoiliuk**
The role for microRNAs in *Drosophila* muscular dystrophies.
*H. Shcherbata, R. Schuh, T. Pieler*

**Heena Sharma**
Ribosome dynamics during tRNA translocation.
*M. Rodnina, K. Tittmann, H. Stark*

**Avani Shukla**
Structural and functional determinants for alterations in synapses in mouse models of human diseases such as Rett syndrome. *O. Schlüter, T. Moser, S. Rizzoli*

**Anita Smarandache**
Functional analysis of vegetally localizing and PGC specific mRNAs in *Xenopus laevis* germ cell development.
*T. Pieler, H. Shcherbata, M. Kessel*

**Sven Truckenbrodt**
Long-term temporal dynamics of synaptic boutons.
*S. Rizzoli, R. Jahn, B. Schwappach*

**Agata Witkowska**
Regulation of presynaptic protein-protein interactions. *R. Jahn, A. Janshoff, S. Jakobs*

**Olena Zaitseva**
Analysis of transcription regulation of KiR genes.
*L. Walter, J. Stülke, M. Dobbelstein*

## External MSc project

**Sumana Sharma**
*Plasmodium falciparum* erythrocyte invasion: Screening for novel parasite-erythrocyte receptor-ligand interactions; supervised by *Julian Rayner*, Wellcome Trust Sanger Institute, Cambridge, United Kingdom

# The Masters of 2012

**Irena Andreeva**
(*Marina Rodnina*)
Real-time monitoring of translation initiation upon polysome formation *in vitro*.

**Victor Bustos Parra**
(*Linda Partridge*, MPI for Biology of Ageing, Cologne, Germany)
Analysis of the role of DNA binding and acetylation status in dFOXO activity.

**Marta Carneiro**
(*Christian Griesinger*)
N-glycan recognition mechanism of the cyanobacterial *Oscillatoria agharddii* agglutinin.

**Bernard Freytag**
(*Matthias Dobbelstein*)
Significance of MicroRNA-449 for the differentiation of mucociliary epithelium.

**Christoffer Hitzing**
(*Jürgen Wienands*)
Signal integration by the adapter proteins Dok1 and Nck in activated B cells.

**Paola Kuri**
(*Francesca Peri*, EMBL, Heidelberg, Germany)
Towards finding novel find-me signals in microglia-neuron communication.

**Sona Pirkuliyeva**
(*Jürgen Wienands*)
The role of C type lectin 17 A in B cell antigen receptor signaling.

**Tino Pleiner**
(*Dirk Görlich*)
Engineering nuclear pore complexes with synthetic FG nucleoporin anchor points.

**Michael Ratz**
(*Dirk Görlich*)
Characterization of nucleoporin-specific viral proteases.

**Ines Rudolf**
(*Angelika Eggert*, Universitätskinderklinik, Essen, Germany)
The role of TrkA expression in checkpoint activation and DNA double strand break repair in neuroblastoma cells.

**Avani Shukla**
(*Nils Brose*)
Functional analysis of the cell adhesion molecule IgSF11 in primary neuron culture.

**Ingrid-Cristiana Vreja**
(*Silvio Rizzoli*)
Testing the potential role of superabundant SNARE molecules in the plasma membrane.

# The Doctors of 2012

**Shweta Aggarwal**
Molecular mechanisms of lipid-rich myelin membrane sheet formation.
*Mikael Simons, Peter Rehling, Dirk Görlich*

**Alwaleed Alkhaja**
The identification and characterization of Mio10 and MINOS1 as novel regulators of mitochondrial inner membrane organization.
*Peter Rehling, Reinhard Jahn, Markus Zweckstetter*

**Mandy Hannemann**
Dense-core vesicle maturation at the Golgi-endosomal interface in *Caenorhabditis elegans*.
*Stefan Eimer, Reinhard Jahn, Nils Brose*

**Chandini Kadian**
Identification of nuclear export signals and structural analysis of nuclear transport complexes.
*Dirk Görlich, Marina Rodnina, Ralf Ficner*

**Oleksandra Karpiuk**
*The role of H2B monoubiquitination in cellular differentiation.*
*Steven Johnsen, Halyna Shcherbata, Heidi Hahn*

**Frederik Köpper**
The kinase MK2 in DNA replication upon genotoxic stress and chemotherapy. *Matthias Dobbelstein, Jürgen Wienands, Michael Kessel*

**Karen Linnemannstöns**
The transmembrane receptors Otk and Otk2 function redundantly in *Drosophila* Wnt signal transduction.
*Andreas Wodarz, Annette Borchers, Reinhard Schuh*
thesis submitted: Dec 2012
thesis defense: Jan 2013

**Oleksandr Lytovchenko**
Structural and functional analysis of the mitochondrial presequence translocase.
*Peter Rehling, Holger Stark, Dirk Fasshauer*

**Sina Mozaffari Jovin**
Mechanism of regulation of spliceosome activation by Brr2 and Prp8 and links to retinal disease.
*Reinhard Lührmann, Ralf Ficner, Reinhard Jahn*
thesis submitted: Dec 2012
thesis defense: Feb 2013

**Miroslav Nikolov**
Systematic analysis of the interactome of modified chromatin.
*Henning Urlaub, Peter Rehling, Dirk Görlich*

**Doris Petroi**
α-Synuclein in *Saccaromyces cerevisiae*: model for aggregate clearance, cell survival and influence of autophagy.
*Gerhard Braus, Michael Thumm, Stefanie Pöggeler*

**Volkan Sakin**
Sumoylation of nuclear transport receptors and the small GTPase Ran.
*Frauke Melchior, Nils Brose, Gerhard Braus*

**Hermann Broder Schmidt**
Evolutionary conserved features of FG repeats that allow the formation of hydrogel-based permeability barriers with NPC-like properties.
*Dirk Görlich, Peter Rehling, Helmut Grubmüller*

# London calling – for Göttingen graduates!

After finishing our PhD in cosy Göttingen, with a surprise we found ourselves moving to the biggest city in Europe (although they wouldn't agree with the *belonging to Europe* part) – London! However, we would like to warn any brave person who intends to follow this trend about some possible hazards of this process. For example, pick a time for your move when locals have not decided to burn the shops in the neighbourhood and pick up an occasional flat screen TV for free – also known as the London Riots of 2011. Thanks to the omnipresent CCTV (Polizeistaat! some in Germany would shout), many unexpected owners of stolen goods were found quite soon. Luckily it all picked up from there, and the riots didn't turn out to be an annual activity. We have to point out here that in contrast the average English person is very polite to a level of apologizing to people that bump into THEM, and occasionally thank you for the chance to hold a door open for you.

Visitors from Göttingen (Ieva Gailite: left; Martina Wirth: right)

Our actual purpose for moving to London was not an anthropological study of English habits, but to do a postdoc in one of the best London research institutes – which happens to be named just like that - the Cancer Research UK London Research Institute. Being spoiled by the great research environment in Göttingen, we found ourselves unable to settle for anything but the best. An in-house facility for mini preps, microscopy and sequencing was enough to melt our hearts, although there is still room for improvement – maxi preps are also quite boring to do! The institute has a great postdoc program, too, providing the usually forgotten postdocs with retreats, career seminars and transferable skills courses among other things. Cancer Research UK is a charity-run establishment, and sometimes works rather like a company than an academic institution. Lots of effort is put into communicating the research to the public and into outreach activities.

London was a big change from our Göttingen routine – after the first shock of sky-high rents for even tiny flats with a carpet in the bathroom (an English specialty next to the separate water taps for hot and cold water) and the realization that Göttingen English does not equal British English, we found ourselves in the middle of great events. Olympics 2012 came and went, providing entertainment for days, and failed to provide the great traffic catastrophe that Londoners feared. Many Londoners decided to escape the city during that time so that the tube (underground) became bearable, including a guaranteed seat in the morning – a luxury not often granted. A short respite from being squeezed against the armpit of your fellow traveller every morning on the way to work was very welcome.

Everyday fun in London in the scarce time after work is easy to organize – there is the obligatory Friday pub, when all colleagues go for a pint. Eating before the pub is considered cheating and frowned upon. While drinking the flat English beer (called ale and actually becoming quite tasty after a short acclimatization period) one can admire scantily dressed English girls and boys on their way to clubs. A proper English youth ignores weather conditions, and rain and cold can't stop them from going out wearing only T-shirts and minimal dresses.

