

MOLECULAR BIOLOGY NEWSLETTER

Georg-August-Universität Göttingen · International Max Planck Research School



JAN
2015

Welcome message

Dear alumni, students, friends and colleagues, welcome to the new edition of our annual newsletter. On the following pages we report about events and activities of the past year, present contributions by current and former members of our graduate program, and honor their achievements.

Our cordial congratulations go to Stefan Hell, who was awarded the Nobel Prize in Chemistry 2014 for his pioneering work in the development of super-resolved fluorescence microscopy. He shares the prize with Eric Betzig and William E. Moerner.



Erwin Neher, Stefan Hell and Manfred Eigen at the Nobel celebration in the University Aula

Source: Public relations University of Göttingen & MPI-bpc

Stefan Hell is engaged in the graduate education of our students through his participation in various thesis advisory committees. His group also contributes to the scientific training of our graduate school with a methods course in advanced light microscopy. We are delighted that Stefan Hell accepted our invitation to give the scientific keynote lecture at our 15th Anniversary Celebration in the University Aula on May 29, 2015.

Student-organized events certainly belong to the highlights of our program.

These include the annual Horizons in Molecular Biology PhD student symposium together with its Career Fair (p. 32) and the Women's Careers and Networks symposium (p. 30; a GGNB-wide enterprise), both of which were, once again, a great success. These events are the ideal forum for PhD students and postdocs to build their own networks for scientific and career-related exchange. We are glad to observe an increasing number of our alumni getting involved in these meetings and sharing their experience with our students. Following the same idea, students and faculty members of our program participated in the Turkish-German Graduate Workshop on Molecular Neuroscience in Istanbul on the beautiful campus of Boğaziçi University (p. 31). A return visit is planned for spring 2015. On the other side of the ocean, alumni from Göttingen met in San Francisco on the occasion of the Research Alumni Conference on Digital Transformation – Impacts on Research, Science and Teaching (see p. 23).

Last spring we launched the joint Molbio/Neuro Network LinkedIn Group, which has been joined by almost 200 members since then (see p. 36). While membership in this group is confined to our current and former students, all participants are also members of the open "GGNB Network" group, thus being able to benefit from the larger community of our graduate school. Social media will become increasingly important for our alumni networks over the next years and we hope that many members of our program will benefit from its potential to stay in touch and provide mutual support, particularly in career-related issues.

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The Master's examinees in August 2014 were the first cohort of students graduating under the new examination regulations, though the differences can be considered minor. Also new is a completely revised online application system which makes it more comfortable for the applicants to apply, but also for our office and the members of the admissions board to evaluate the more than 700 complete applications we received for the fall intake 2015. While numerous other administrative issues kept us busy throughout the year, the fun part started with the preparation of our 15th Anniversary Celebrations and the International Alumni Day, which will take place in May 2015 with a, as we feel, very attractive program (see backside cover of this newsletter). We look forward to meeting you there.

M. Rodnina, J. Stülke, S. Burkhardt

Ribosomes shifting the reading frame

Ribosomes are protein factories in cells that read three letters of a given messenger RNA (mRNA), one at a time. However, in rare instances ribosomes are programmed to encode the mRNA in an altered way such as by moving to an alternative reading frame in -1 or +1 direction, which is called programmed frameshifting (PRF). For viruses, which have their limited genome size, frameshifting brings advantages to encode more than one protein from the same mRNA. For higher organisms it can be used to regulate gene expression under certain conditions. Efficient frameshifting depends on the coordina-

ted action of two main sequence elements embedded in the mRNA. The first of these elements is a slippery sequence (such as X XXY YYZ) over which the ribosomes shift the rea-

What puzzled researchers for the last decades were, at which codon does the ribosome decide to move to the alternative reading frame and at which step of the elongation cycle does frameshifting take place. In my project, we aimed to answer these questions using rapid kinetic analysis tools and a purified biochemical system from *E. coli*. The system we used to study the nature of frameshifting was composed of highly purified translation components such as tRNAs, elongation factors, ribosomes and mRNAs with or without frameshifting elements. By using the rapid

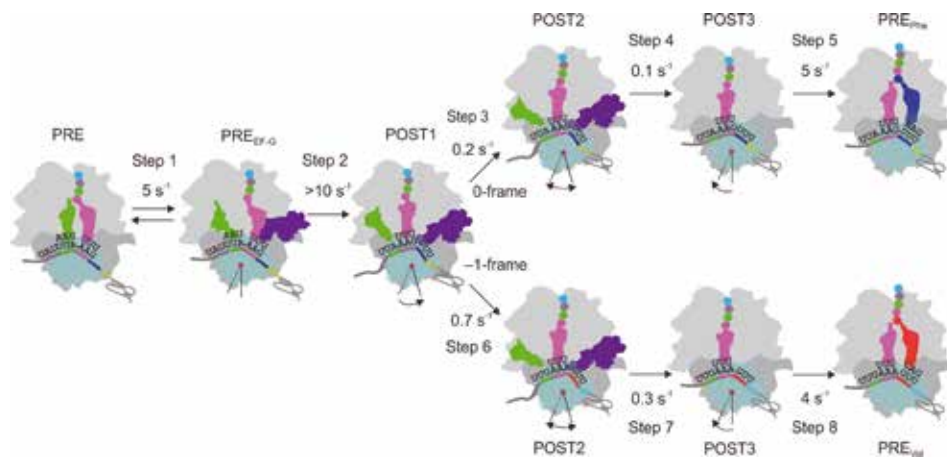


Fig. 1: Kinetic model of -1 programmed ribosomal frameshifting. The slippage occurs after step 2 during translocation of the two tRNAs bound to the slippery sequence. The rates of individual steps are given.

ding frame and the other is a downstream secondary structure, usually a pseudoknot.

PhD-related publications 2014 (PhD students of the Molecular Biology program in bold type)

Ailion M, **Hannemann M**, Dalton S, Pappas A, Watanabe S, Hegemann J, Liu Q, Han H, Gu M, Goulding M, Sasidharan N, Schuske K, Hullett P, Eimer S, Jorgensen E (2014) Two rab2 interactors regulate dense-core vesicle maturation. *Neuron* 82(1), 167-180

Bakhti M, **Aggarwal S**, Simons M (2014) Myelin architecture: zippering membranes tightly together. *Cell Mol Life Sci* 71(7), 1265-1277

Biesemann C, Grønberg M, Luquet E, Wichert S, Bernard V, Bungers S, Cooper B, Varoqueaux F, Li L, Byrne J, Urlaub H, Jahn O, Brose N, Herzog E (2014) Proteomic screening of glutamatergic mouse brain synaptosomes isolated by fluorescence activated sorting. *EMBO J* 33(2), 157-170

Brendel J, Stoll B, Lange S, **Sharma K**, Lenz C, Stachler A, Maier L, Richter H, Nickel L, Schmitz R, Randau L, Allers T, Urlaub H, Backofen R, Marchfelder A (2014) A Complex of Cas Proteins 5, 6, and 7 Is Required for the Biogenesis and Stability of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-derived RNAs (crRNAs) in *Haloflex volcanii*. *J Biol Chem* 289(10), 7164-7177

quench-flow technique we monitored the synthesis of each individual amino acid at the frameshift motif in real-time. We found out that slippage took place after the decoding of two slippery codons and before decoding of overlapping codons, meaning during translocation.

In order to precisely determine which step of translocation was affected during frameshifting, we used fluorescence labels on EF-G, ribosomes and tRNAs. We monitored the binding and dissociation of EF-G, the movement of tRNAs through ribosomes as well as movements of small (30S) subunit. The initial phases of translocation were not affected; EF-G could bind on the ribosomes and promote the rapid movement of the tRNAs through the ribosome. However, at the end of translocation the 30S head has to move backwards and translocate by one codon.

We have shown that exactly this background movement was impaired during frameshifting, leaving ribosomes at a previously undefined

chimeric state. Possibly upon multiple attempts of the EF-G, the steric hinderence of the pseudoknot is resolved and translation resumes in the new reading frame. In the presence of the pseudoknot alone, the movement of the 30S head and translocation of the tRNAs is dramatically slower. In the presence of both elements, the slippery site provides the necessary freedom for the ribosomes to change its position with respect to the pseudoknot, which allows faster completion of translocation in the new reading frame. In kinetic terms, frameshifting can be envisioned as a choice of two fates; very slow translocation in the 0-reading frame

versus faster movement in the -1-reading frame.

The present data shed light on the roles of the slippery sequence and the pseudoknot in promoting -1 PRF and expanded our understanding of reading frame maintenance during translation. We hope that this kinetic view of -1 PRF will be useful in identifying specific targets for antiviral therapeutics and for studying frameshifting in higher organisms.

Neva Caliskan worked on her doctoral thesis in the group of Marina Rodnina at the Max Planck Institute for Biophysical Chemistry. She defended her PhD thesis in May 2013.

These results were published in *Cell* (2014) 157, 1619-1631.



Caliskan N, Katunin V, Belardinelli R, Peske F, Rodnina M (2014) Programmed -1 frameshifting by kinetic partitioning during impeded translocation. *Cell* 157(7), 1619-1631

Demircioglu FE, Burkhardt P, Fasshauer D (2014) The SM protein Sly1 accelerates assembly of the ER-Golgi SNARE complex. *Proc Natl Acad Sci USA* 111(38), 13828-13833

Eckermann K, Dippel S, KaramiNejadRanjbar M, Ahmed H, Curril I, Wimmer E (2014) Perspective on the combined use of an independent transgenic sexing and a multifactorial reproductive sterility system to avoid resistance development against transgenic Sterile Insect Technique approaches. *BMC genetics* 15 (Suppl 2), S17

Engelke M, **Pirkuliyeva S**, Kuhn J, Wong L, Boyken J, Herrmann N, Becker S, Griesinger C, Wienands J (2014) Macromolecular assembly of the adaptor SLP-65 at intracellular vesicles in resting B cells. *Science Signaling* 7(339), ra79

Repairing the engine while it's running

A module swap in the mitochondrial presequence translocase drives matrix transport

When you opened this newsletter to browse through its pages and got lost in the latest stories of the Molecular Biology program, you used up energy. Even the decision you took, when you started looking right away instead of postponing it until later, required energy.

All processes of life require some kind of energy. Mostly this is provided in the form of ATP, the universal biological currency of power. To produce the vast amounts of ATP used every day we, being eukaryotes, heavily rely on oxidative phosphorylation in the mitochondria. However, our powerhouses are no autonomous factories. They depend on proteins which are encoded in the nucleus and translated by cytosolic ribosomes. Consequently, these need to be imported into the organelle, at the expense of, yes you are right, energy.

The majority of these proteins are targeted to mitochondria by an N-terminal targeting signal, the presequence.

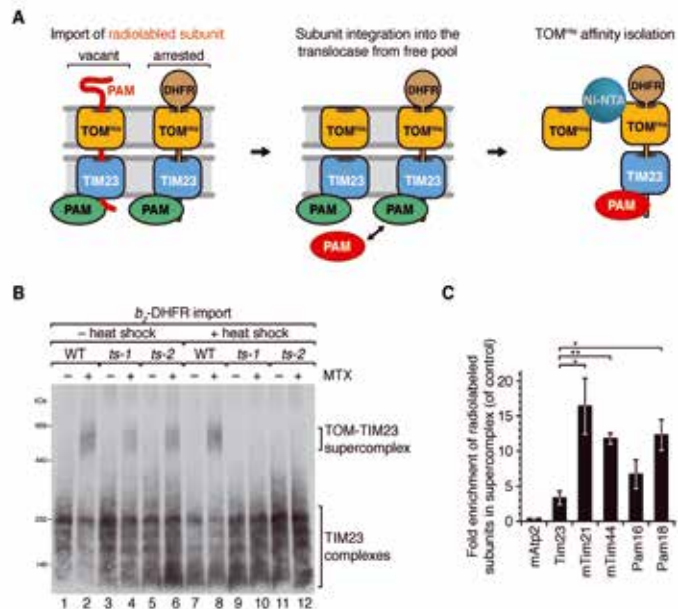


Fig. 1: A) Subunit integration into the active TIM23 complex from the free pool was assessed by arresting a cytochrome b_2 and mouse dihydrofolate reductase (DHFR) fusion protein (brown) with methotrexate (MTX) in 50% of the TIM23 complexes. Subsequently, radiolabeled TIM23/ PAM subunits (red) were imported and their integration into the active (arrested with b_2 -DHFR) translocase was analyzed by isolation of TOM. **B)** Arrest of the b_2 -DHFR fusion protein leads to the formation of a TOM-TIM23 supercomplex as detected by blue-native PAGE and α -Tim23 western blotting. This depends on the import motor as shown with the inactivation of mtHsp70 using temperature sensitive alleles. **C)** Quantification of the results obtained from experiments described in (A) reveal that newly imported Tim21, Tim44, Pam18, and to a lesser extent Pam16, integrate into the active TIM23 complex.

PhD-related publications 2014 (continued)

Engels N, König L, Schulze W, Radtke D, **Vanshilla K**, Lutz J, Winkler T, Nitschke L, Wienands J (2014) The immunoglobulin tail tyrosine motif upgrades memory-type BCRs by incorporating a Grb2-Btk signalling module. *Nat Commun* 5, 5456

Ghalei H, von Moeller, Eppers D, Sohmen D, Wilson D, Loll B, Wahl M (2014) Entrapment of DNA in an intersubunit tunnel system of a single-stranded DNA-binding protein. *Nucleic Acids Res* 42(10), 6698-6708

Khoshnevis S, Gunisova S, Vlckova V, Kouba T, Neumann P, Beznoskova P, Ficner R, Valasek L (2014) Structural integrity of the PCI domain of eIF3a/TIF32 is required for mRNA recruitment to the 43S pre-initiation complexes. *Nucleic Acids Res* 42(6), 4123-4139

Köpfer F, Binkowski A, Bierwirth C, Dobbstein M (2014) The MAPK-activated protein kinase 2 mediates gemcitabine sensitivity in pancreatic cancer cells. *Cell Cycle* 13(6), 884-889

After passing through the translocase of the outer membrane (TOM) the precursor protein encounters the translocase of the inner membrane (TIM23). This multi-subunit complex is composed of Tim17, Tim21, Tim23, Tim50 and Mgr2. While initial precursor transport across the inner mitochondrial membrane is driven by the membrane potential, full matrix translocation depends on the presequence translocase-associated motor (PAM). The mitochondrial heat shock protein 70 (mtHsp70) is recruited to the TIM23 complex and provides energy for the process through ATP hydrolysis.

To achieve efficient forward movement of the precursor, motor activity needs to be temporally and spatially coordinated. Tim44 recruits mtHsp70 to the translocase exit site where its ATPase activity is stimulated by Pam18. To be bound to the translocase, this protein requires a specialized partner, Pam16. Despite the identification of these co-chaperones, the mechanism by which precursor progression is coupled to the motor activity remained enigmatic.

We established an assay that allowed us to analyze the integration of free subunits into the active translocase in isolated yeast mitochondria (Fig. 1A). In this assay, half of the TIM23 complexes were occupied by an arrested precursor that spanned both the TOM and TIM23 complex. The generation and maintenance of this intermediate requires the activity of the import motor (Fig. 1B). Radiolabeled translocase subunits were subsequently imported into these mitochondria using the vacant TIM23 complexes and their integration into the active, arrested, translocases was monitored by affinity isolations of the TOM complex. Surprisingly, we found

that Pam18, Pam16, Tim44 as well as Tim21 integrated into the active translocase (Fig. 1C). When we performed a detailed analysis of Pam18, we revealed that Mgr2 modulates its cycling. Taken together, these results show that recharging of the translocase with these co-chaperones at the TIM23 complex is required to maintain import motor function and, concomitantly, protein translocation into the matrix. Hence the constant replacement of import motor subunits at the active translocase is a prerequisite for continuous energy production by the organelle.

Christian Schulz worked on his doctoral thesis in the group of Peter Rehling at the Department of Cellular Biochemistry, University Medical Center Göttingen. He defended his PhD thesis in November 2013.

These results were published in *Nature Communications* (2014) 5, 4349.



Linnemannstöns K, Ripp C, Honemann-Capito M, Brechtel-Curth K, Hedderich M, Wodarz A (2014) The PTK7-Related Transmembrane Proteins Off-track and Off-track 2 Are Co-receptors for *Drosophila* Wnt2 Required for Male Fertility. *PLoS Genet* 10(7), e1004443

Lytovchenko O, Naumenko N, Oeljeklaus S, Schmidt B, Deckers M, Warscheid B, Rehling P (2014) The INA complex facilitates assembly of the peripheral stalk of the mitochondrial F1Fo-ATP synthase. *EMBO J* 33(15), 1624-1638

Melin J, Schulz C, Wrobel L, Bernhard O, Chacinska A, Jahn O, Schmidt B, Rehling P (2014) Presequence recognition by the tom40 channel contributes to precursor translocation into the mitochondrial matrix. *Mol Cell Biol* 34(18), 3473-3485

Milovanovic D, Honigsmann A, Koike S, Göttfert F, Pähler G, Junius M, Müller S, Diederichsen U, Janshoff A, Grubmüller H, Risselada H, Eggeling C, Hell S, Jahn R (2014) Hydrophobic mismatch sorts SNARE proteins into distinct membrane domains. *Nat Commun* 5, 5984

“All proteins of the membrane, assemble!”

Cholesterol driven multi-protein assemblies underlie the general organization of the plasma membrane

In the plasma membrane most proteins form clusters. Interestingly, these clusters themselves also tend to have patterned distributions rather than being randomly scattered. To find out if a general mechanism exists behind this observation, we aimed to see the big picture of membrane patterning: instead of focusing on interactions of individual protein species, investigate all proteins in the plasma membrane simultaneously. We achieved this by metabolic labeling of proteins in mammalian cells indiscriminately through incorporation of an unnatural methionine analogue for several days. This was followed by fluorescent tagging of proteins through a highly specific conjugation reaction, also known as the click reaction.

The direct labeling approach was combined with super-resolution imaging using stimulated emission depletion (STED) microscopy to be able to characterize the mesoscale (roughly 10-500 nm) aspects of the protein patterning in the plasma membrane. We

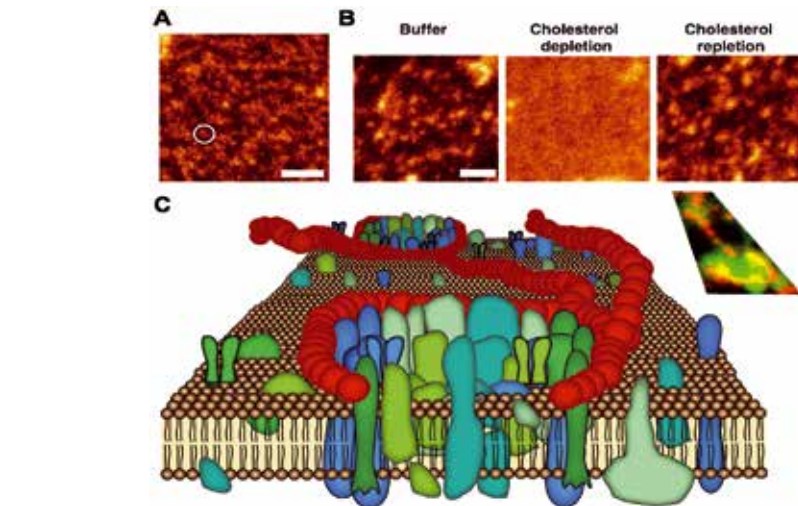


Fig. 1: (A) Super-resolution imaging of fluorescently labeled proteins in the membrane reveal the “protein assembly” organization (an example assembly is marked with a white circle). (B) The panels show high-zoom STED images of membrane sheets treated with buffer (negative control) or subjected to cholesterol depletion, which resulted in loss of the assembly organization. Repletion of cholesterol restored the assembly pattern. (C) The graphics represent the protein assembly organization in the plasma membrane. Different protein groups are shown in shades of blue and green, and actin is in red. The image on the right corner is a crop from a two-color STED image with click labeling of the assemblies (green) and immunostaining against actin (red).

have found that a general mosaic-like pattern governs the protein organization (Figure 1A). Multiple proteins were heterogeneously gathered into protein-rich domains surrounded by a protein-poor background. We

PhD-related publications 2014 (continued)

Moehlmann S, **Mathew R**, Neumann P, Schmitt A, Lührmann R, Ficner R (2014) Structural and functional analysis of the human spliceosomal DEAD-box helicase Prp28. *Acta Crystallogr D Biol Crystallogr* 70, 1622-1630

Mozaffari-Jovin S, Wandersleben T, Santos K, Will C, Lührmann R, Wahl M (2014) Novel regulatory principles of the spliceosomal Brr2 RNA helicase and links to retinal disease in humans. *RNA Biol* 11(4), 298-312

Park Y, Vennekate W, **Yavuz H**, Preobraschenski J, Hernandez J, Riedel D, Walla P, Jahn R (2014) alpha-SNAP Interferes with the Zippering of the SNARE Protein Membrane Fusion Machinery. *J Biol Chem* 289(23), 16326-16335

Plagens A, Tripp V, Daume M, **Sharma K**, Klingl A, Hrle A, Conti E, Urlaub H, Randau L (2014) *In vitro* assembly and activity of an archaeal CRISPR-Cas type I-A Cascade interference complex. *Nucleic Acids Res* 42(8), 5125-5138

have termed these high-abundance domains “protein assemblies” and characterized them using various complementary techniques and experimental strategies.

We studied their dynamics with STED-based fluorescence correlation spectroscopy in living cells. We also investigated the intermixing of the assemblies by two-color-STED microscopy after inducing cell-cell fusion. The protein assemblies were stable for minutes, although the individual proteins were dynamic. Then, we used isolated sheets of plasma membrane to assay contributions of different factors to formation and maintenance of the assemblies. The assembly pattern was surprisingly resistant to a variety of manipulations including alterations in ionic composition and strength, manipulation of protein density, disruption of cytoskeletal elements, and hydrolysis of phospholipids. However, when we depleted cholesterol from the membrane, the assembly pattern was almost completely eliminated in reversible fashion, allowing us to single out cholesterol as the main molecular

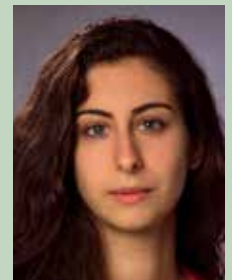
organizer of the protein assemblies (Figure 1B). Although disruption of actin cytoskeleton did not abolish the assemblies, it caused an increase in their sizes. Accordingly, actin was identified as a secondary factor that borders the assemblies and prevents their coalescence.

To probe the relevance of this general pattern to specific proteins, we investigated distributions of proteins of different classes with respect to the protein assemblies. All of the specific proteins analyzed were enriched in the assemblies as expected, but they displayed differential enrichment profiles. Many

proteins were preferentially located in particular areas within the assemblies, such as their edges or centers. Functionally related protein groups showed similar preferences, suggesting that functional protein-protein interactions create specialized subdomains within the assemblies. We conclude that the assemblies constitute a fundamental principle of the mesoscale membrane organization, which affects the patterning of most membrane proteins, and possibly also their activity (Figure 1C). We expect this organization to lay the membrane pre-arranged for rapid formation of more specific and functional units.

Sinem Saka Kırli completed her PhD thesis under supervision of Silvio Rizzoli, formerly at the European Neuroscience Institute and now at the Department of Neuro and Sensory Physiology in University of Göttingen Medical Center. She graduated from the Molecular Biology program in November 2013.

These results were published in Saka et al. (2014) *Nat Commun* 5, 4509.



Revelo N, Kamin D, **Truckenbrodt S**, Wong A, Reuter-Jessen K, Reisinger E, Moser T, Rizzoli S (2014) A new probe for super-resolution imaging of membranes elucidates trafficking pathways. *J Cell Biol* 205(4), 591-606

Ruskamo S, Yadav R, Sharma S, Lehtimäki M, Laulumaa S, **Aggarwal S**, Simons M, Buerck J, Ulrich A, Juffer A, Kursula I, Kursula P (2014) Atomic resolution view into the structure-function relationships of the human myelin peripheral membrane protein P2. *Acta Crystallogr D Biol Crystallogr* 70, 165-176

Saka S, Honigmann A, Eggeling C, Hell S, Lang T, Rizzoli S (2014) Multi-protein assemblies underlie the mesoscale organization of the plasma membrane. *Nat Commun* 5, 4509

Saka S, Vogts A, Kroehnert K, Hillion F, Rizzoli S, Wessels J (2014) Correlated optical and isotopic nanoscopy. *Nat Commun* 5, 3664

Schmidt HB, Görlich D (2015) Nup98 FG domains from diverse species spontaneously phase-separate into particles with nuclear pore-like permselectivity. *eLife* 4

Deciphering stem cells

Designing transcription factors for cell fate transitions

This story begins one evening some years ago when my wife returned home from an EMBO conference in Barcelona. At dinner she told me that she met Ralf Jauch at the conference and that he is working on a topic very near my research interests. Ralf is an old friend I met in Göttingen where we both graduated from the international graduate program on molecular biology. Apparently, he was striving to understand the mechanisms underlying the function of several transcription factors involved in cell fate transitions during embryonic development. Remarkably, at the same time I was establishing a small team in Münster aimed at studying the mechanisms by which transcription factors regulate stem cell pluripotency. However, apart from our similar goals, our approaches were different. While I am a computational biophysicist, Ralf is an experimenter in structural biology.