London is also a great place for weekend markets of food and handmade things, concerts and art exhibitions. London offers a chance to sample de-

Tower Bridge decorated with the Olympic Rings (which could be folded up when ships sailed through)

licious food from all over the world, and one can find even German bread and go to a German Christmas market when homesickness strikes hard. There are still things we miss from Göttingen, like a possibility to pop on your bike and be at your target in ten minutes, meeting your friends spontaneously, and going to a restaurant without a reservation or queuing outside – a beloved activity in London. The longer the queue, the better the restaurant, according to local "wisdom". However, sentimentality aside, London is fun, and if you want to work hard and party, eat and shop hard, London is the right place for you!

Supporters of Team GB - British love their Union Jack

**Ieva Gailite** did her PhD with Andreas Wodarz at the Department of Stem Cell Biology, GZMB, University of Göttingen Medical Center. She graduated in May 2010 and is presently working as a postdoctoral research fellow at the Cancer Research UK London Research Institute in the Apoptosis and Profileration Control Laboratory (Nicolas Tapon Group).

**Martina Wirth** did her PhD with Wolfgang Fischle in the Chromatin Biochemistry Group at the Max Planck Institute for Biophysical Chemistry. She graduated in November 2010 and is presently working as a postdoctoral research fellow at the Cancer Research UK London Research Institute in the Secretory Pathways Laboratory (Sharon Tooze Group).

# Suddenly at the cutting edge

After graduating from the MolBio program in 2006, I started a postdoc at the University of Chicago. On the plus side: the paycheck was higher, I lived in a nice neighborhood in Hyde Park three blocks south of a relatively unknown Illinois senator, and it was a sunny and extremely humid summer to enjoy the city. But at the bench? I was trying to establish transgenic scuttle flies and failed spectacularly – not quite the start I had hoped for, and a good moment to let go of remote hopes I might have had left about an academic career.

Luckily, a few other experiments eventually were more successful and allowed me to publish two stories on the evolution of embryonic patterning in flies. I liked writing these papers, and I continued to like the science at the bench, so I started to think again about the "what's next". While I was still contemplating about a second postdoc, I was attending a seminar by Philipp Keller in 2009. As PhD student in the labs of Jochen Wittbrodt and Ernst Stelzer at EMBL he had developed a digital scanned laser light sheet fluorescence microscope (DSLM) that allowed him to record time lapse movies of entire fish or fly embryos with a resolution that was good enough to generate a digitalized atlas of development at the cellular level.

When working with my different fly species, I had noticed several morphological differences during early embryonic development, and I had been fantasizing about possibilities to compare embryonic morphogenesis between different species at the cellular and subcellular level. With *Drosophila* as genetically dissected reference system, I thought that comparing different flies might be a fun approach to explore the molecular basis for the evolution of novel form in general. Now here it was, a method I had just been waiting for (DSLM), a place with all necessary infrastructure (Heidelberg), and just one caveat: this project was not on the postdoc scale anymore.

Steffen Lemke

Feedback from Urs, my thesis advisory committee, Jochen in Heidelberg and others encouraged me to write a grant proposal that would allow me to start up my own group. Writing this proposal was a lot of fun: at times it literally felt like an enterprise into unchartered territory, which for sure was an instructive and intense experience. After the DFG had decided to fund the project, we moved from Chicago to Heidelberg in spring 2011 (son and pregnant mum included), and while we certainly experienced some sort of reverse culture shock, the bigger impact on me probably had a slowly growing realization of what it actually means to "set up a lab".

"The lab", that was a room and an office, benches, a hood, fridges and some centrifuges. No incubators for the flies, no CO2 or injection setup, no computers, pipettes, enzymes, and of course, neither PhD students nor a technician. The first year was learning by doing almost every day: how to pay bills and manage a budget, how to organize seminars, lectures and practicals, how to design questions for written tests and take part in TACs and PhD exams. Actual science started again after about six months with a technician and two PhD students, and we still have gel pictures with nothing but beautiful 1kb DNA ladders as reminders of these beginnings in all of our lab books.

I feel incredibly lucky to be working at the Centre for Organismal Studies in Heidelberg, which provides a very collaborative environment where senior PIs and the director take exceptional care of us junior groups. And still there are days where life in the lab reminds me a bit of this snowboard class I was taking recently: you have this grand vision of elegantly surfing downhill, but in fact you are extremely happy for the few moments you barely keep your balance before embracing the snow again. It is fun, it is exciting and cutting edge, and I would not want to do anything else on earth: it is just slightly different from what I had imagined.

**Steffen Lemke** was among the first students of the Molecular Biology program. He completed his PhD with Urs Schmidt-Ott in 2006 and continued his postdoctoral research at the University of Chicago. In 2011 he has been awarded an Emmy Noether Fellowship by the DFG and is now heading his own research group at the Centre for Organismal Studies Heidelberg.

# Life of a scientist in Boston

My name is Gizem Dönmez and I am an Assistant Professor at Tufts University School of Medicine, Department of Neuroscience in Boston, USA. I am one of the first 20 students of the International Molecular Biology MSc/PhD Program in Göttingen. After completing my PhD in Reinhard Lührmann's lab at Max Planck Institute for Biophysical Chemistry in 2007, I started my postdoctoral research at MIT in Boston. Since October 2011, I have my own laboratory at Tufts University in Boston.

Having a PI position in USA is quite competitive: hundreds of postdocs (at many places close to 500) compete for one position. After obtaining the position, an assistant professor spends the first year setting up his/her lab, starts doing research, writes grants and tries to publish. It is not easy, but if you love science, this is the best thing to do. You are independent and you can do whatever research you want.

I am in a great department surrounded by wonderful colleagues. In my own lab, I have two postdoctoral fellows, one PhD student and two undergraduate students. I take part in teaching two courses for PhD students.

My lab works on brain aging and neurodegenerative diseases such as Alzheimer's and Parkinson's Diseases. We study these disorders from the perspective of sirtuins, which are age-associated protein deacetylases. They are stress response enzymes that show effects when organisms are under stress conditions. We study their roles in the brain. We are also interested in heat shock mechanism and protein aggregation in aging mammalian brain.

My time spent in Göttingen and in the Molecular Biology program helped my development as a scientist tremendously. I obtained my bachelor's degree in Molecular Biology and Genetics from Middle East Technical University (METU) in Turkey. A few months later, I arrived in Göttingen starting as a student in the program. I gained most of my research experience in the program by rotating in different labs and also having different lab courses.

Gizem Dönmez in her office at Tufts University School of Medicine

The International Molecular Biology program is not only important for me scientifically but also special for me personally. It is in this program that I had met my life partner, Abdullah Yalcin who was my classmate. He did his PhD with Thomas Tuschl. We got married in 2004 when we were PhD students and moved to the USA together. He is a researcher at Harvard University in Boston.

I would recommend Boston for students who are planning their future career. It is a lovely city and a hub for scientists. Although we love Boston, we miss our little Göttingen, especially at this time of the year (December), with its colorful Christmas market and delicious Glühwein …

**Gizem Dönmez** belonged to the first cohort of students in the Molecular Biology program. She did her PhD with Reinhard Lührmann at the Max Planck Institute for Biophyical Chemistry. After her graduation in 2007 she started her postdoctoral research at the MIT. Since October 2011, she has her own laboratory as an assistant professor at Tufts University School of Medicine, Department of Neuroscience, Boston.

# A 1-billion € scientific instrument in Hamburg

"This was the last western-blot in my life!" - I promised my molbio-fellows in winter 2006, and kept my word since then. Wet-lab just wasn't for me, I always felt more comfortable in a seated position, left-hand equipped with a hot filtered-coffee, right-hand on a keyboard.

In this position I was enjoying the time with Holger Stark (my PhD supervisor) where I was developing software for cryo-electron microscopy. Same position but different location, I am still enjoying designing software – however now for controlling the European X-ray free-electron laser (XFEL) that is currently constructed in Hamburg.

From a molecular biologists point of view the European XFEL will be an instrument for (time-resolved) structure determination. Our vision: scientists bring a sample of their liking, inject it into the laser, and have a 3D atomic resolution structure (or even a movie of a reaction) some minutes later.

Montage of the main building with the underground experiment hall. (Copyright European XFEL GmbH)

As you can read I am actually not that far away from what I studied in Göttingen and indeed my knowledge helps me to understand my most important customers: the scientists going to visit the European XFEL facility in the future.

Apart from the vision, my day typically starts by trying to remember where I parked my car yesterday and hoping not to find any suspicious tickets under my wipers. Even with an above-postdoc salary a basement garage in Hamburg-Eppendorf is not an option for me (costs almost as much as my whole flat in Göttingen back then). Finally at work about 20 people in the group are greeting me with a good morning but sometimes I hear it in 12 different languages.

I am glad to have my own office which, on packed days, I see only twice for putting and getting my jacket because I am hopping from one meeting or phone conference to the next. Many people are involved in this huge project and many people are somewhat related to its software system. I am trying to talk to all of them and coordinate requirements and developments. On good days, however, I have time to implement important concepts myself in the preferred seated position described above.

The difference to the good old PhD times is the responsibility you feel: the European Union invests a billion euros into a company consisting of 250 employees in total (currently we are approximately 140). In 2016 there must be an instrument constructed and running which produces extraordinary results - not only on the electricity bill.

Burkhard Heisen

Career and work is one thing, a nice flat in a nice district and an intact social life the other one. My current job is the result of optimizing the latter. After my PhD and nine years of a distance relationship, my girlfriend and I first decided for the city, both successfully searched for a job and, thanks to a good portion of luck, found a cosy flat, which we enjoy together.

**Burkhard Heisen** did his PhD under the supervision of Holger Stark in the 3D Cryo-Electron Microscopy Group at the Max Planck Institute for Biological Chemistry. He graduated from the Molecular Biology program in September 2009. Currently, he is holding a permanent staff position at the European XFEL GmbH in Hamburg. He is a chief-software architect of the XFEL control and data analysis system.

# Things we are doing make sense

At some point during the PhD everybody realizes that, although it feels endless, this period of life would probably not last forever. Besides the many disadvantages one has to suffer from – among the positive aspects is that you don't really need to care much about what is going to happen next. There are always more experiments to be done and each answer raises at least 10 new questions. So what are we all striving for during that time?

During the PhD, I met my wife and our first daughter Leonora was born. With family comes responsibility… As we all know, things tend to go from bad to worse if left on their own, therefore I spent considerable time thinking about my future plans and came to the conclusion that my mind-set and definition of success probably aligns better with the industry path.

To test this, I applied for several industry positions during the last half year of my thesis work. Good news: all it takes as a door-opener is a really good resume. It turned out that people in industry actually like the idea of inviting us IMPRS elite students, so I got to see several different companies from 3 to 120,000 employees. The more interviews I had, the happier I became with my decision pro industry. I finally chose the 120,000 offer and signed a contract with Pfizer as a research scientist.

At a first glance, doing a post-doc and finding a tenure-track position in academia would have been the most obvious path – this is how your PI got where he is now, right? So why did I choose the industry career? The way up can be a lot faster, there are fairly clear success criteria, and everything you do follows a precise plan – everything you do has to generate revenues at some point. Being regarded as a hard working scientist does not imply long working hours. Actually the opposite is true. At Pfizer, there are 8 working hours a day. People that need more time to finish their work are considered ineffective.

Adrian Schomburg and his team at Proteros

In industry, your organization has to like your plans and support you. Otherwise, they make you stop. And this is what happened to me next. At Pfizer, I had a little project on my own and things were going well and peacefully. Ignoring that, Pfizer decided to close down all European research facilities, probably to overcome the income-drop from the expiring Viagra patent that saved so many marriages, as well as my job. So my project, although interesting and successful, was terminated, together with my contract. But Pfizer was generous and there was a 5 month grace period at full salary and they also helped with the job search.

I started applying for industry positions again, now more focused than after the PhD, and with the clear goal of having technicians in my next job. It turned out that I found a really nice group leader position at Proteros, a ~100 people pharma/biotech company in Munich. My group of five great technicians now works on several different projects. Some projects are working nicely and some are painful, but on average it is a lot of fun and I have the pleasing feeling that the things we are doing make a lot of sense. We are collaborating with great academic research labs. Conferences, talks, or publications are welcome and supported, so that the distance to academia feels shorter.

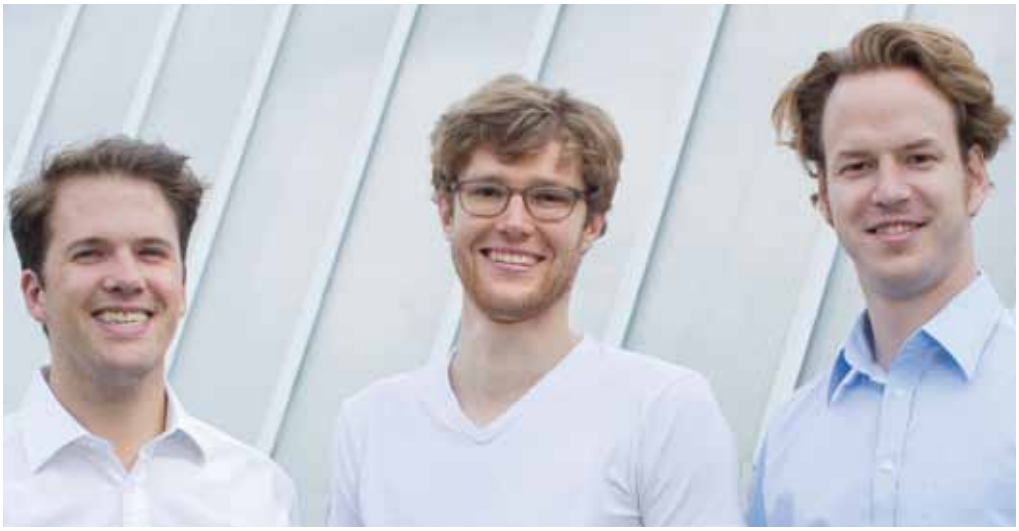
As far as work-life balance is concerned: My second daughter Verena was born here. The Munich area has a lot to offer to distract you from work. Germany's top 5 lakes are within 30 min, the Alps 45 min, and everybody accepts that a day off during Oktoberfest or after heavy snowfall in the mountains is a must. I am happy, and if anyone of you is full of loopholes on the future plans, feel free to contact me.

**Adrian Schomburg**
did his PhD in the Chromatin Biochemistry Group of Wolfgang Fischle. He graduated from the Molecular Biology program in November 2010. Currently, he works as a group leader at Proteros in Munich, Germany.

# labfolder: from science to entrepreneurship

Founding a company to improve the way research is done – by Florian Hauer

With the amount of biological knowledge growing, so is the availability of data: Online databases of papers, patents, structures, pathways, diseases and many other biological data categories can be accessed online – with one exception: There is no source of structured protocol data which can be easily used to optimize your own experiments. Instead, methodological knowledge is often not published, and mostly remains buried forever in lab notebooks.



The labfolder team Simon Bungers, Mathias Schäffner, and Florian Hauer (from left to right)

Because of an enormous potential in the ways methodological knowledge is handled is lying dormant, my colleague and friend Simon Bungers from the Max Planck Institute for Experimental Medicine and I decided that it was time to do something about it. What we envisaged was a database in which you could easily find whether somebody has done something similar to your work before and then get suggestions on how your own protocol should be altered for a higher chance of success.

Thus, we decided to start up a company to make or idea real, and labfolder was born. In search of a brilliant programmer to realize labfolder together with us, we found Mathias Schäffner, who had just sold his first start-up successfully and was eager to work on the next world-changing project. With Mathias living in Berlin already, and with the Free University of Berlin providing us assistance in the acquisition of funding, we decided that labfolder should happen in Berlin.

When designing the concept of labfolder, we figured that the easiest way to structure methodological data would be to capture the data at the source: at the level of entry into the lab notebook. So we decided to create our own digital lab notebook which is – unlike the others – attractive and simple to use.

In this digital lab notebook, protocols and experimental data can not only be entered in free form regardless of the data format, but labfolder will provide a toolbox in which any protocol can be built together with building blocks, like with Lego bricks. This does not only save time, but also allows to create flexible templates which can be reused easily for recurring protocols and have the capabilities of in-data calculations, like calculating molarities with changing volume, dilution series, master mixes and much more.

As a bonus, the utilization of common building blocks for the representation of protocols makes automated comparison and data mining possible. Instead of painfully reading notebooks piled up in your department, you can quickly find and compare all the protocols relevant for your own work.

As a scientist, becoming a self-employed entrepreneur can be quite a challenge: You have to do a lot of things you never thought you would have to do. Since it is relatively easy for scientists to acquire funding for start-ups, most of them are not prepared for doing all the representative and administrative tasks required if you suddenly have to run your own company: Developing an innovative software, convincing people of our idea on the phone,

during meetings and presentations, dealing with legal issues concerning lab documentations, handling a tight budget, and many more responsibilities.