We both were studying Oct4 and Sox2, two transcription factors that play crucial roles in early embryonic development and were among the four factors in the minimal cocktail used by Shinya

Yamanaka and his team to induce pluripotency in somatic cells. Interestingly, Oct4 also plays an active role in the early stages of differentiation of embryonic stem cells. In pluripotent cells, the two

factors associate to bind predominantly to a composite motif formed by the juxtaposition of their individual binding sites named "Canonical". During differentiation into primitive endoderm,

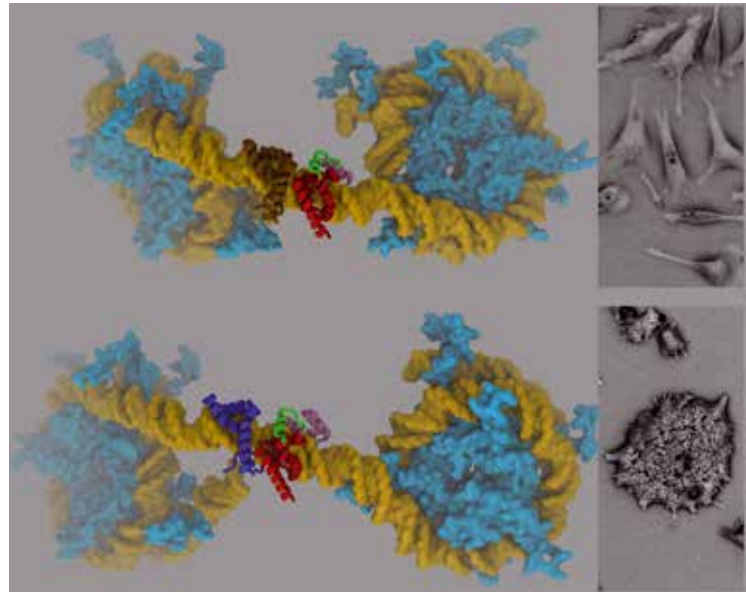


Fig. 1: The OCT4-SOX2 (bottom) and OCT4-SOX17 (top) complexes bound to the Canonical and Compressed motifs respectively. The two DNA binding domains of OCT4 are in red and mauve and the linker between them is in green. SOX2 is in dark blue and SOX17 in brown. DNA is in yellow. For artwork, two flanking nucleosomes are shown with the core histones in green. The illustrations of embryonic stem cells (lower left) and primitive endoderm cells (lower right) were provided by Kenjiro Adachi.

PhD-related publications 2014 (continued)

Schulz C, Rehling P (2014) Powering the cell cycle. *Science* 346(6213), 1059-1060

Schulz C, Rehling P (2014) Remodelling of the active presequence translocase drives motor-dependent mitochondrial protein translocation. *Nat Commun* 5

Soykan T, Schneeberger D, Tria G, Buechner C, Bader N, Svergun D, Tessmer I, Pouloupoulos A, Papadopoulos T, Varoquaux F (2014) A conformational switch in collybistin determines the differentiation of inhibitory postsynapses. *EMBO J* 33(18), 2113-2133

Truckenbrodt S, Rizzoli SO (2014) Spontaneous vesicle recycling in the synaptic bouton. *Front Cell Neurosci* 8, 409

Oct4 remains active and cooperates with the endodermal factor Sox17 to bind an alternative composite motif named “Compressed” which lacks one base pair between the individual sites comparing to the Canonical motif. Importantly, neither Oct4 and Sox17 cooperate to bind to the Canonical motif, nor Oct4 and Sox2 cooperate to bind to the Compressed motif. Ralf and co-workers designed a single point mutation in Sox17 and the mutant acquired Sox2 properties including cooperative binding with Oct4 to the Canonical motif and maintenance and induction of pluripotency. However, they failed to design a Sox2 mutant that acquires Sox17 properties. At this point, our successful collaboration began.

Since the structure of the Oct4-Sox17-Compressed complex was unknown, I proposed to apply molecular simulations to resolve the mysteries remained. Remarkably, from the simulations of the wild type Oct4-Sox2 and Oct4-Sox17 complexes bound to both DNA motifs we were able to reveal the structural basis for the Oct4-Sox17 cooperativity and explained the motif preference of different Oct4-Sox complexes. The

protein-protein interactions in the Oct4-Sox17-Compressed and Oct4-Sox2-Canonical complexes differ and are mutually exclusive. Then, we designed a Sox2 double mutant that we predicted and confirmed experimentally to act like Sox17. To further validate our findings, we performed additional simulations of six Sox2 and Sox17 mutants bound to the two DNA motifs and found a good correlation between their estimated and measured relative cooperativities. This ultimately shows that *in*

silico design of transcription factors to manipulate cell fate transitions is attainable and may contribute to future regenerative medicine approaches based on cell fate manipulation.

As for me and Ralf, we are now continuing this fruitful collaboration and we hope to have soon other great stories to tell. Would all this be possible without the two of us meeting and becoming friends in Göttingen?

Vlad Cojocaru worked on his doctoral thesis in the group of Thomas Jovin at the MPI for Biophysical Chemistry and graduated in 2005. Currently he is heading a project group on Computational Structural Biology at the MPI for Molecular Biomedicine in Münster.



Ralf Jauch worked on his doctoral thesis in the group of Herbert Jäckle at the MPI for Biophysical Chemistry and graduated in 2005. Currently he is principle investigator at the Guangzhou Institute of Biomedicine and Health of the Chinese Academy of Sciences.



These results were published in *Structure*, 2014, 22(9): 1274-86.

Warkocki Z, **Schneider C**, **Mozaffari-Jovin S**, Schmitzova J, Höbartner C, Fabrizio P, Lührmann R (2015) The G-patch protein Spp2 couples the spliceosome-stimulated ATPase activity of the DEAH-box protein Prp2 to catalytic activation of the spliceosome. *Genes Dev* 29, 94-107

Weiler S, **Krinner S**, Wong A, Moser T, Pangrsic T (2014) ATP Hydrolysis Is Critically Required for Function of Ca(V)1.3 Channels in Cochlear Inner Hair Cells via Fueling Ca²⁺ Clearance. *J Neurosci* 34(20), 6843-6848

Wilhelm B, Mandad S, **Truckenbrodt S**, Kroehnert K, Schaefer C, Rammner B, Koo S, Classen G, Krauss M, Haucke V, Urlaub H, Rizzoli S (2014) Composition of isolated synaptic boutons reveals the amounts of vesicle trafficking proteins. *Science* 344(6187), 1023-1028

Wysoczanki P, **Schneider C**, Xiang S, Munari F, Trowitzsch S, Wahl M, Lührmann R, Becker S, Zweckstetter M (2014) Cooperative structure of the heterotrimeric pre-mRNA retention and splicing complex. *Nat Struct Mol Biol* 21(10), 911-918

Students

Master's class 2014/15

Charlotte Blessing, Germany
BSc from University of Regensburg

Kai-Hsin Chan, Taiwan
BSc from National Taiwan University

Mohamed El-Brolosy, Egypt
BSc from German University of
Cairo

Ákos Farkas, Hungary
BSc from Eötvös Loránd University,
Budapest

Isaac Fianu, Ghana
BSc from University of Ghana, Accra

Mohammad Ghaem Maghami, Iran
MSc from Tarbiat Modares University,
Tehran

Zivojin Jevtic, Serbia
BSc from University of Belgrade

Adrian Kovac, Germany
BSc from University of Göttingen

Franziska Kretzschmar, Germany
BSc from Universität des Saarlandes,
Université de Strasbourg

Matija Kronic, Serbia
BSc from University of Belgrade

David Kuhs, Germany
BSc from Leibniz University Hannover

Marija Liutkute, Lithuania
BSc from University of Edinburgh,
Scotland

Matthew Logsdon, USA
BSc from Purdue University, Indiana-
polis

Michael Mitter, Austria
BSc from University of Göttingen



Vindhya Pillai, India
BSc from Sri Venkateswara College,
University of Delhi

Oleh Rymarenko, Ukraine
BSc from Taras Shevchenko
National University of Kyiv

Claudia Schmidt, Germany
BSc from Ludwig-Maximilians
University Munich

Julia Schröder, Germany
BSc from Gottfried Wilhelm Leibniz
University Hanover

Madhobi Sen, India
BSc from Sri Venkateswara College,
University of Delhi

Shama Sograte Idrissi, Morocco
BSc from University of Padua, Italy

Swati Subramanian, India
BSc from Sri Venkateswara College,
University of Delhi

Harald Vöhringer, Germany
BSc from University of Göttingen

PhD projects started in 2014



Aleksandar Chernev
Targeted proteomics in proteins expression and oncogenic signaling.
Henning Urlaub
Markus Bohnsack
Tim Beißbarth



Martin Helm
The dendrite nanomap.
Silvio Rizzoli
Nils Brose
Bert de Groot



Frank Richter
Coupling of import to protein assembly in mitochondria.
Peter Rehling
Stefan Jakobs
Nils Brose



Constantin Cretu
Structural and functional investigations of the human SF3b1 (hSF3b) complex.
Vladimir Pena
Patrick Cramer
Henning Urlaub



Tahere Kalantary Dehaghi
Intracellular trafficking of proteins to presynaptic sites.
John Chua
Dieter Klopfenstein
Stefan Jakobs



Minhui Su
Neuronal regulation of myelination and myelin plasticity.
Mikael Simons
Blanche Schwappach
Steven Johnsen



Ridhima Gomkale
Structural and functional analysis of mitochondrial translocases.
Peter Rehling
Holger Stark
Patrick Cramer



Stefanie Krinner
Heterogeneity of sound encoding at inner hair cell ribbon synapses - A molecular and biophysical study of single active zones.
Tobias Moser
Erwin Neher
Stefan Hell



Oleksandr Yagensky
Elucidation of signaling pathways involved in neuronal intracellular trafficking.
John Chua
Dieter Klopfenstein
Dirk Görlich

Applications 2014

In the year 2014, the Molecular Biology program received 532 applications from 65 countries.

Germany 40
other Western Europe 16
Eastern Europe 52
North America 19
Central/South America 11
North Africa 51
Central/South Africa 46
Asia, Near East 41
Asia, Far East 256

External MSc projects

H. Alice Buchner
Role of histone demethylases (HDMs) in mouse embryonic stem cells.
Main supervisor: Prof. Stuart H. Orkin, MD
Assistant supervisor: Partha Pratim Das, PhD
Harvard Medical School

Students

Graduated

The Masters of 2014

Toni Bäumlér

(Göran Andersson, Karolinska Institutet, Stockholm, Sweden)

Determination of targets and potential inhibitors of tartrate-resistant acid phosphatase (TRAP) in a breast cancer cell line (MDA-MB-231)-based system.

Nora Cascante Estepa

(Jörg Stülke)

Carbon metabolism and RNA processing in *Bacillus subtilis*.

Aleksandr Chernev

(Ivo Feußner)

Alkene-producing enzyme from *Tribolium castaneum*.

Constantin Cretu

(Vladimir Pena)

Towards the structural investigation of proteins that drive the conformational transitions of the spliceosome.

Stefan-Sebastian David

(Wolfgang Fischle)

Preparation of histone thioesters and modified histone octamers as substrates for nucleosomal arrays.

Anne-Sophie Ernst

(Uwe-Karsten Hanisch)

Signaling contributions of CD14 in TLR4-challenged microglia.

Tahere Kalantary Dehaghi

(Sandra Göbbels)

Functional consequences of Sip1 inactivation in oligodendrocyte lineage cells of the CNS.

Mohammad Karami Nejad Ranjbar

(Ernst Wimmer)

Germline transformation efficiency of different variants of piggyBac trans-

posase in *Tribolium castaneum* and *Drosophila melanogaster*.

Goran Kokic

(Marina Rodnina)

Monitoring co-translational protein folding in real time.

Stefanie Krinner

(Tobias Moser)

Spatiotemporally resolved imaging of single active zone function.

**Alexander Schendzierlorz**

(Peter Rehling)

Characterization of the presequence binding capacity of Tim44.

Susanne Schlick

(Matthias Döbelstein)

Inhibition of HSP90 as a novel chemotherapeutic strategy in ovarian cancer.

Manuel Maidorn

(Silvio Rizzoli)

Design of new affinity probes for super resolution microscopy.

Nataliia Naumenko

(Peter Rehling)

Characterization of Ina17, a novel F1Fo ATP synthase assembly factor.

Navaneethan Palanisamy

(Claudia Höbartner)

Fluorescent functional ribonucleic acids (RNAs) for sensing c-di-AMP: An essential second messenger of pathogenic Gram-positive bacteria.

Daryna Tarasenko

(Lutz Walter)

Cloning and functional analysis of antibody single chain variable fragments.

Ahmed Warda

(Markus Bohnsack)

Analysis of the RNA methyltransferase Emg1.

Oleksandr Yagensky

(Sandra Göbbels)

Identification of novel factors triggering oligodendrocyte differentiation.

The Doctors of 2014

**Kevser Gencalp**

Nuclear export of actin: A biochemical and structural perspective.

*Dirk Görlich
Jörg Großhans
Peter Rehling*

**Simone Mayer**

Molecular mechanisms of collybistin-dependent gephyrin clustering at inhibitory synapses.

*Nils Brose
Reinhard Jahn
Blanche Schwappach*

**Halenur Yavuz**

In vitro investigation of trans SNARE complexes arrested between artificial membranes.

*Reinhard Jahn
Dirk Görlich
Silvio Rizzoli*

**David Haselbach**

Conformational dynamics of large protein complexes.

*Holger Stark
Kai Tittmann
Jörg Enderlein*

**Jonathan Melin**

Import of presequence-containing precursor proteins into mitochondria.

*Peter Rehling
Ivo Feußner
Christian Griesinger*

**Christian Hoffmann**

Structural investigation of the histone chaperone complex FACT using genetically encoded cross-linkers in *Saccharomyces cerevisiae*.

*Heinz Neumann,
Wolfgang Fischle,
Steven Johnsen*

**Jennifer Seefeldt**

Analyzing the eukaryotic translation initiation apparatus and new approaches in affinity chromatography.

*Dirk Görlich
Marina Rodnina
Volker Lipka*

**Samir Karaca**

MS-based quantitative analysis of the CRM1 export pathway and spatial proteomics of the *Xenopus laevis* oocyte.