With the preparation I got from the secondary skills courses and the experiences I had made already during the organization of the Horizons conference and while doing administrative work in the PhDnet, I was already quite well prepared – not only in terms of professional preparation, but also in terms of valuable contacts.

Help us to make labfolder even better: visit **www.labfolder.com** and register for free to try out labfolder. labfolder is free and will always be for individual scientists, whereas groups larger than three scientists can use additional data and protocol sharing functionalities for a monthly fee. labfolder releases its beta in February, and all of you are invited to register for free and give us your feedback and ideas: How do you want labfolder to be? What are the data challenges you are facing in the lab every day? Which tools would help you most in the lab every day? Let us know!

Contact us any time at fh@labfolder.net!

## Current profession and location of our PhD alumni

### Profession

**Academia / Research**
Professors, permanent staff positions: 6 %
Postdocs: 60 %
Science management, public relations: 2 %

**Private Enterprise**
Consulting: 4 %
R&D scientists, lab heads: 11 %
Management: 6 %
Patent attorneys: 2 %

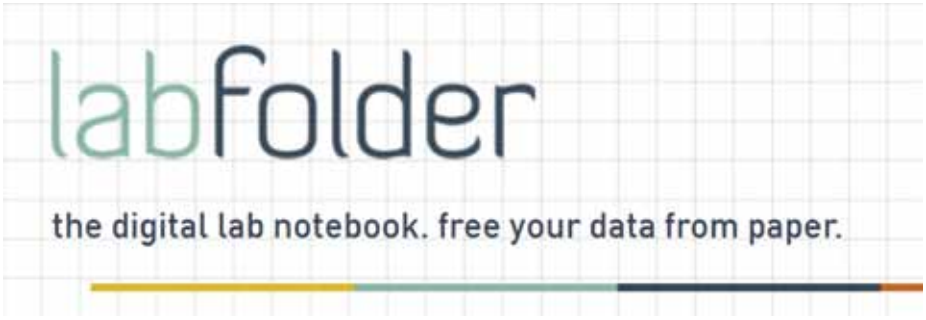
**Other**
e.g. family management, job applications: 9 %

### Country Distribution

**Europe**
Germany: 55 %
United Kingdom: 7 %
Switzerland: 6 %
Denmark: 2 %
Estonia: 1 %

**North America**
United States: 16 %
Canada: 6 %

**Asia / Australia**
Singapore: 3 %
Australia: 1 %
Bahrain: 1 %
India: 1 %
P. R. China: 1%




**Florian Hauer** did his PhD in the group of Holger Stark at the MPI for Biophysical Chemistry. He graduated from the Molecular Biology program in August 2009, wondering why so many biologists are still not exploiting the full potential of computers the every-day work of biosciences research. Seeing the necessities of general changes in data handling and information management, he co-founded *labfolder* to make the changes happen.

# The right time to have a baby ...

***A baby that depends on me, a thesis to finish and a career to plan… Quite a challenge altogether. Is it the right time to have a baby during the PhD?***

We were frequently asking the question to ourselves: When is good time to become parents? Then we realized that the ideal time for founding you own family simply doesn't exist. There is always a manuscript to finish, a grant to write or a project to finalize in an academic career path.

Neva Caliskan, her husband Kemal, and their daughter Alya

We noticed that handling a baby wouldn't be easier in the following years, when we seek a faculty position or are rising in a company. In the end we knew that at one point we wanted to have kids, therefore, we stopped planning the perfect timing for becoming parents and decided to experience it.

Parenting is like a second job. However, I saw very positive examples around that can handle both duties together. I met several female professors who have more than one child and young group leaders who were successfully continuing their careers while being pregnant or after having kids. The general impression I got was that children were not probably causing any big delay in the career path. In some cases it can even substantially increase productivity and efficiency at work.

When I have informed my boss about my pregnancy she was very supportive. Nevertheless, some changes had to be made. For example, my lab space was reorganized to avoid certain chemicals and radioactive material. I continued my work without problems until my maternal leave with the help of a technician when necessary. I should note that when I got pregnant, my experiments were mostly completed. Therefore I knew that I wouldn't jeopardize the completion of my PhD thesis.

I had quite a smooth pregnancy and birth and I think I was also lucky that our daughter Alya was very supportive. After the birth I have decided not to take a long break in my PhD. Therefore, when Alya was one month old I started working from home and after three months I was more often in the lab.

Of course, this wouldn't have been possible without the great support I received. Most important is my family. My husband is taking time off during the week when I need to complete some experiments. In addition, my mother came over for one month to help with baby-care so I could go to lab more often. Secondly, our PhD program and my hosting lab together supported me by funding a half-time technician for several months, which enabled me to continue my work to a certain extent. Moreover, the time of maternal leave was added to the PhD deadline which gave me more flexibility. I was also lucky to have a very supportive and understanding boss.

Apparently, it is not always so easy and not only fun. First of all, it is without any doubt a big challenge to become a mum while writing a thesis and preparing a manuscript. Thanks to the motherhood hormone oxytocin, I guess I will forget about all this after a year. I have to be very well organized to have some work done.

The real challenge is to switch between the mummy brain and the PhD student brain, which consumes a significant amount of time. During the first weeks after Alya was born, I closely observed the sleep schedule of the baby during the day. Then I organized my work in small pieces accordingly, so that I knew exactly what had to be done next. For example, it is possible to scan through a paper or quickly write an e-mail during the short pauses. Also, I have been more productive in the evenings when the baby slept longer. This helped me to estimate the productive working times and be more efficient.

Likewise, my lab work had to be well planned and organized, as I could go there only for a couple of hours at one time. Consequently, I had (and still have) to finish all the work within a fixed timeframe to be back home when Alya needs me. However, I have to admit that there are still some inefficient days despite very well planning ...

We believe for our careers it is more advantageous to handle the situation with a shorter parental leave. Yes, it is more challenging; one needs to plan better, organize better and work more efficient, which

Neva and Alya on the beach

I consider vital skills in life. In our case, everything seems to work just fine up to now.

To sum up, it is possible to handle parenting with careers in case you have a supportive environment to continue your work. For us the most challenging period is, as we hope, almost completed by now and it is getting easier and easier. I am sure there will be more challenges ahead but we are stronger and more efficient than before in dealing with them.

Despite all the challenges and concerns about the career, it gives us more pleasure than anything else to see the smiling face of Alya and watching her growing up. I now look forward to finishing my PhD but also to hear Alya's first words she will speak soon.

**Neva Caliskan** is presently a PhD student with Marina Rodnina in the Department of Physical Biochemistry at the Max Planck Institute for Biophysical Chemistry. In her PhD thesis she investigates programmed ribosomal frameshifting in bacteria. Her daughter Alya was born at the end of her third year of PhD studies.

# German-Turkish Workshop in Istanbul

With an estimated number of about 14 million citizens, Istanbul is one of the largest cities in the world. It has its quiet refuges though, one of them being Büyükada, one of the Princes islands. Horse-drawn carriages are still the only means of public transportation there. A good place for 50 scientists from Turkey and Germany to meet on the occasion of the German-Turkish Workshop on Molecular Neuroscience in September 2012.

The majority of the internationally mixed German delegation came from Göttingen, representing faculty members, current and former PhD students of the Molecular Biology and Neuroscience programs. The workshop marks the latest step in a series of meetings, initiated upon the foundation of the Turkish-German University in Istanbul a few years ago. A team of German and Turkish partner universities has formed to actively support and guide this initiative under the patronage of Dr. Rita Suessmuth, former President of the German Federal Parliament.

With the vision of establishing bilateral graduate programs and joining forces in doctoral education in the molecular life sciences and neurosciences, the Bogaziçi University in Istanbul and our graduate programs in Göttingen serve as the primary partner institutions for promoting scientific exchange.

The workshop comprised two days of invited lectures by the German and Turkish participants together with a poster session. In addition, funding opportunities for German-Turkish scientific projects were presented. The meeting concluded with a Bosphorus tour, certainly one, but by no means the only motivation to return to the beautiful city of Istanbul in the near future. StB

# Life Sciences Open Day at WIS

Every other year, the Feinberg Graduate School at the Weizmann Institute of Science in Rehovot, Israel invites members of our Molecular Biology and Neuroscience programs for their Life Sciences Open Day - a great opportunity to learn more about the top-notch science done there and discuss possibilities for research collaboration.

No surprise that more than 50 people signed up when we extended the invitation to our students and faculty. The twenty lucky ones who could join our delegation travelled to Israel in October 2012 for a four-day visit. Once again, our hosts spoiled us with a beautiful hotel on Tel Aviv beach, delicious meals in Old Jaffa and Abu Ghosh, and a guided tour through Jerusalem. Everyone appreciated this program and was grateful for the generous hospitality.

Of course, science was also discussed. By now, the cooperation between our programs and the Feinberg Graduate School builds on more than six years of mutual visits on the occasion of scientific meetings in Rehovot and Göttingen, external MSc thesis projects by our students at WIS, and other joint activities. After a warm welcome and a tour through the brand-new visitor's center, several members of our delegation used the first day on the Weizmann Campus to meet scientists they already collaborate with. In addition, our host took great care that all other members of our group had the opportunity for one-on-one meetings and lab visits with PhD students and senior scientists in their field or research.

On the Open Day itself, all life science groups of the Feinberg Graduate School presented their current research on posters: an unusual but pleasant experience for the guests from Germany to discuss science in October at an open-air poster session. Once again, the highlights of the biennial event also included keynote lectures by distinguished guest speakers.

To make sure that our group will never forget the wonderful visit of the Weizmann Campus, the day concluded with a life performance by the Batsheva Dance Company, followed by Jazz, Latin & Bossa Nova with wine & beer on the lawn. Many thanks again to our host for such a wonderful experience. We look forward to meeting many WIS students and senior scientists again this year in Göttingen on the occasion of the Horizons and Neurizons conferences organized by our students. StB

# Breaking the wall of long presentations

Fitting 100 talks into one day: personal impressions from the Falling Walls Lab meeting

***How long is your usual lab-progress presentation? Twenty minutes? Half an hour? Imagine you are limited to 3 minutes max. This is all the time you have for your introduction, methods and results altogether.***

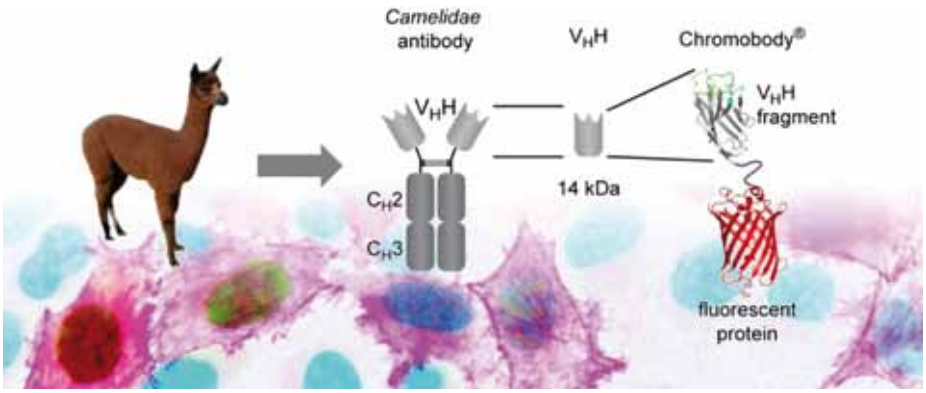

The Irish hat in a role of a Chromobody®. Nina's hat helps me to present our breakthrough in cellular screening at the Qualifying Lab in Munich.

To take this 3-minute challenge at the Falling Walls Lab meeting for young innovators, you even do not have to be a scientist, you "just" need to have a breakthrough idea in any area – from biology to business or even music. My talk was still related to science though: I presented a new approach for drug discovery to screen for future medications. Of course, these are to be cellular screens based on Chromobodies®, the unique llama mini-antibodies which we develop at ChromoTek GmbH.

To bring your idea to the stage, you have only 3 slides, one of which is a title slide starting with the words "Breaking the wall of…". This puzzled me before the Qualifying Labs: how on earth should one explain and impress within 180 seconds? Some 40 long minutes of confused cycling home from work helped me to get a winning idea: my so specific Chromobodies®-antibodies will be impersonalized by a crazy hat, which fits only those people/antigens you like and makes them visible for you! Now you see them, now you can trace them, live: switch on you microscope… Thanks to Nina McGuinness (our former MolBio program assistant) for this Irish Culture Night hat, that brought me a prize at the Qualifying Labs and led me to the final.

The Falling Walls Lab Final 2012 in Berlin was a kaleidoscope of a hundred of innovations, ranging from how to preserve cow excrements by adding sauerkraut juice into it (won the 1st prize) to how to save classical concerts from dying out! Besides the opportunity to hear out-of-box ideas, interact, party, stay in a nice hotel and win some Euros, the Falling Walls Lab provided unique extras. One had a chance to mingle with big shots and reporters, as the prominent jury was formed by the directors and presidents of renowned companies. You could talk to the organizers, the strategy consultants from ATKearney, and you were invited to the prestigious Falling Walls Conference (different from Labs) to learn about the latest revolutionary breakthroughs of our society.

A nice extra was that you meet MolBios everywhere – and I was more than happy to have a mini-reunion with Florian Hauer (now a co-founder of labfolder; also in this newsletter), Benedikt Frank (now a consultant at ATKearney) and Kerstin Bartscherer (now a group leader at the MPI for Molecular Biomedicine in Münster) at the meeting. My personal recommendation: join the Falling Walls Lab (www.falling-walls.com/lab) next year to hear a hundred of interdisciplinary talks, to train you presentation skills, to win and of course to have fun!




The principle of the Chromobody® technology (read more at www.chromotek.com/home/technology). The antigen-binding domain of a single-chain llama antibody is fused to a fluorescent protein and transfected into cells, where it enables real-time monitoring of antigen dynamics.

**Larisa Yurlova** did her PhD with Mikael Simons at the Max Planck Institute for Experimental Medicine. After her graduation in July 2010, she joined ChromoTek GmbH, Martinsried, Germany as an R&D scientist.

# 10th anniversary just beyond the Horizon!

With more than 300 young scientists from all over the world, the 9th "Horizons in Molecular Biology" meeting in October 2012 broke the participants record in the history of our symposium! Together with the 24 invited renowned international speakers they spent a truly stimulating, diverse and entertaining week of scientific exchange.

The famous biochemistry textbook author couple Judith and Donald Voet delivered two riveting opening talks at the Career Fair preluding the symposium and were kind enough to stay with us throughout the entire event. Donald Voet cautioned us not to pursue "cargo cult science", i.e. science that is carried out correctly in its form but without any understanding of the scientific method, while his wife Judith Voet shared her joy in teaching and communicating science. It was a great experience to have two real celebrities of the field, who furthermore were so accessible and eager to interact with students. Even some of our speakers got very excited, Drew Endy calling the Voets his "personal heroes".

The main idea of "Horizons" – stimulating exchange between PhD students and senior scientist in academia and other fields – thus was off to a good start. Apart from the intense communication after lectures and during poster sessions, several scheduled events provided a platform to allow for communication. For example, students engaged senior scientists during speed dating sessions or in the more casual event "Lunch with the Prof". Many of the speakers also mingled with the students at the conference dinner, the subsequent party and various other social events. Connecting cutting-edge science with the joys of life is another hallmark of "Horizons". This became perhaps most apparent during the vivid traditional "Wine & Cheese" poster session.

Plenary lectures by Tom Rapoport, Kurt Wüthrich, Joshua Kaplan, Judith and Donald Voet

One feature of "Horizons" is also its diversity, which was achieved by inviting speakers from a wide range of subject areas in molecular biology and beyond, thereby attracting students with equally diverse interests who contributed their own ideas and research. This year's talks spanned such diverse fields as dynein motion (Andrew Carter), the genomic history of the "Black Death" (Johannes Krause), large non-coding RNAs (Ronald Breaker) or the host-pathogen arm's race in evolution (Harmit Malik). Jennifer Lippincott-Schwartz and several other speakers expressed how stunned and delighted they were to get the opportunity to experience this stimulating diversity together with the students. Exchange between fields of research often leads to entirely new ways to view ones own problems in science and maybe even the one or the other cooperation was sparked or a postdoc application set up because of this symposium.