*Henning Urlaub
Dirk Görlich
Ralph Kehlenbach*

**Upadhyayula Sai Srinivas**

Role of 5-FU in DNA double strand break repair for improved targets in colorectal cancer therapy.

*Matthias Dobbstein
Wilfried Kramer
Holger Reichardt*



My Canadian Journey

My career in neuroscience began as a graduate student in Dr. Reinhard Jahn's lab where I studied the molecular mechanisms of neuronal membrane fusion. For my postdoctoral research, I moved to the laboratory of Dr. Ann Marie Craig at the University of British Columbia in Vancouver, Canada. I worked extensively on the molecular mechanisms of neuronal synapse development and function, specifically on a category of proteins known as "synapse organizers".

Many of the genes encoding synapse organizing proteins have been linked to a variety of neurodevelopmental and psychiatric disorders including autism and schizophrenia. I published my research findings in reputed journals such as *Neuron*, *Journal of Neuroscience* and *Human Genetics* and also obtained independent grants which helped me secure a tenure-track research position at the University of Manitoba in Winnipeg.

I made a conscious decision to stay back in Canada as I realized that there is much more stability and security in terms of research funding and salaries which many universities in the United States could not guarantee.

Moreover, the University of Manitoba allowed me to hire my wife Nirmala, also a graduate of the Molecular Biology program, as a research associate in my lab. This arrangement is of mutual advantage as it enables us to work as a team.

Together, we hope to carry forward our research on the molecular mechanisms of synapse development with a particular focus on how selective brain circuits develop. We hope this work will contribute to our un-



Tabrez J. Siddiqui in his laboratory at the University of Manitoba

derstanding of synaptic dysfunction in mental illnesses. Our laboratory is located in the newly built Kleyesen Institute for Advanced Medicine (KIAM), part of the extensive Health Sciences Complex in downtown Winnipeg. One of the highlights of this position is that it enables both basic and clinical neuroscience research collaborations in this well-knit research environment.

Winnipeg is one of the coldest cities in the world with temperatures dipping to as low as -50°C in winter which would scare most people away from thinking of a more permanent move. But with appropriate winter gear and temperature controlled homes, we already feel very comfortable in our first winter here.

Thanks to the amazing adaptability of the human body, -20°C now feels comfortable. Our hangout places for the weekends include indoor malls,

play areas to entertain our four year old son, and restaurants. Winnipeg is known to be a friendly city as the state of Manitoba proudly boasts of its epithet 'Friendly Manitoba'. Being a relatively small compared to large North American cities, Winnipeg is also known to have a very favorable environment to raise children as it is blessed with reasonable home prices, good school systems, strong supportive communities offering sports leagues, programs, classes and events for children and families. These factors were comfor-

ting to know and helped us in deciding to move to one of the coldest parts of the world.

Tabrez J. Siddiqui did his doctoral research under the supervision of Reinhard Jahn in the Department of Neurobiology at the Max Planck Institute for Biophysical Chemistry. He graduated from the Molecular Biology Program in 2006. Afterwards, he joined the Brain Research Centre at the University of British Columbia Hospital in Vancouver, Canada as a postdoctoral fellow. In 2014 he accepted a tenure-track professorial position at the University of Manitoba, where he started his lab at the Kleyesen Institute for Advanced Medicine in Winnipeg.

Footsteps of Dante

I was invited to the interviews of the IMPRS Göttingen in April 2003. We stayed at a guesthouse where my bed was just under an oblique ceiling window on top of which sprouting spring flowers were nudging as the wind swiped them. Apparently, this rare combination of boutique lofts and excruciating foliage in Germany was among the first motivation to make a career here. I got my MSc in Göttingen in 2005, the same year when I started PhD in Christiane Nüsslein-Volhard's lab in Max Planck Institute for Developmental Biology in Tübingen. I was in the lab of this Nobel Prize laureate, whose poster I had been seeing every day at the exit of my college auditorium. Life has a weird karma! I started working on tissue regeneration in zebrafish.

Not the answers, but the questions lead us to consistent conclusions. I always loved asking questions even the ones that looked odd to most people. In my PhD, my question was maybe also a naïve one: what are the molecular mechanisms that make some organisms able to regenerate? I believed that regeneration could have specific molecular programs that nobody had ever identified. After long years, together with Christopher Antos, who was a postdoc at that time, we could find corroborative evidence that specific regeneration programs could indeed prevail while tissues regenerate in zebrafish.

I moved to Dresden as a postdoctoral researcher in Michael Brand's lab in 2009. I carried my initial question to central nervous system and became interested in regeneration of neurons in

the brain. We identified several genes and pathways, which could be part of a molecular program that zebrafish might use universally to regenerate its brain. These findings were novel and of great importance to regenerative



Caghan Kizil at the zebrafish facility of the DZNE/CRTD in Dresden
Photo: Martin Kaßner, CRTD

medicine because they suggested the presence of molecular programs that underlay the regenerative capacity and stem cell response in vertebrates. Those programs could one day be used in clinical settings.

In 2013, I received an internationally competitive Helmholtz Young Investigator Group award and established my laboratory in January 2014 at the German Centre for Neurodegenerative Diseases (DZNE) Dresden site within the Helmholtz Association, directed by Gerd Kempermann, a leading figure in adult neurogenesis field, and beyond it an excellent mentor and colleague. I am currently working on neurodegenerative diseases and plasticity response of the neural stem cells in a broader regeneration context.

With an excellent and motivated team, we are testing the hypothesis if the key success of regenerating organisms is to turn on specific programs, and whether

we could harness this knowledge for designing regenerative therapies.

Most of the time, when you proceed in your career, you walk into a business where you need skills you had not been educated for. The psychologist, decision-maker, accountant, and PR-person: all you! So, it is quintessential to put together an excellent team - a collage of people who are getting along, considerate, tolerant and empathetic. I feel lucky that our team can do all these and more. A marvellous thing is to have a collective mind and character in the lab. Labs do have a personality. I am trying to generate a family in the lab, putting the people at

first, not the projects. We are generating our way of living despite the external stress. We are of course listening to comments and suggestions, but at some point you have to realize that it is you who has the responsibility, and it is only yourself who to blame if things go wrong. In the end of the day, Dante is right: "you follow your own path, and let the others talk".

Caghan Kizil graduated from the Molecular Biology program with an MSc degree in 2005. After his doctoral studies at the MPI for Developmental Biology in Tübingen he moved to CRTD TU Dresden for his postdoctoral research. In 2013, he received a Helmholtz Young Investigator Group award and established his laboratory at the German Center for Neurodegenerative Diseases Dresden.

Becoming a patent attorney

Becoming a patent attorney is almost never a straightforward decision. Natural sciences and law are performed by nearly mutually exclusive breeds of people. Most natural scientists I know consider law studies excruciatingly mundane. On the other hand, for many lawyers molecular biology borders on occultism. Naturally, unlike firemen, only few people ending up combining these disciplines had consistently planned on doing so. I am, of course, no exception.

Even though my father, being a lawyer, had instilled me with a certain interest for law, I started studying biology. At this point, a career based on science and law alike appeared far-fetched and, entering the Molecular Biology program, this thought was pushed aside by my love for science. Then again, towards the end of my PhD studies, my doubts increased whether this love would be mutual and everlasting. With the kind help of Prof. Mary Osborn, who supported me in investigating my career perspectives, I gained confidence that patent law was a good alternative to a life in science.

There exist relatively few patent attorneys. In Germany, their number is about 3,300 (for comparison there are more than 160,000 lawyers). Aside from the perceived incompatibility of disciplines mentioned above, the main reason why few people decide for this profession is probably the long education. German patent attorney candidates need a minimum of three years of legal training in addition to their scientific qualification (usually a PhD). Two years of this are on-the-job training in a patent attorney firm, a further year (without pay) to be spent at the German Patent and Trademark Office and the Federal Patent Court. The curriculum



is concluded with an exam at least as strenuous as the Master's examinations after the first year of the Molbio program. Succeed and you can call yourself German patent attorney. Unfortunately, that is often not end of the story. In fact, irrespective of whether you work as a freelancer or as an employee (e.g. for a pharmaceutical company or law firm) the additional qualification as a European patent attorney will become necessary at some point.

The reward for enduring all this hardship is a relatively well paid job that will challenge you every day with a different scientific or legal problem. When drafting patent applications, you will work directly with inventors and discuss with them their science and its practical application. You will defend your clients' patents against third parties in court and participate in patent infringement proceedings. Last but not least, you will spend a considerable

amount of time negotiating the grant of patents with the German or European patent office. Apart from the different scope, work as a patent attorney has some similarities to working as a scientist. For those susceptible, the potential for self-exploitation is virtually limitless. Irregular working hours and weekends are not unheard of. There is a lot of scientific reading involved and "life-long learning" is a prerequisite for doing the job right.

Besides having a satisfying, occasionally even amazing job and getting to read a lot of exciting science, a major asset of my life as a patent attorney is living in Munich. The city is lovely, colorful and on some days has a southern European charm to it (some call it Italy's northernmost city). Also, the mountains are nearby. In fact my wife and I spend every Sunday dragging our reluctant kids up and down the Bavarian Alps.

As a personal résumé, even though my affection for science has never left me, becoming a patent attorney has definitely changed my life for the better. Thank you Mary.

Roland Graf did his doctoral research under the supervision of Gerd Vorbrüggen at the Max Planck Institute for Biophysical Chemistry. He graduated from the Molecular Biology Program in 2007. After three years of training he became German patent attorney and, two years later, European patent attorney. Since 2011 he is associate at Jones Day, Munich. Roland is married and has two daughters.

Science through the looking glass of politics

Lessons learnt from our Traineeship at the European Research Council in Brussels

Imagine a room of about 1,000 people, most coming directly from university with a Master's degree and an age average of 27 years. We are from over 50 different countries and everybody is very formally dressed. High-up members from the European Commission, Parliament and Council are giving motivational speeches. We are constantly told about how we have gone through a tough selection, with a success rate of 4%, and that working for the EU is a big deal – we can actually impact on the life of people in the Europe of tomorrow. Can you imagine how psyched we were at the end of this first day of our Traineeship at the European Commission?

The next work day, we will go to our new workplace. Formally dressed? Check! Entrance badges? Check! Transport ticket? Check! We take the tram and the two subway connections that lead us to the European Research Council (ERC), which is located in one of the new glossy-looking buildings in Brussels.

Fast forward a few weeks and it feels like we are an integral part of the ERC. The fact that we keep switching between four different languages every day in the office is no longer confusing. We have attended so many meetings by now that we know more about European politics and

budget management than we ever deemed acceptable. And probably the oddest part about it all is that we enjoy it – we even talk about it in



Ulf Leonhardt explains the science of invisibility to Simone and Cadu at TEDxBrussels

our free time with our new peers. We are constantly looking into the news first thing in the morning because the meetings are always reacting to the newest political developments. It is as if every lab meeting agenda would be the paper that just popped up on your feed 15 minutes ago, and if you didn't see it or didn't manage to read it, you won't be able to follow the meeting. Exciting times!

In our day-to-day work, we do a bit of everything – from programming databases and checking for recent publications in different parts of Europe to writing a press release explaining the significance of the new Nobel Prize in Physiology or Medicine within a few minutes from its announcement. We are actually doing much more science stuff than expected. However, by science here, we mean all sciences.

We are constantly exposed to new developments in engineering, social sciences, humanities physics, chemistry and biology. A highlight in this respect has been the recent TEDx conference in Brussels, at which five ERC grantees explained their research to the audience gathered in the theatre hall and many thousands following it online. We had the chance to meet many of the speakers in the coffee breaks, among them Ulf Leonhardt from

the Weizmann Institute. He explained his research on the physics of

continued on next page

Simone Mayer worked on her doctoral thesis in the department of Nils Brose at the Max Planck Institute for Experimental Medicine. She graduated from the Molecular Biology program in June 2014.

Carlos Eduardo Lima da Cunha worked on his doctoral thesis in the department of Marina Rodnina at the Max Planck Institute for Biophysical Chemistry. He graduated from the Molecular Biology program in June 2013.

Science through the looking glass of politics (continued)

invisibility and impressively demonstrated how special balls are invisible in water. From the ERC grantee Kirsten Hastrup from Copenhagen we learned how important it is to study climate change from an anthropological perspective and we discovered how local people already respond in different ways to changes in their water supply.

At the 6th European Innovation Summit, which was held in the European Parliament, we could contribute to the discussions on how to make Europe more competitive when it comes to translating research findings to applications that will benefit society as a whole. Just as it is mind-boggling to find out how your protein accomplishes a certain task in a cell, it is mind-boggling to understand how research can be translated into new technologies in different disciplines.

But at the same time, we are also getting to know the mechanics at work inside a funding agency. The ERC invited representatives from funding agencies all over Europe for a workshop so they could share their experience with different funding schemes and how these can be integrated on a European level. This links well to the efforts of the ERC in analyzing the projects and researchers funded, which we are deeply involved in. We are constantly analyzing the performance of grantees by reading their papers and putting their results in the context of their field of research to determine the impact of the research on the field and society as a whole.

Of course an agency such as the ERC requires some very science-aware administrators – and this was by far one of the most pleasant surprises.