As always, it were the little things that made this event memorable: For example, the 2002 chemistry Nobel laureate Kurt Wüthrich delivered his talk in entirely new wardrobe, purchased especially for the occasion – because his

Former Molbio students at alumni sessions and the career fair (Daniel Zwilling - UC Berkeley, Nadja Jung - Graf von Stosch Patent Attorneys, Larisa Yurlova - ChromoTek GmbH, Gabriella Ficz - The Babraham Institute, Cambridge) / Guests from the cooperating Weizmann Institute of Science

Horizons organizers at the reception desk, at the opening lecture, and as session chairs

luggage got stuck at Frankfurt airport. Thomas Südhof came to the "SNARE-Mecca Göttingen" to poach in Reinhard Jahn's domain with an intriguing talk containing almost exclusively unpublished data.

nowned speakers as Tim Hunt (Nobel laureate of 2001), who will give the keynote talk, and cordially invite all of you to celebrate the anniversary with us! The highlights of the 2012 meeting were filmed and combined in a trailer

The traditional wine and cheese poster session.

In the year 2013 we are going to celebrate the 10th anniversary of our "Horizons in Molecular Biology" symposium, taking place on September 9th-13th. We already look forward to yet another great conference with such re-

that can be viewed on our website. We kindly ask you to share this trailer amongst your friends and colleagues and thereby help us in promoting the upcoming 10th "Horizons"!

Sven Truckenbrodt, Tino Pleiner

Preparations for the Horizons video trailer

## Horizons speakers 2012

**Molecules of Life**
Wah Chiu, Judith Frydman, Anne Marie Pyle, Matthias Selbach, Kurt Wüthrich

**Organization of the Cell**
Andrew Carter, Jennifer Lippincott-Schwartz, Hidde Ploegh, Tom Rapoport, Romeo Ricci, Sharon Tooze

**From Genes to Function**
Dominique Bergmann, Ronald Breaker, Drew Endy, Joannes Krause, Harmit Malik, Maria Elena Torres-Padilla

**Cellular Communication**
Maria Pia Cosma, Joshua Kaplan, Dieter Oesterheldt, Jeremy Reiter, Thomas Südhof

**Horizons Openying Talk**
Ron Laskey

**Career Fair Keynote Lecture**
Judith and Donald Voet

# IMPRS 12 plus

About grant money, online surveys, soccer, and site visits

Imagine that you are asked to carry out an online survey among all of your PhD students and PhD alumni who graduated during the past six years – 87 people altogether. They are supposed to answer dozens of questions in a questionnaire that you would never like to fill in yourself. Nothing they can complete in five minutes, but will keep them rather busy. Not only tick boxes, but also text comments. In particular, words of appreciation are desired: how great their graduate program was - and still is. You can give them only 10 days to return the questionnaire because time flies and the deadline for the renewal proposal needs to be kept. One reminder will be possible one week after you have circulated the survey.

What would be a realistic expectation regarding the number of participants? One third? Perhaps slightly higher among the current PhD students as you still meet them on campus frequently? Yes, this would certainly be a good guess in many cases. But we are talking about the Molbio program. The questionnaire was a mandatory part of the proposal of an extension of the IMPRS funding beyond 2012 for six additional years. And this means that 98.9 % (!) of our PhD students and PhD alumni participated in the survey that was started on April 10 and closed on April 20, 2012.

Did they use the opportunity to get rid of their frustration and complaints? Fortunately not. In fact, the feedback we received was very positive throughout. Several students wrote that "joining the Molbio program was one of the best decisions they have ever made", pointing out the value of the networks they were able to establish during their stay in Göttingen, and the "excellent environment for my professional and personal career development". Thank you guys! Such feedback certainly adds even more to the motivation of our faculty and program officials to keep the program running at the highest standards.

Four external experts were asked by the president of the Max Planck Society to evaluate the "12 plus" renewal application of our IMPRS for Molecular Biology: Anne Ephrussi (EMBL Heidelberg), Rolf Kemler (MPI for Immunobiology and Epigenetics, Freiburg), Ulrike Kutay (ETH Zurich), and Dietmar Vestweber (MPI for Molecular Biomedicine, Münster). For the site visit on June 18, 2012 in Göttingen they were accompanied by the rapporteur Hilmar Bading, University of Heidelberg, and the representative of the Max Planck administration Ralph Meiers. They were challenged with reading the renewal proposal (109 pages), a report of the previous funding period (342 pages) and the results of the online survey mentioned above (16 pages).

In preparation for the site visit, the referees arrived the evening before and had the opportunity to meet with the president of the university, program officials, and a few students for dinner. Apparently, nobody ever checked possible clashes of the IMPRS evaluation with major sports events. The 20:45 start of the German soccer team on its way to the quarter-finals in the European championship quickly divided the group of referees and program members into two groups even before the dessert was served; the larger fraction moving to the adjacent pub to watch the game. Fortunately, the 2:1 win over Denmark left the referees in a good mood, so that everything was best prepared for the site visit the next day.

After welcome addresses by the managing director of the MPI-bpc and the vice president of the university, Reinhard Jahn presented an overview of the achievements and perspectives of the IMPRS. Afterwards, the stage was open for our students and they did a wonderful job, presenting both their personal views on the IMPRS and their doctoral research. Thank you, students, for the exciting talks and excellent discussions at the posters and during the closed session with the referees. Also many thanks to our faculty who joined us in large numbers for the morning session and the closed session in the afternoon.

We hope the external experts do not mind that we conclude this little report by quoting one sentence from their evaluation report: "In general, we were practically overwhelmed by the excellence of the science and the organization of the School, by the opportunities it provides for its students as well as by the maturity and the self-confidence of the students". Along this line, we look forward to keep up the spirit of our program, further develop the scientific education, support networking and career opportunities, and remain in close contact with our alumni.

StB

## Student representatives

We thank **Simone Mayer** and **Agata Witkowska**, whose terms as PhD or MSc student representatives ended in 2012. We also wish to express our gratitude to **H. Broder Schmidt** for the representation of the GGNB PhD student community in the Managing Board of GGNB. His term ended in December 2012. Many thanks to **Kevser Gencalp** for serving as a PhD representative in our Molecular Biology program for a second term. Last but not least, we wish to welcome our new student representatives **Tino Pleiner** (PhD student) and **Manuel Maidorn** (MSc student).

## 100 PhD graduates

If you carefully read this newsletter, in particular the science spotlight at the beginning, you will notice the student with the flowers on the photo below, standing next to Rienhard Lührmamnn. Yes, it is Sina Mozaffari Jovin again. This time because of his PhD thesis defense which he passed with distinction recently. The title of his thesis: "Mechanism of regulation of spliceosome activation by Brr2 and Prp8 and links to retinal disease". Spliceosome work, of course, as the thesis was supervised by Reinhard. Congratulations, Sina!

What Sina didn't know when he defended his thesis: Sina is the hundredth PhD graduate of our Molecular Biology program. Can you imagine this? It almost feels like yesterday that the first brave students from all over the world joined our program in the fall of 2000. And it seems that our 100 doctors are doing quite well, regardless of the career path they took after their graduation. A reason to celebrate.

StB

## Honors and Awards

**Bertram Brenig**, faculty member of the Molecular Biology program and Director of the Institute of Veterinary Medicine at the University of Göttingen, received the "Friendship Award" by the Chinese Government for his long-term support of the P.R. China in the development and introduction of molecular techniques in animal breeding.

**Annette Denker**, former PhD student in the group of Silvio Rizzoli, was awarded an EMBO Long-Term Fellowship to support post-doctoral work in the group of Prof. M. Hetzer at the Salk Institute, La Jolla, USA

**Ivo Feußner**, faculty member of the Molecular Biology program and head of the Department of Plant Biochemistry at the University of Göttingen, was awarded the Terry Galliard Medal of the International Symposium on Plant Lipids 2012.

**Kevser Gencalp**, PhD student in the group of Dirk Görlich, was awarded a Boehringer Ingelheim Fonds PhD Stipend.

**Akanksha Goyal**, PhD student in the group of Marina Rodnina, was awarded a Boehringer Ingelheim Fonds PhD Stipend.

**Florian Hauer**, former PhD student in the group of Holger Stark, was awarded the EXIST Fellowship of the BMWi for founding scientists (http://www.exist.de/exist-gruenderstipendium/index.php)

**Christoffer Hitzing**, PhD student in the group of Jürgen Wienands, was awarded a GGNB Excellence Stipend.

**Muna Ayesha Khan**, MSc student in the group of Boris Görke, was awarded the Otto Bayer Scholarship by the Bayer Foundation in support of her Master's thesis project.