Despite of being almost all managers with a business background, our colleagues are all very interested in science and its impact in Europe. This makes us constantly wish that the reciprocal was also true – if scientists were also more aware of the effort that the people in granting agencies go through and could work with them, research might move at much larger leaps.

Carlos Eduardo Lima da Cunha
Simone Mayer

Current profession and location of our PhD alumni

Profession

Academia / Research

Professors, group leaders, permanent staff positions: 13 %
Postdocs: 52 %
Science management, public relations: 6 %

Private Enterprise

Consulting: 3 %
R&D scientists, lab heads: 11 %
Management: 9 %
Patent attorneys: 2 %

Other

e.g. other professions, family management, job applications: 4 %

Country Distribution

Europe

Germany: 53 %
Switzerland: 7 %
United Kingdom: 7 %
Belgium: 2 %
Denmark: 2 %
Turkey: 2 %
Estonia: 1 %
Netherlands: 1 %
Poland: 1 %
Spain: 1 %

North America

United States: 14 %
Canada: 5 %

Asia / Australia

China: 2 %
Australia: 1 %
Bahrain: 1 %
India: 1 %
Iran: 1 %
Singapore: 1 %

Papa at home

How twelve months of parental leave helped my family and my career

„What, a whole year?“ It was this response, a mixture of incredulity and incomprehension, that I mostly got when telling people that I was planning to take twelve months parental leave after the birth of our daughter. Some even envisioned me as house husband for the rest of my life. Admittedly, there was some risk involved as I did not have a secure job perspective at the time. Still, I am certain the reactions would not have been the same if I was a woman. Fathers who take off more than two months for their children are still more exception than the rule.

I also knew that in times when CVs include an invisible sub-headline „mind the gap!“, such a long break is quite unusual. However, I have had the wish to take some time off for my (prospective) children long since. And, even more important, my partner Anna and I wanted to equally share all the efforts and joys that raising a child bring along.

At the time when our daughter Runa was born I had just completed my first year as a postdoc in the same lab where I had also done my PhD. For a long time I had decided that I did not want to continue research. Instead, I had the wish to enter science communication. Anna was approaching the end of her studies to become a physician, having taken off one and a half years for her doctoral thesis already. My long parental leave, we hoped, would help us in various ways: First, it would allow me to orient myself as to what exact career path I want to follow. Secondly, it would give Anna the opportunity to complete her studies with only a short additional delay.

So I did not extend my postdoc contract but performed my last scientific experiments (ever?) and entered one of the most exhausting, but also exciting and varied years of my life. After having spent two months at home with Anna and Runa, I did an internship at the press office of the Max Planck Institute for Biophysical Chemistry. I liked



Frederik, Anna and Runa

the work a lot and was quickly determined to seek a job in academic public relations. In the following spring and summer I indeed became house husband while Anna completed her last semester and studied for her state examination. In parallel, I used the little spare time I had – mostly in the evenings – to work as a freelancer, writing press releases for research groups of the GZMB to gain some work experience. Runa being a wonderful but nevertheless demanding child, these months were quite tough for Anna and me: A good night's sleep was rare and there was hardly any time left to spend on anything different than childcare, household duties, or work.

In parallel, I of course had to look for a job. Options in and around Göttingen were limited. In the end, fortune

smiled at me: Carmen Rotte, my boss at the press office at the Max Planck Institute for Biophysical Chemistry during my internship, called me one day in September and offered me a position in her team that had just become available. Not needing to think twice, I accepted.

Now, my year of parental leave is over. I am working thirty hours a week. Anna's practical training in a Göttingen hospital is a full-time job. Runa is already 15 months old. She spends eight hours a day in the day-care, and we are very glad she likes it. She is fantastic, and having her with us is the greatest gift we can imagine. Life is still tough, but the challenges changed somewhat. Sometimes we feel it is all about managing the day. Having a good plan, it can work. However, even the most carefully planned week may end in chaos if Runa falls ill. And the day-care being a major germ breeding ground, this can happen often. Luckily, Runa can bring joy even to the most exhausting day.

Looking back at the past year, we are very happy how it all worked out. And being in the same situation again as I was at the time of Runa's birth, I would not decide any different: Yes, a whole year.

Frederik Köpper completed his doctoral research in the group of Matthias Dobbels at the University Medical Center Göttingen. He graduated from the Molecular Biology program in October 2012.

Keep an open mind and embrace change

I never planned to move to Saudi Arabia. But neither did I plan on spending four years in Houston, Texas. Both these places are worlds apart from Göttingen but what an amazing experience it has been. If I were to give anyone starting out in this business a piece of advice, it would be to keep an open mind and embrace change. Sometimes the most unlikely of places and opportunities will provide you with the most exciting experience, not to mention the challenge of living in a completely different world.

The founding of King Abdullah University for Science and Technology (KAUST) marks a clear revolution in the education and research trend in the region. The university represents a collaboration between the people from



The interior of one of the four research buildings. The building consists of three floors with large windows at the end facing either the desert or the Red Sea. The labs are housed on both sides where you see the low ceilings. Each lab has about 200 to 300 square meters of space which can be customized to suit the requirements. Generally, the lab staff and students sit outside the labs at the cubicles.



Entrance into the campus from the parking garage. The KAUST campus complex is designed to permit maximum air flow and sufficient sunlight exposure. The building on the left is where our lab is situated. The campus is also littered with fountains which provide a wonderful atmosphere for chilling with a coffee.

different backgrounds, nationality, race and religion, where prejudice and discrimination is replaced by a common goal to discover and learn. People that come to KAUST usually have a similar profile; an interest in science, an adventurous spirit and an open mind eager to experience the Middle Eastern culture and hospitality.

While commercialization is an important aspect, the university also recognizes the importance of publishing and free access of information to the public. For example, the Red Sea Research Center (RSRC) shares fish mi-

gration data with the fisheries department for sustainable fishing in the Red Sea and much of the research from the photovoltaic department is implemented in the solar panels on the roof of the university that provide part of the energy needed to run the labs. As a member of the only protein crystallography and biochemistry group here, I am involved in a variety of projects. These include engineering proteins for use as sensors and studying novel proteins from organisms in the Red Sea. This diversity in the topics keep my professional life interesting and allows me to constantly learn and explore new areas in science.

The KAUST compound consist of the university as well as housing for staff and students. When I arrived in KAUST



The campus mosque is where the staff and students pray during working hours.

with Kasia, my wife, we were assigned a fully furnished villa. This really made moving here easier since we don't have to commute from Jeddah (about



Jeddah Old Town – Scene from the Jeddah old town (Al Balad) historical festival. The photo was taken from the roof of one of the historical houses which was formerly the king's palace (Naseef House).

an hour away) and, with the language barrier; we avoid negotiating rental contracts in Arabic. Furthermore, the security within the compound is very high. So high, that I don't own a bike lock anymore. The KAUST compound is governed by its own set of rules. For example, women are allowed to drive within the compound and they are not required to wear the abaya (the long black robe).

Our leisure time is spent traveling, diving and enjoying the outdoors in the



KAUST campus at night.

Arabian Desert. Lately, I have become interested in astronomy and there are very few dark sites left in Europe and North America that can provide the level of detail I see when I go into the desert here. We have also enjoyed many diving and snorkeling trips. Last year, during the whale shark season, we managed to see eleven whale shark sightings in two days. An added treat was watching the marine biology students tag these sharks with transmitters to track their migratory pattern.

There's no doubt that our time in Saudi Arabia is limited. Our contract has a 3-year expiry date. But in that time, I am confident that we will experience a completely new culture, learn Arabic (which we have started for the last 2 months) and see a side of the world that tends to be misunderstood and misrepresented in the media. Who can ask for more, eh?

Anand Radhakrishnan



Wahba crater at night. Approximately three to four hours east of Jeddah there is a volcanic range called Harrat. There are some amazing lava fields and volcanic formations in this area. An example is the Wahba crater which is about 2.5km in diameter and 200m deep.



The KAUST library was awarded the Merit award for design in 2011 by the American Institute of Architects. Every month the university hosts a sunset classical concert by the staff and students of the university at the library.

Anand Radhakrishnan

received his MSc degree from the Molecular Biology program in 2003. He continued with a PhD thesis in the group of Reinhard Jahn at the MPI for Biophysical Chemistry and graduated in 2007. After four year of postdoctoral research in Houston, TX, USA (MD Anderson Cancer Center and Rice University) he took up the position of a research scientist at the King Abdulla University of Science and Technology (KAUST) in Saudi Arabia.

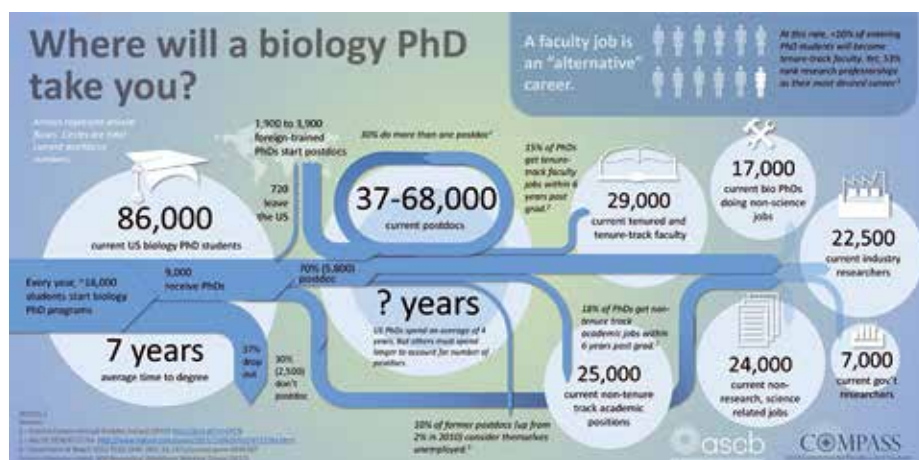
Inform yourself, and choose wisely!

The career track of PhD students used to be straightforward, at least in the mind of most scientists in the academic field. You study hard, you'll work hard, you'll get a paper or more, you'll become a scientist. Then you move on and find a new university, where you will learn new skills, develop and follow your own scientific ideas under the mentorship of an experienced mentor. Your primary focus as a postdoc is to develop your own research track, publish many papers, get exposure, learn the necessary skills needed to run a lab and teach classes, and network. Then you use your network to become a new faculty member and you now become the mentor to graduate students and postdocs. The academic cycle completes.

The reality is very different, and unfortunately most graduate students do not know this, or refuse to acknowledge the reality. Today's reality is that the academic career has become the 'alternative' career. The American Science for Cell Biology recently reviewed data on the on-the-job prospects of current US graduate students and postdocs (<http://www.ascb.org/ascbpost/index.php/compass-points/item/285-where-will-a-biology-phd-take-you>). The report is devastating: Assuming that average postdoc training is 4 years, and the average scientist works 30 years after the postdoc that means that per year 9,000-17,500 postdocs press into the academic job market, while only about 3,200 scientific positions become available per year, almost evenly split between academia and industry. Tenure-track professorships only make up about 25% of these positions. In other words, the academic track of becoming a professor is the real 'alternative' career and working in science-related jobs in industry is the norm.

Postdocs and graduate students here have become painfully aware of the hypercompetitive state of scientific jobs. Many of us chose this avenue because we love science and we believe in improving humanity through

programs available, it still produces 7,000 graduates per year and only 6% of those will eventually secure full-time academic positions (<http://www.nature.com/news/2011/110420/full/472276a.html>).



research, and thus are willing to engage in decade of training with little compensation, chasing for the one experiment that proves we had the right idea. In my work as campus chair for the Postdoctoral Union at UCSF I meet many postdocs that are disillusioned, feeling betrayed by the promise of an academic future, and exploited by their professors who use them as cheap labor. Professors in turn are caught in highly competitive grant application cycles, eating away the little time they have to provide what students and postdocs require most, good career mentorship and scientific training.

This problem isn't just unique to the scientific powerhouse USA. The data for the UK looks even worse (https://royalsociety.org/~media/Royal_Society_Content/policy/publications/2010/4294970126.pdf). While Germany seems to be on the right track by limiting the number of graduate

There is no quick fix in sight. While discussions on how to improve the research training system have started, implementing changes will take years, if not decades. At the same time, governmental research support in the US has fallen to levels below those of 1990 due to inflation and the use of more expensive research tools (<http://nexus.od.nih.gov/all/2014/03/05/comparing-success-award-funding->

Bijan Boldajipour graduated from the Molecular Biology Program / IMPRS in 2009 and is currently a fifth-year postdoc at the University of California San Francisco. He is also part of the leadership team of the Postdoctoral Union that represents over 6,000 postdoctoral scientists at all University of California campuses.

Research Alumni Conference

Inform yourself (continued)

rates/). European research support is higher, but job prospects in academia are dire. As graduate students and future postdocs you need to be aware of what the future prospects are. Use the time the PhD gives you to explore other options than just the academic track. Find out where your real interest is, what you are looking for in life and work. Copying the career your mentor had some 20 years ago may not be what you want – and it may not be possible either.

This type of soul searching is daunting, even painful. But there are tools to help you: ideally you identify someone around you that can act as a career mentor. This person sits down with you and helps you realize what type of work you like, where your skills are, and what you need to work on in order to get a job that makes you happy. Unfortunately, few professors do this so most graduate students do not have access to such a person. For this reason, Science Careers has started the Individual Development Plan (<http://myidp.sciencecareers.org/>), a system designed to help you move your career forward. While a computer questionnaire is not going to do the work for you, it is a good help to get you started on thinking about your career options. Because in the end it is you who will choose what type of career you are going to go for. So inform yourself, and choose wisely!