**Mariia Levchenko**, PhD student in the group of Peter Rehling, was awarded a Boehringer Ingelheim Fonds PhD Stipend

**Sven Truckenbrodt**, PhD student in the group of Silvio Rizzoli, was awarded a GGNB Excellence Stipend.

**Ingrid-Cristiana Vreja**, PhD student in the group of Silvio Rizzoli, was awarded a Dorothea-Schlözer Fellowship by the University of Göttingen.

**Larisa Yurlova**, former PhD student in the group of Mikael Simons, was awarded the Falling Walls Lab Munich, 3rd Prize for "Breaking the wall of cellular screening in drug discovery"

# Thank you, Reinhard

When Reinhard Jahn returned to Germany in 1997, he had experienced graduate education as a professor at Yale University for several years. Key features of the US curricula, including lab rotations to identify a hosting research group for the PhD thesis, or the joint responsibility of faculty members in the supervision of graduate students in thesis advisory committees, seemed to be beneficial for the students, but lacking in the traditional German doctoral education. Moreover, Reinhards new position as a director of the Department of Neurobiology at the MPI for Biophysical Chemistry made him realize that, at that time, is was difficult if not impossible to officially supervise and formally evaluate the performance of your own PhD students if you were not holding a full faculty position at a German university. There was certainly space for improvement in the communication and collaboration between university scientists and researchers at non-university institutions.

In the late 90s, Reinhard Jahn, together with his university colleagues Gerhard Braus, Tomas Pieler, and Kurt von Figura, developed plans for establishing a new international MSc and PhD graduate program. The aim was to take advantage of the strengths of both the German and the US American educational systems, drafting a novel curriculum and a concept of PhD supervision hitherto unknown in German graduate education. At the onset of the so-called "Bologna process" in 1999, at which European education ministers decided on a major reform of the European higher education system, the time seemed to be ideal for the foundation of the Molecular Biology program. The former president of the Max Planck Society, Hubert Markl, founded the IMPRS funding program to provide a framework of structured PhD education in a joint effort of Max Planck Institutes together with partner universities. Thanks to Reinhards successful grant proposal, the newly established MSc/PhD Molecular Biology program received funding as an International Max Planck Research School from fall 2000, thus belonging to the first cohort of ten "IMPRS guinea pigs" testing new ideas and concepts in graduate education. This funding was accompanied by grants of the Federal State of Lower Saxony and by the German Academic Exchange Service.

In his role as the Dean of the IMPRS for Molecular Biology and the Max Planck representative in the Molbio program committee, Reinhard invested much time and efforts to make the graduate program as successful and internationally visible as it is now. He contributed with many lectures, courses, and rotation projects to the curriculum, is still hosting the Wednesday seminars for the MSc students, joined the Molbio retreats whenever time allowed, wrote guidelines and offers seminars on good scientific practice. Both of his proposals for an extension of the IMPRS funding after six and twelve years were successful (see also page 26). In the year 2006, he initiated the cooperation of the IMPRS with the Feinberg Graduate School at the Weizmann Institute of Science in Rehovot, Israel, which resulted in a lively scientific cooperation, reflected in continuous mutual visits, external thesis projects, and more (see also page 22).

Through his broad and distinct scientific background, experience, and commitment for improving graduate education in Germany, he was the ideal candidate to serve also as the coordinator and speaker of the Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences (GGNB), funded by the German Excellence Initiative. He took the leading role in writing the GGNB grant proposal and was responsible for the successful extension of GGNB for a second funding period just recently. In 2010, Reinhard received the Science Award of the State of Lower Saxony (Niedersächsischer Wissenschaftspreis) for his excellent research contributions to the neurosciences, but also for his outstanding achievements for the scientific community and graduate education on the Göttingen Research Campus.

One of the reasons for Reinhard to hand over the position of the Dean of our IMPRS to Marina Rodnina is his new appointment as the chair of a presidential committee of the Max Planck Society, established by Peter Gruss recently, with the task of developing proposals for future policies with regard to junior scientists within the Max Planck Society. This assignment includes a critical review of the doctoral education within the Max-Planck Institutes including the IMPRS program – a time-consuming and challenging task.

Many thanks, Reinhard, for all your contributions to the success of our program. We are glad that you will remain active as a faculty member in our program. StB

# Left the program in 2012

## Current faculty members

**University of Göttingen - Biology:** Gerhard Braus, Rolf Daniel, Ivo Feußner, Ralf Ficner, Christiane Gatz, Boris Görke, Wilfried Kramer, Heike Krebber, Volker Lipka, Burkhard Morgenstern, Heinz Neumann, Stefanie Pöggeler, Jörg Stülke, Kai Tittmann, Ernst Wimmer

**University of Göttingen - Chemistry:** Tim Grüne, Andreas Janshoff, Claudia Steinem

**University of Göttingen - Physics:** Jörg Enderlein, Dieter Klopfenstein

**University of Göttingen - Agricultural Sciences:** Bertram Brenig

**University Medical Center Göttingen:** Mathias Bähr, Holger Bastians, Tim Beißbarth, Markus Bohnsack, Matthias Dobbelstein, Roland Dosch, Wolfgang Engel, Uwe Groß, Jörg Großhans, Heidi Hahn, Tobias Moser, Tomas Pieler, Peter Rehling, Blanche Schwappach, Michael Thumm, Jürgen Wienands, Andreas Wodarz

**MPI for Biophysical Chemistry:** Wolfgang Fischle, Dirk Görlich, Christian Griesinger, Helmut Grubmüller, Stefan Hell, Claudia Höbartner, Herbert Jäckle, Reinhard Jahn, Stefan Jakobs, Michael Kessel, Reinhard Lührmann, Ahmed Mansouri, Erwin Neher, Marina Rodnina, Reinhard Schuh, Halyna Shcherbata, Holger Stark, Henning Urlaub

**MPI for Experimental Medicine:** Nils Brose, Klaus-Armin Nave, Moritz Roßner, Mikael Simons

**German Primate Center:** Stefan Pöhlmann, Lutz Walter

For details regarding the research of our faculty members, see www.gpmolbio.uni-goettingen.de/content/ c_faculty.php

**Stefan Eimer** received an offer by the University of Freiburg, where he accepted a professor position for Structural Cell Biology at the BIOSS Center for Biological Signaling Studies in 2012.

Stefan joined the Molecular Biology program in 2007, after he had established his research group for molecular neurogenetics at the European Neuroscience Institute Göttingen. In 2006, he became the coordinator of the Network of European Neuroscience Institutes (ENINET) and of the Electron Microscopy Network Göttingen (GöNEM). He is still active in several thesis advisory committees in Göttingen. The last PhD student of the Molbio program who was directly supervised by Stefan, was Mandy Hannemann, who graduated in April 2012 (see also the science spotlight on pp. 6-7 of this newsletter). The program thanks Stefan for his contribution to the graduate education in our program.

www.uni-goettingen.de/en/57935.html

**Steven Johnsen** moved to Hamburg in the summer of 2012 to the Universitätsklinikum Hamburg-Eppendorf, Department of Tumor Biology, where he is heading a research lab on epigenetic regulation of tumorigenesis and stem cell differentiation.

Steve joined the Molecular Biology program in 2007, after he had moved from the European Molecular Biology Laboratory, Heidelberg to Göttingen. As an assistant professor in the Department of Molecular Oncology at the University Medical Center Göttingen, Steve supervised several PhD students, including students of the Molecular Biology program. The last PhD student of the Molbio program who was directly supervised by Steve, was Oleksandra Karpiuk, who graduated in November 2012 with distinction. Her PhD thesis project is summarized in the science spotlight on pp. 2-3 of this newsletter. The program thanks Steve for his contribution to the graduate education in our program.

www.uni-goettingen.de/en/57988.html

New Faculty

# Joining the program in 2012

**Tim Beißbarth** was appointed as Professor for Biostatistics at the University Medical Center Göttingen in 2008, where he since then leads the group Statistical Bioinformatics in the department of Medical Statistics. He received his doctoral degree from the University of Heidelberg in 2001. As a postdoctoral fellow he worked at the MPI for Molecular Genetics in Berlin, and at the WEHI Bioinformatics Division in Melbourne. From 2005 to 2008, he led the Bioinformatics & Modeling Group, Department of Molecular Genome Analysis at the German Cancer Research Center (DKFZ) in Heidelberg. His current research focuses on the development of methods and tools to analyze biomedical data, especially on machine-learning approaches for the discovery of prognostic biomarker signatures as well as on methodology for the reconstruction of molecular networks from genomics data. In his work he is closely collaborating with other clinical and biological researchers.

www.uni-goettingen.de/en/318896.html

**Markus Bohnsack** joined the Department of Biochemistry I at the University Medical Center Göttingen as a Professor of Molecular Biology in 2012. He received his doctoral degree from the University of Heidelberg in 2005. After two and a half years of postdoctoral research at the Wellcome Trust Centre for Cell Biology, University of Edinburgh, he became group leader at the Institute for Molecular Biosciences, Goethe University in Frankfurt, where he was also an adjunct investigator at the Cluster of Excellence Frankfurt (CEF) "Macromolecular Complexes". His current research investigates the biogenesis, dynamics and regulation of RNA-protein complexes in yeast and mammalian cells, and their modulation in development and disease, with the main focus is on RNA helicases and disease-related cofactors.

www.uni-goettingen.de/en/414036.html

**Jörg Enderlein** was appointed as Professor of Biophysics at the University of Göttingen in 2008. He received his doctoral degree in Physical Chemistry from the Humboldt University Berlin in 1991. During is further research, he was a postdoctoral fellow at Los Alamos National Laboratory, USA, assistant professor at the University of Regensburg (habilitation in 2000), Heisenberg Fellow of the DFG at Forschungszentrum Jülich, and Professor of Biophysical Chemistry at the University of Tübingen. His present research focuses on the development of new methods of single molecule fluorescence spectroscopy and imaging and their application to biophysics and the physics of complex systems.

www.uni-goettingen.de/en/102461.html

**Helmut Grubmüller** is Director at the MPI for Biophysical Chemistry (MPI-bpc), Göttingen, heading the Department of Theoretical and Computational Molecular Biophysics since 2003. He received his doctoral degree in physics from the Technical University of Munich in 1994, followed by an EMBO fellowship at the Institute for Molecular Biology and Biophysics, ETH Zurich in 1997, a group leader position for theoretical molecular biophysics at the MPI-bpc from 1998 to 2003, and an associate professorship for biomolecular sciences at École Polytechnique Fédérale de Lausanne in 2003. His current research aims at an understanding of the physics and function of proteins, protein complexes, and other biomolecular structures at the atomic level. For this purpose, complex computer simulations of the atomistic dynamics are carried out.

www.uni-goettingen.de/en/57975.html

**Stefan Hell** received his doctorate in physics from the University of Heidelberg in 1990. From 1991 to 1993 he worked at the European Molecular Biology Laboratory (EMBL), Heidelberg, followed by stays as a senior researcher at the University of Turku, Finland (1993-1996), and as a visiting scientist at the University

of Oxford, England (1994). In 1997 he was appointed to the MPI for Biophysical Chemistry in Göttingen, where he has built up his current research group dedicated to sub-diffraction-resolution microscopy. In 2002, following his appointment as a director, he established the Department of Nanobiophotonics. He is credited with having conceived, validated and applied the first viable concept for breaking Abbe's diffraction-limited resolution barrier in a light-focusing microscope. For these findings he received numerous awards and distinctions. Following his invention of STED, RESOLFT, GSDIM and 4Pi microscopy and related techniques, his current research continues to focus on optical microscopy beyond the diffraction barrier with far-field optics.

www.uni-goettingen.de/en/57981.html

**Stefan Jakobs** was appointed as Professor of High Resolution Microscopy in Neurodegenerative Diseases at the University Medical Center Göttingen in 2010. He is also heading the "Structure and Dynamics of Mitochondria" research group at the MPI for Biophysical Chemistry. He received his doctoral degree from the University of Cologne in 1999. As a postdoctoral research fellow he worked first at the MPI for Plant Breeding Research in Cologne, before he joined the laboratory of Stefan Hell at the MPI-bpc and assumed the position of a research group leader in 2005. His two major research interests are the role of mitochondria in neurodegenerative diseases and, as part of a research initiative with the Department of NanoBiophotonics, the investigation, development and application of reversibly switchable fluorescent proteins (RSFPs).

www.uni-goettingen.de/en/85666.html

**Andreas Janshoff** was appointed as Professor of Biophysical Chemistry at the University of Göttingen in 2008. He concluded his studies in Biology (1987-1989) and Chemistry (1989-1994) with a doctoral degree at the University of Münster in 1997. After two years of postdoctoral research at the Scripps Research Institute, La Jolla, CA, USA, he completed his habilitation in biochemistry at the University of Münster in 2001. Before he moved to Göttingen, he was associate professor (2001-2006) and full professor (2006-2008) at the University of Mainz. His current research includes four major fields of studies: membrane biophysics, cell mechanics, sensor design, and single-molecule force spectroscopy.

www.uni-goettingen.de/en/100625.html

**Stefan Pöhlmann** is heading the Infection Biology Unit of the German Primate Center (DPZ) since 2010. He received his doctorate from the University of Erlangen-Nürnberg in 2000. He continued his research as a postdoctoral fellow at the University of Pennsylvania (2000-2003), before he assumed the position of the head of a SFB Junior Research Group at the University of Erlangen-Nürnberg (2003-2007). In 2007, he was appointed as Professor of Experimental Virology at Hannover Medical School. His Infection Biology Unit at the DPZ investigates host cell interactions and pathogenesis of primate lentiviruses and emerging viruses. A particular focus is on the first step of the infection process, viral entry into target cells.

www.uni-goettingen.de/en/362311.html

**Claudia Steinem** was appointed as Professor of Biomolecular Chemistry at the University of Göttingen in 2006. She concluded her studies in Biology (1987-1989) and Chemistry (1989-1994) with a doctoral degree at the University of Münster in 1997. After 1.5 years of postdoctoral research at the Scripps Research Institute, La Jolla, CA, USA, she completed her habilitation in Biochemistry at the University of Münster in 2001. Before she moved to Göttingen, she was Associate Professor for Bioanalytics and Biosensors at the University of Regensburg (2001-2006). Presently, her main research focus is on artificial membrane systems, which are used to answer biochemical questions under well-defined conditions in a quantitative manner. Her group is particularly interested in peptides, channel proteins and pumps, as well as proteins that connect the plasma membrane with the cytoskeleton.

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# Postdocs - the neglected group

It has long been waited for… Career Service at GGNB

Should I apply for a(nother) postdoc? What alternatives are out there? Doubts about Ph.D.'s qualification for non-academic job are widespread. Doubts about success in an academic career are no less. So it's really time for career advice and services for junior scientists with a Ph.D. degree! Thanks to the German Excellence Initiative, GGNB (the Göttingen Graduate School for Neurosciences, Biophysics, and Molecular Biosciences, to which also the Molecular Biology MSc/PhD program belongs) can now offer some. And I'm the lucky person to establish it.

I'm enthusiastic about being the new coordinator of the GGNB Career Service Unit. I have always liked pushing the development of others - as of myself - forward. Everyone has specific abilities, skills, and talents. And there are numerous career options within and outside academia. Finding the right place to make use of these is challenging whilst at the same time exciting.

My work aims at supporting self-assessment and informed decision-making about the next career step. Moreover, I see a huge potential in exchange of information and experiences. As a peer network provides important information, support, and career resources, I want to initiate a vivid exchange within the postdoc community hopefully resulting in many creative career-supporting activities organized by the postdocs themselves. Insights from alumnae like you may enrich this exchange, because you are now out there.

Katrin Wodzicki, coordinator or the newly established GGNB Career Service Unit

So, we will see how to enable you to share your expertise and experiences, and maybe, by the way, to come back to Göttingen sometime.
To give you an impression about me, here a few words about my own career: I studied Psychology at the University of Jena, and completed my Ph.D. at the University of Zurich. The last five years, I carried out research about social psychological and motivational aspects of computer-mediated communication and cooperation, especially in social networks, as a postdoc at the Leibniz-Knowledge Media Research Center (KMRC) in Tübingen.

Besides research, I was responsible for equal opportunity issues, good scientific practice, and a series of workshops of the graduate program at the KMRC. To look beyond my own nose, I took part in the think tank of the "Stiftung Neue Verantwortung" in Berlin, which aimed at encouraging an intersectional dialogue between science, business, politics, and society, in my case about the challenges and promises of the new digital society. Finally, I'm one of the founders of the group blog wissensdialoge.de on which we discuss and report about psychological research relevant for practitioners in knowledge management and organizational learning.

I hope very much to get to know some of you at an event of the Career Service Unit!

Katrin Wodzicki


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