Bijan Boldajipour

This year's alumni conference was held on September 11-12, 2014 in the beautiful city of San Francisco, California at the Fort Mason Center. The meeting is part of the collaborative project "International Research Marketing", a joint initiative funded by the Alexander von Humboldt Foundation, the German Academic Exchange Service, the Deutsche Forschungsgemeinschaft and the Fraunhofer Gesellschaft.

The meeting was about the digital transformation, how it will impact research, science and teaching and the media we will be using in the future. Digital libraries, web applications and digital data curation will change the landscape of university libraries and the way we access the ever increasing amount of data available. Leading experts in the topic were invited to speak about the current state and the future direction that the digital transformation will take. Invited speakers included Ulrike Beisiegel, President of the University of Göttingen, Norbert Lossau, Vice-President of the University of Göttingen and MacKenzie Smith, University Librarian at UC Davis and Wolfram Horstmann, University Librarian, Göttingen to name a few.

At night people had the opportunity to mingle, socialize and network. On the first night, participants were invited to dinner at Forbes Island, a restaurant on an artificial island across from Pier 39. This was a great opportunity to meet alumni that had studied in Göttingen throughout the years and it was great to get together with professionals from a variety of different disciplines in a casual atmosphere. I met alumni that had been in Göttingen in the 1970's, 80's and 90's and it was good to hear some of their stories and experiences they had in the city that all of us know so very well. The Molecular Biology and

Neurosciences programs were well represented with current students and alumni and it was great to meet old and new friends from both Max Planck Research Schools.

The second day the conference ended with a reception at the German consulate hosted by German Consul General Stefan Schlüter. The guest speaker of the evening was Karen Breslau who talked about some of her memories of her time as a journalist. Karen Breslau began her career as a journalist for Newsweek magazine. As a foreign correspondent she was based in Germany covering the fall of the Berlin Wall, the Romanian revolution, the Soviet coup, the German unification and the Yugoslav Civil War. Hearing how she experienced these historic events was definitely the highlight of the evening.

All in all the conference was a very informative and inspiring experience, not only because the conference program was very interesting but also because the socializing and networking events were especially fun and a good opportunity to network and connect with other Göttingen alumni. I am sure many of us are already looking forward to the next alumni conference.

Daniel Zwilling

Daniel Zwilling did his PhD with Reinhard Jahn at the MPI for Biophysical Chemistry and graduated from the Molecular Biology Program in 2005. He continued his research at the J. David Gladstone Institutes, UCSF. Currently he is leading a small group of scientists in research on Parkinson's Disease at Circuit Therapeutics, Menlo Park, CA.

“Once-in-a-lifetime” opportunities

After finishing my PhD in Göttingen, I had a crazy idea: travel half-way around the world by motorcycle. Experience new cultures, see more of wonderful Mother Nature, and live a dream for a bit. After all, you only live once. With that in mind, I left Göttingen in autumn 2009 on a second-hand military motorcycle to cross Asia and end up in Kathmandu some five months later (see Molbio newsletter, Jan 2010, p. 22-23). Then, I had thought, after taking this once-in-a-lifetime opportunity, I could settle down and become serious about life, career, etc.

Or so I had thought. Except that adventure motorcycle travel is one of the most addicting things in the world. Once you do it, you will always want to do it again. And despite being serious about things like career, the dream of another journey had always been on my mind. I was always on the lookout for the next “once-in-a-lifetime” opportunity. The

My original plan had been Asia again, but taking the northern route via Siberia and Mongolia and Alaska to culminate in a circumnavigation of the world. Siberia in winter however, is not such a great place to be on a motorcycle, and I chose Africa instead. I’ll cut a



Out for a Sunday ride with the Kigali Biker Club (Rwanda)

very long story very short, and only say that reaching the African continent was a lot more difficult than I had anticipated. To give you just one example: one of the many plans I had initially had relied on some way of crossing Syria without getting shot.

of Pharaonic Egypt certainly did not disappoint, but spending three weeks in the Sahara wild camping and stargazing all the way was probably even more impressive, only to be topped by the unsurpassed hospitality of the people of Sudan.

Ethiopia also had remarkable sights in store: mountains, rifts and rock churches, and further south the many tribes of the Omo valley that still live the same way as they probably did more than 2,000 years ago. Spending a few nights with these tribes is certainly an experience I will never forget. The same is true for the route that followed, which put both me and my bike to the test. After we both reached our physical and mental limits

at 50°C in the shade on tracks where smallest obstacle is basketball sized, it was an almost surreal experience to see a tarred road and signs of civilization 1,200 km later.



African wildlife, up and close

good thing of working as a management consultant is, that these kind of opportunities tend to come by a little bit more frequently than in other professions, and so I saw another opportunity window open at the end of 2013.

Finally arriving on the ‘dark’ continent, the experience was fantastic. There was wonderful hospitality in Arabia, including forced meals – at gunpoint if necessary – with militias in Libya. The well-known splendors

Of course a visit to Africa is not complete without a Safari, and over the course of this journey I saw pretty much every single animal that the continent has to offer (NB “Safari” is the Swahili word for “journey”). I did dis-



On the piste in the Sahara (Tunisia)



Pyramids not only in Egypt, plenty in Sudan



Crossing the equator (Uganda)



Primary mode of transportation (Burundi)



Famous red dunes (Namibia)

cover however, that operated tours in four-wheelers (motorcyclists call them “cages”) might have one potential benefit: being confronted and chased by an angry elephant bull on a sandy track is not so much fun. Motorcycles do not have a reverse gear after all.

Towards the end I passed by the Victoria Falls, the famous red dunes in Namibia, and wonderful coast lines in South Africa to name just a few sights, before wheeling into Cape Town in April 2014. The experience from the last trip paid off, and the bike was on an airplane back to Europe in record time. My personal statistics were also a significant improvement, as this trip featured zero arrests and zero deportations (which both cannot be said about my visit to Asia).

What’s next? There are still many more dreams on my mind. But for now, I’ve swapped motorcycle suit for business suit once more, and spend work days advising clients on business strategy. The initial culture shock of coming back isn’t easy, but at the moment I am enjoying being back at work. And who



Mursi tribe (Ethiopia)



Great stay in a Himba village (Namibia)

knows, maybe there will be another “once-in-a-lifetime” opportunity – motorcycle or other – somewhere down the road.

Ben Frank



Bike route through Africa (30,343 km)

Benedikt Frank worked on his doctoral thesis in the group of Christian Griesinger at the Max Planck Institute for Biophysical Chemistry. He graduated from the Molecular Biology program in 2009. Currently he holds the position of a manager at the global management consulting firm A. T. Kearney.

Mission Impossible: Australia in three weeks

Some things in life are worth celebrating, and one such thing is having a sister, Tanja, who at the same time is your best friend, and even more so if she finishes her Master studies. With one of my closest childhood friends having emigrated to Melbourne five years ago, it was a straightforward decision to celebrate with a long trip to the other end of the world- well, not excessively long, just three weeks, as I convinced my supervisor. So at the beginning of October, we were on a plane to what would turn out to be the most amazing trip of my life.



Annette and her sister Tanja in front of the Harbor Bridge in Sydney

Unfortunately, upon landing in Melbourne after a two-day stop in Singapore, we realized that we were not prepared for these temperatures- we were freezing horribly and our luggage consisted mainly of flipflops and shorts! But after borrowing some sweaters from my friend Annika, we went off to explore some Australian wildlife on nearby Phillip Island- and 24 hours after landing I couldn't imagine how this trip could get any better. We cuddled with kangaroos, wallabies and wombats (with the latter not being overly enthusiastic about physi-

cal contact). We saw koalas and emus as well as penguins waddling over the beach to their nests.

With these unforgettable experiences in mind and every bone in our bodies turned into an icicle, we then took the five hour flight to tropical Darwin in the Northern Territory. Darwin is still considered by many Australians as a real outback town, but before making our own opinion we visited Litchfield National Park and made our first experience with driving on the wrong side of the road... an especially close experience with the windshield wiper every time we wanted to signal! Litchfield itself was quite deserted in terms of other people (as most of Australia) and simply stunning. How often do you swim in your own private pond under a waterfall in the middle of a tropical rainforest and under a tree full of flying foxes (looking pretty much like Dracula)? We then spent one night in Darwin, which didn't have anything to offer except for very drunk backpackers, all freshly graduated from high school, and then took another plane to Cairns, marking the start of our little road trip down the East Coast and the Great Barrier Reef.

Cairns itself is not that beautiful, so we quickly continued to Mission Beach, a scenic town and home of one of the last cassowary populations (pretty scary and dangerous birds, about the same size as me). Over Townsville we then came to Airlie Beach and the world-famous Whitsunday Islands, where we snorkeled and swam at the most perfect beach imaginable- extremely fine white sand and turquoise water; it was just a too-good-to-be-true feeling. But while we would have liked to stay, we had to follow our ambitious travel schedule, so we



Annette feeding a wallaby (plus baby in the pouch)

passed through Rockhampton to Fraser Island, the largest sand island of the world (about 120 km long) with one of the last "pure" (i.e. no cross-breeding with domestic dogs) dingo populations. Flying in a tiny airplane over the island and watching shipwrecks and sharks from above was definitely one of the highlights of the whole trip!



Curious wombat on Phillip Island near Melbourne

We had originally planned to finish off the East Coast road trip in Brisbane, but we then decided to drive a bit further south to Byron Bay, a town full of people who seem to have no other occupation than to go surfing or do yoga. Or as the ever-present Lonely Planet puts it: "A weekend turns into a week, a week into a month..."



Snorkeling at the Great Barrier Reef



Whitehaven Beach on the Whitsunday Islands

Before you know it, dreadlocks are a serious consideration.”

Luckily we stayed only two nights, so we did not end up with dreads, tattoos or piercings, and then took our last intra-Australian flight to the must-see destination of any trip down under- Sydney. By now, we were not even surprised to find that its largest city is as stunning as the rest of the continent. We were lucky to stay at a friend’s place in Bondi Beach, and one night we even went to the see a play in the world-famous opera house.

Finally, we found ourselves on the plane back home. It was a very weird feeling, as three weeks are of course simply too short to experience a country of this size, but at the same time we had so many new experiences and impressions it felt like we had been travelling for much longer. Anyways, I don’t think I have ever been so reluctant to leave a place to come back home- maybe that is because Australia is just so far away and you know that it is not a trip you will easily take again. And it is so far away that it hardly ever

appears in the news and thereby in our everyday lives- most of us probably wouldn’t know the name of their prime minister. Or as Bill Bryson puts it at the end of his highly recommended book “In a Sunburned Country”: “Life in Australia would go on, and I would hear nothing, because once you leave Australia, Australia ceases to be. What a strange, sad thought that is.”

Annette Denker



Annette in front of the Sydney Opera



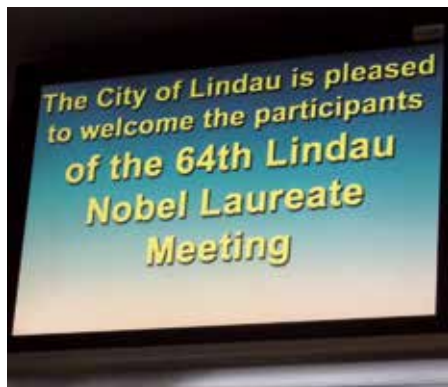
Annette Denker worked on her doctoral thesis in the group of Silvio Rizzoli at the European Neuroscience Institute. After her graduation in 2011 she joined the Salk Institute for Biological Studies in La Jolla, California for her postdoctoral research. Currently she works as a postdoctoral research fellow in the Biomedical Genomics group at the Hubrecht Institute in Utrecht, The Netherlands.

Secret recipe of the Nobel kitchen

Highlights of the 64th Lindau Nobel Laureate Meeting “Physiology or Medicine“

What does it take to win a Nobel prize? Intelligence? Knowledge? Hard work? Surely all of it. But only if the recipe had been that simple. To uncover the secret ingredient that transforms an excellent researcher into a Nobel laureate we, the three Molbio students, headed to the small German city of Lindau, which hosts the annual Nobel laureate meeting.

Over 600 students and young scientists from all corners of the world for five days had a chance to live up to the Lindau meeting’s main motto “Educate. Inspire. Connect”.



Even buses were welcoming the participants

The meeting was opened with a welcome address from the countess Bettina Bernadotte as well as Dr. Johanna Wanka, the federal minister of education and research. The absolute highlight, however, was a video greeting from space by an ISS astronaut, a former Lindau participant. The rest of our time was filled with Nobel laureates’ lectures, discussion panels, scientific breakfasts and Q&A sessions with laureates in small groups. The latter often had a very personal touch to them. Laureates answered all quirky questions and shared own stories and life experience.

The lectures offered a vast overview of the advancements of molecular biology. Barry Marshall described how he has identified *Helicobacter pylori* to be the cause of gastric ulcers, despite general disbelief that bacteria could survive in the acidic stomach environment. He proved his theory by self-infection and analysis of his own ulcers biopsy samples. Although he did not recommend following up his experiment, it gave a flavor of scientific determination.

Peter Agre told us about the importance of scientific connections. It was his professor, Dr. John Parker, suggesting the new protein identified by Agre to be the long-sought water channel. Agre himself described his finding as a lucky chance.

Among others we absolutely admired Roger Tsien, who despite suffering from the consequences of a severe stroke came to Lindau to share his ideas with the participants. Tsien spoke of the science of the future – tools developed in his lab allow surgeons to visualize cancer tumors in order to remove them with great precision.

Surely, the most entertaining lecture was given by Oliver Smithies. Titled “Where ideas come from” it motivated the young generation to never stop on a quest for the unknown and to enjoy it in the process. Smithies came up with the protein gel electrophoresis exploiting gelatinized starch after seeing his mother using starch to stiffen his father’s shirt collars. Smithies did not speak of work-life balance while showing pictures of his late Sunday night lab book entries. He said you only should be



Agata Witkowska, Tino Pleiner, Mariia Levchenko

pursuing science if this is what makes you happy. Even now, at the age of almost ninety, he is still doing experiments and keeps perfectly documented lab notes. He taught us that discoveries come from passion and a healthy dose of science obsession.

The laureates were also approachable for individual discussions. After a nice chat with Tim Hunt over a glass



Mariia Levchenko, Paola Kuri and Tino Pleiner together with Tim Hunt

of wine he apologized for canceling his participation in Horizons 2013. Peter Agre described his current work at the Malaria Institute that he considers one of the biggest milestones of his life. Agre quoted his mother telling him "It is important to do something useful; winning Nobel prizes is not enough." Martin Chalfie had students guess, how many postdoc application he receives per year. Our estimates ranged from 200-1,000 and we were surprised to find out that the number lies between 8 and 10. So the chances of getting a post-doc position in the lab of a Nobel laureate aren't that low!

However, the Lindau meeting is not only about scientific discoveries. In the end we do science because it is useful, technologies and innovations are being developed due to the scientific knowledge. During the meeting industry representatives and academic researchers discussed how their collaboration could be more beneficial for both sides. For example a science breakfast organized by Mars Inc. was dedicated to ageing research and role of nutrition in healthy ageing. Together with McKinsey & Company we were concerned with scientific leadership, debating on what it takes to run a productive lab. In the final discussion termed "Science for the benefit of the mankind" we tried to ask ourselves what responsibilities do we, as scientists, have towards society and what can we do to create a better future?

Of course even scientists do not talk about science at all times. We had plenty of opportunities to get in touch with other participants during academic dinners, learned a traditional dance at the Bavarian evening,

EMBL in Heidelberg. The pearl of the meeting – a boat trip to the Mainau island – gave a perfect chance to expand our scientific network and exchange a number of contacts. Despite cultural differences and the diverse background of the participants it was really easy to connect with each other.

The last will of Alfred Nobel states that the prizes should be given to those who have conferred the greatest benefit to mankind. There seems to be no unique solution to getting a Nobel prize. All you can do is do what you love and be a good scientist. In the end we should remember Peter Agre's mother and do something useful, because winning Nobel prizes is not enough!



Time for photos at the harbor of Lindau

enjoyed musical performances at an international get-together upon invitation of Australia and had a nice time during the "Grill-and-Chill"



Boat trip to Mainau

with Lindau citizens. We especially enjoyed meeting Paola Kuri who had been studying with us in Göttingen and is now doing her PhD at the

Mariia Levchenko is currently a PhD student in the group of Peter Rehling and the University Medical Center Göttingen.

Tino Pleiner is currently a PhD student in the group of Dirk Görlich at the MPI for Biophysical Chemistry.

Agata Witkowska is currently a PhD student in the group of Reinhard Jahn at the MPI for Biophysical Chemistry.

Organizing the WoCaNet symposium

Getting empowered and empowering others in return

The Women's Careers and Networks (WoCaNet) Symposium originates from the idea of two IMPRS MolBio students, Annette Denker and Broder Schmidt. Its main goal is to help women in the advancement of their careers both within and outside academia by giving young female researchers the chance to interact with successful women and find role models. I was fortunate to attend the first edition of WoCaNet in 2011. I was so inspired by this event that I decided to join the organizing team for the next meetings.

The 3rd Women's Careers and Networks Symposium took place in Göttingen on November 20th, 2014. I helped to organize this event together with 16 PhD candidates and postdocs from the University of Göttingen, the Max Planck Institutes for Biophysical Chemistry and for Experimental Medicine. During the twelve months invested in organizing this symposium we coalesced into an efficient team and brought the WoCaNet concept to fruition.

I can wholeheartedly say that it was a fantastic experience from which I learned not only how to successfully interact with young scientists like myself, but also how to connect to established scientists and professionals from outside academia. The time required from my part as a Career Fair team leader was about 2-6 hours per week. I consider this time well invested in learning how to manage my time and team, how to coordinate our efforts with the rest of the organizers, and how to effectively communicate with peers and institutions. Moreover, I had the opportunity to strengthen and expand my professional network and, on a personal level, to gain valuable friends.

This is why the actual day of the symposium for our team was a celebration of our efforts. We were deeply rewarded by the empowering discussions, the friendly atmosphere and positive feedback from both guests and participants. Our aim was to help women in



science to “unlock their potential” and explore their opportunities both in science and outside. For this, we offered a broad spectrum of talks from academia, industry, and science policy. Among the highlights of the event were talks from Prof. Ann Kiessling (Founding Director of Bedford Stem Cell Research Foundation) who encouraged women to become actively involved in policy making and changing, from Prof. Maria Fitzgerald (Research Group Leader, UCL) who sent across important key steps and advice for succeeding in academia, and from Dr. Caroline Simard (Research Director, Clayman Institute for Gender Research, Stanford) who presented the barriers faced by women in science and put forward solutions and best practice guidelines.

The Career Fair, which was held in parallel with the talks, also encouraged participants to discover alternative career paths from industry (Bioline, Sartorius, Measurement Valley) and scientific publishing (eLife, Springer). At the same time, it offered resources for academic

success with the help from the Dorothea Schlözer Mentoring Program and the Equal Opportunity Office of Göttingen University. The novelties of WoCaNet 2014 were the Body Language Workshop by Sabine Mariß and the discussion “LeanIn – women and men working together towards gender equality” guided by Dr. Katrin Wodzicki (GGNB Career Service Unit Coordinator) and based on Sheryl Sandberg's book (Facebook COO). Aside from this, participants had the opportunity to gain first-hand advice from speakers and peers while practicing their networking skills in the table topic event during coffee breaks or in a special networking dinner after the symposium.

Overall, organizing this 3rd WoCaNet was a wonderful chance to get inspired by discussions with successful women. It motivated young female researchers like me to share experience and wisdom, and to seek and offer advice. Striving for gender equality should go beyond addressing women. It should aim at changing paradigms by including men as equal contributors in the quest to build a future in which both men and women have equal opportunities for personal development and success. As a consequence, the next goal of WoCaNet is to broaden its scope to include more male participants, both as guests and participants.

Ingrid-Cristiana Vreja

Ingrid-Cristiana Vreja is presently a PhD student in the group of Silvio Rizzoli. In her doctoral thesis she investigates the high-resolution structure and dynamics of protein complexes.

Molecular Neuroscience at the Bosphorus

Turkish-German Graduate Workshop in Istanbul

The year 2014 was not only decided to be the international year of crystallography, but was also announced as the Turkish-German Year of Research, Education and Innovation. This found expression in the Turkish-German Graduate Workshop on Molecular Neurosciences taking place from 3rd-7th September 2014 in Istanbul. Organized by a joint committee of scientists from Boğaziçi University in Istanbul, pearls Potsdam, and the Göttingen Molecular Biology program, the workshop intended to bring young scientists together to catalyze the exchange of scientific ideas. So, we really looked forward to discover the scientific and non-scientific sides of the cultural capital of Turkey.

Arriving at the Atatürk airport, we immediately noticed the differences compared to cold and rainy Germany. First

was the climate: very warm and humid, at least compared to Göttingen. But we soon were compensated for this as the location for the workshop was directly situated at the Black Sea

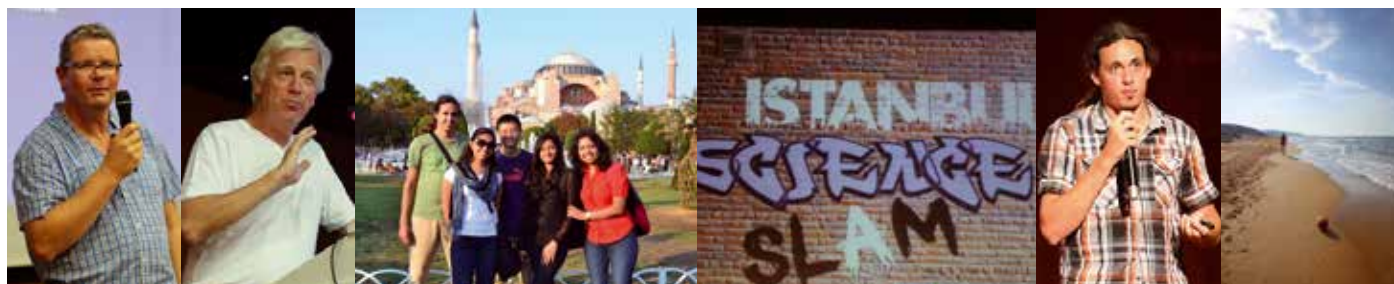


(part of the university campus is indeed located at the beach!). Of course, this provided a very fertile and productive base for interactions with our Turkish fellow students. In fact, the local students contributed a lot to create a hospitable and friendly environment.

the summer residence of the German ambassador – located directly at the Bosphorus – made a lasting impression. Not least, a public science-slam was also organized in the context of the workshop. It attracted people from all over the university and also was the first of its kind in Turkey. All this was complemented by a generous and delicious offer of local food during meal time which made the oriental feeling perfect.

All in all, we experienced four beautiful days giving us quite some cultural impression and scientific input. Also, we are looking very much forward to the return visit in May 2015 in Göttingen.

Manuel Maidorn



of all, we could not overlook the fact that Istanbul is somewhat bigger than Göttingen. Actually, it is much bigger. Yet it is very charming in its own way: The Turkish traditions and cultural heritage are well integrated into the crowded bustling city. For instance, we were very surprised when Turkish students showed us their widespread vegetable garden as a part of the Boğaziçi University campus – in the middle of the metropolis! What was also noticeable from the moment we got off the plane

Apart from the conventional content of such workshops meaning key note lectures, scientific talks and intensive discussions during coffee breaks, the workshop was gussied up by several additional events. Definitely remarkable was the venerable university campus of the Boğaziçi University overlooking the Bosphorus bridge linking Europe and Asia. The campus area was also characterized by a great number of wild cats and dogs, residing in harmony with the students. Also, a visit to

Eight students of the Göttingen Molecular Biology and Neuroscience programs participated in this workshop: I. Ömer Cicek, Shrutee Jakhanwal, Manuel Maidorn, Dragomir Milovanovic, Avani Shukla, Markus Stahlberg, Nidhi Subhashini, Man-Ho Wong.

Of journeys, circles and small wonders

The 11th Horizons in Molecular Biology PhD Student Symposium

The 11th Horizons in Molecular Biology Symposium, organized by students of the IMPRS for Molecular Biology, took place from September 15-18, 2014. We were glad to be able to welcome a diverse selection of excellent speakers and an audience of more than 250 participants from 42 countries – setting a new record in international diversity!

The Horizons symposiums are renowned for their diversity of topics, giving participants the opportunity to interact with scientists from a broad range of fields, and this year was no different: From our section “Journey through Life” over “Circles of Life” and “Small Wonders of Life” to “Messages in Life”, virtually all areas of Molecular Biology were covered.

Among this year’s 19 speakers were the two Nobel Laureates Ada Yonath, with a riveting talk about “the amazing ribosome”, and Sir John Walker, who shared his insights on the mechanism of ATP-synthesis. Further topics inclu-



Nobel lecture by Sir John Walker

ded the construction of connectomical maps of the brain (Jeff Lichtman), the resolution of structures of membrane proteins by solid-state NMR (Mei Hong), the connection between DNA methylation and Rett syndrome (Sir Adrian Bird), using proteomics to elucidate angiogenesis processes in

cancer-associated cells (Sara Zanivan), the translation from bench to bedside through the examples of DNA vaccines (Margaret Liu), and the use of KATP channel blockers in neonatal diabetes (Frances Ashcroft).

But we also looked beyond pure research: In his keynote lecture, Ingo Potrykus shared with us his journey of developing Golden Rice and trying to deliver it to the farmers in countries in need of it, reminding the audience of



Uri Alon and Ada Yonath

the social and political implications of research. And during the opening talk of the Career Fair, Uri Alon elaborated in his amazing guitar talk on “Love and Fear in the Lab” and the importance of emotions in scientific work.

Finally, Horizons has always been and always will be a place for students to interact with each other and with established scientists, to forge contacts, and, not less important, to have fun! The relaxed atmosphere during the “Wine & Cheese” poster session, the conference dinner and party, the speed-dating event at the Career Fair, and last but not least the coffee breaks, fuelled by hundreds of litres of coffee and a sizeable amount of cookies, promoted close proximity between speakers and participants.



The Horizons 2014 organizers

The 12th Horizons in Molecular Biology symposium will take place from September 14 – 17, 2015 and we are happy to already be able to announce that Nobel Laureate Martin Chalfie, best known for his work on GFP, has agreed to join us as a guest speaker. So save the date, and see you in 2015!

Katharina Seitz

Horizons speakers 2014

Nobel Lectures

Sir John Walker, Ada Yonath

Messages in Life

Jeff Lichtman, Jason Chin, Linda van Aelst, Frances Ashcroft, Sir Adrian Bird

Circles of Life

Sara Zanivan, Ingo Potrykus, Linda Partridge, Gero Miesenböck, Ian Chambers, Steffen Lemke

Small Wonders of Life

Ada Yonath, Sir John Walker, Gabriel Lander, Mei Hong

Journey through Life

Patrick Cramer, Vinzenz Unger, Anne Spang, Margaret Liu

Career Fair 2014 - Start-up experience

Presenting at the Horizons Career Fair is always a welcomed opportunity for me as an alumnus to reconnect with the Molecular Biology Program, so I was very happy to be given the opportunity to present our start-up there.

Starting up a company is probably not one of the most likely options for scientists who choose an alternative career, but most certainly one of the most exciting opportunities. When founding labfolder, the digital lab notebook available for free at www.labfolder.com, me and my colleagues faced a lot of interesting challenges that we had never before thought we would ever see.

Suddenly having to deal with balance sheets, work contracts and tax or legal issues is probably not what one learns during a scientific education, but I can say that the education in Göttingen helped a great deal in having an open, interested mind and a very useful set of secondary skills.

I was amazed to see how many students are interested in learning more about the principles that govern start-up mentality, which is actually not far away from the demands of working in a scientific environment: it is the necessity for endurance, changing conditions and the necessity to come up

with new ideas on a daily basis which make working on a start-up so interesting and rewarding.

Being a former member of the Horizons Organizing Committee myself, I was particularly pleased to see how positively the symposium has evolved in offering new and interesting features and formats while maintaining the high quality of speakers and content. Thanks a lot to all the organizers – keep up the good work!

Florian Hauer

Horizons 2014 – Coming home

Back to Göttingen, back to the Horizon Meeting – the sudden thrill that came with the invitation e-mail by the organizing committee caught me by surprise: when I started my PhD in Göttingen, I could barely imagine to ever think of Göttingen as a home, a castle, or possibly the place of my scientific roots. Yet the signs became unmistakable as the train started to approach the familiar station, and successive flashes brought back memories as if I was returning from just a weekend trip: worries about upcoming TAC meetings, fly crosses that I should have set up the Friday before leaving, papers to be read, and my legs reminding me that they definitely would not want to bike up that hill.

Passing by the library and the Max Planck Institute for Experimental Medicine then changed the focus of that time travel (possibly facilitated by

the fact that a taxi rather than my bike had been waiting in front of the train station) and reminded me of lectures, lab rotations, seminars, improvised birthday parties, culture nights, Christmas parties, nightly discussions far away from science, as well as our joint studies slightly more focused on science ahead of the exams.

It may have felt a bit odd to present as alumnus rather than to join the audience as usual and simply enjoy the line-up of speakers, yet those spirited discussions at the poster sessions, the exchange of experiences during dinner, and the latest gossip at the party simply left me with the impression of returning home to a scientific family as peer among peers of a superb PhD program. If we just had a shirt, a sweater or a small pin, I'd proudly wear it on any possible occasion.

Steffen Lemke



Steffen Lemke (left) and Florian Hauer

Steffen Lemke graduated from the Molecular Biology Program with a doctoral degree in 2006. Presently he is heading his own Emmy Noether Research Group at the Centre for Organismal Studies, University of Heidelberg.

Florian Hauer graduated from the Molecular Biology Program with a doctoral degree in 2009. Together with two colleagues he founded the start-up enterprise labfolder (www.labfolder.com), a free electronic lab notebook for laboratory research.

Group-specific mentoring in Göttingen

A friend of mine, who is professor in the humanities, recently told me about a doctoral thesis of 800 pages he had to review. The expert opinion by the first reviewer comprised 80 pages, perhaps one of the reasons why the time between thesis submission and defense in the humanities may take up to one year. This is only one example for the many differences between the natural sciences, social sciences and humanities. I consider myself quite open to ideas and practices outside the life sciences. Nevertheless, I well remember my mixed feelings when I accepted the invitation by the central mentoring coordination of the University of Göttingen to serve as a mentor of a mentee from the Seminar of German Philology. Would I be able to offer appropriate advice for career-related questions my mentee would certainly have?

The background to this invitation is the start of two new campus-wide mentoring programs, namely *WeWiMento* – Wege ins Wissenschaftsmanagement and *KaWirMento* – Karrierewege in die Wirtschaft in the fall of 2013. These programs are intended to complement two existing initiatives, the *Dorothea Schlözer Mentoring Program* of the university and the *Mentoring Program of the University Medical Center*, both addressing female doctoral and postdoctoral researchers pursuing a scientific career or one close to science. The target group of the *WeWiMento* program are all late-stage PhD students and early-stage postdocs who are interested in science management and would like to learn more about the career options in this field. Over the course of one year, the young scientists gain first-hand experience, advice and insight into the diverse professions you can find under

the (not always clearly defined) label of “science management”. This is done by a combination of qualification workshops, a series of short internships at different units of science management on campus, and regular meetings with a mentor who has work experience in the field. The *KaWirMento* program is designed for all PhD students and postdocs interested in a career in the private sector, including a mentoring partnership with a



representative of a (regional) enterprise. Additionally, the program offers workshops to acquire key skills and informs the participants about job prospects.

The newly launched *WeWiMento* year, for which I served as a mentor, started with an introductory workshop at which all mentors and mentees got introduced and had the opportunity to meet each other. A week later, I had the first one-to-one meeting with my mentee to openly discuss our background and expectations, trying to find out whether we were a good match to continue together. We both felt that we shared sufficient mutual interest in science management to give it a try and thus scheduled a series of follow-up meetings with defined topics.

A mentoring tandem bears great potential for both the mentor and the mentee. They can mutually benefit from their discussions on career perspectives and expectations, and how these are reflected in the strengths of the mentee. In our early meetings we investigated the wide spectrum of professions related to sci-

ence management and tried to analyze why some appear more attractive to the mentee than others. Our meetings took place in an open, trustful and positive atmosphere where I learned a lot about the environment and conditions for doctoral research in the humanities. Moreover, it was pleasant and rewarding to observe how an initial discussion about self-assessment and personal goals could contribute to decisions of my mentee regarding her future path to take. Motivation benefits from self-confidence and I often had the feeling that the external perspective I was glad to give reminded my mentee of all the valuable and exciting experience she had already made. In the subsequent months, my mentee went through the typical cycle of ups and downs, job applications and interviews, hope, excitement and frustration. The happy end coincided with the end of the mentoring year when she did not only defend her PhD thesis successfully but also received an offer that matched her interest. Well done!

This positive experience did not only apply to our mentoring tandem. All participants agreed unanimously that the time and efforts were well invested, which can certainly be attributed to a significant part to the tireless efforts of the coordinating team that provided the professional guidance to the newly launched mentoring programs. The second *WeWiMento* cycle is about to start now. The coordination team carefully collected feedback and evaluated the experience made in the first round – a perfect basis for a promising future development of the newly launched mentoring programs.

StB

Feel free to contact Dr. Vera Bissinger (Central Coordination Mentoring) for further information: vera.bissinger@zvw.uni-goettingen.de

Data visualization in the life sciences

The First 3D Model of a Synapse

You are bending over the twentieth western blot of this weekend, your back is aching, your fingers are freezing from the ice-cold buffer – and you don't care, these are the last experiments. There is no question that this story – your story – is a great story, and that everyone needs to know about it. *You need them to know about it.* Actually, your career depends on it. It is cold, but you begin to sweat. What if no one likes it? What if no one understands its true significance?

The representation of data can make all the difference in your situation, particularly models that sum up your story. All other things equal, the one with the best advertisement wins – in selling phones as well as in selling science. And you can be sure that you will always have plenty competitors with an equally sound and significant story.

The challenge in making models is, of course, not to play your data for more than it is worth. *You need them to know about it* – what you don't need is them to accuse you of not being objective and honest in the way you represent your data. And fear of not being objective is why life scientists have long turned up their noses at models. Models are not really objective, are they? Honestly, there is no way to make an objective representation of a cellular process in one simple image, is there? Honestly? No, there isn't.

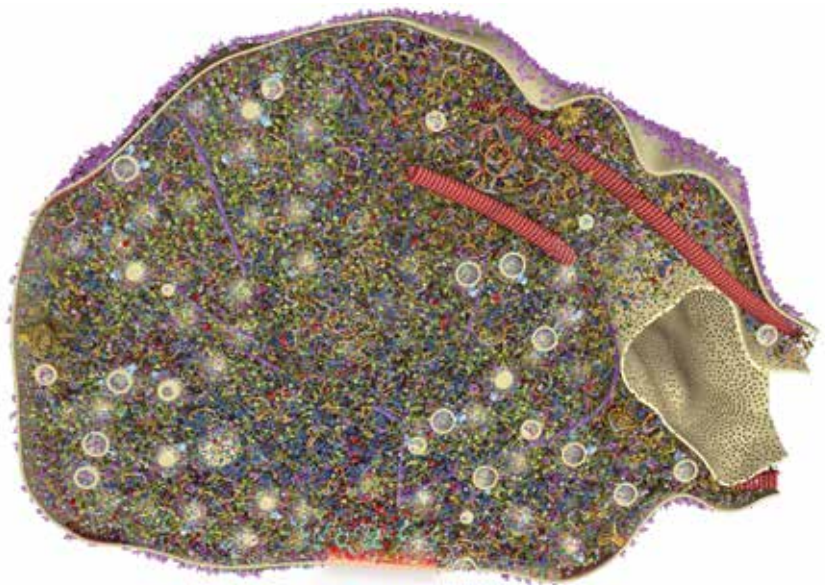
But also, that's not really the issue. Objectivity is an unattainable ideal. Any graph you plot, any exemplary image you select, is far from an objective representation. Objectivity is the central concept on which modern science is built, and that is precisely why it is too

important to treat it as a tin god and turn away from any form of data representation just because it is unfamiliar. Models can be just as objective as any plot – as long as they stay true to the data.

So do not be afraid of making models of your data. It will help you get your story across to others, or to get them interested in the first place. You might also find that you will understand your own data better. Scientists like to think of themselves as highly trained special-

ists, capable of unambiguous interpretation of data. What they often forget is that all data is processed as not-the-real-thing, but as a representation. We are just as fallible as any layman when it comes to interpretation of representations. You should do yourself and other scientist the favour of presenting your results in a condensed and understandable way. Just stay wary of distorting or over-interpreting your data – be honest to yourself and to your audience, and any model you make will enhance your research.

Sven Truckenbrodt



This is an artistic rendering of a synapse, displaying >300,000 proteins as published structures, in copy numbers measured by western blotting, modelled into a 3D electron microscopy reconstruction of a synapse in sub-cellular localization as imaged by super-resolution STED microscopy. Every aspect of the model is thus based on scientific data, condensing thousands of lines of data into one summarizing image.

Wilhelm et al. (2014) Composition of isolated synaptic boutons reveals the amounts of vesicle trafficking proteins. *Science* 344, 1023-1028.

Sven Truckenbrodt is presently a PhD student in the group of Silvio Rizzoli. In his doctoral thesis he investigates the long-term temporal dynamics of synaptic boutons.

Alumni networks and career services

More than 200 students have graduated from the Molecular Biology program with a PhD or an MSc degree by now and we are still in touch with most of our alumni. Three out of four Molbio alumni have a LinkedIn profile with a rising trend. In order to facilitate interaction between our current and former students, we opened the Molbio/Neuro Network group on LinkedIn in spring 2014.

In the meantime, this forum has become an established platform to share career-related information, announce open positions or fellowships, connect and communicate, view professional profiles of other students or alumni, and thereby strengthen existing networks. As of today, the Molbio/Neuro Network group counts 187 members, with a continuously rising trend. While member-

ship in this group is confined to current and former students of the Molecular Biology and Neuroscience programs, all participants are also members of the open "GGNB Network" main group, thus being able to benefit from the larger community of our graduate school.

Interaction with our alumni is a cornerstone for various career-related measures and activities on campus. We visit companies at which our alumni are employed for industry excursions, involve them in skills training, and invite them for the annual student-organized Horizons meetings, career fairs, or similar events (p. 33). Furthermore, our alumni help us with the recruitment of new students, not only by advertising our graduate program but also by supervising our written entrance exam which we organize every February worldwide.

PhD graduates of our program who are still in Göttingen benefit from career-related measures offered by our GGNB career service unit (<http://www.uni-goettingen.de/en/426275.html>), which offers frequent "Career Impulse Sessions" for networking in different sectors, workshops on career orientation and application skills, online media such as the GGNB career blog or LinkedIn group, and individual counselling for advanced PhD students and postdocs. It is no secret that the number of scientists who will finally assume a professorial position is rather small. Therefore, our GGNB career service unit also offers support in investigating possible career paths in the private sector, as well as in non-professorial staff or science management positions. These activities are coordinated with central measures by the University of Göttingen such as the

Honors and Awards - Students & Alumni

Neva Caliskan, former PhD student in the group of Marina Rodnina at the MPI for Biophysical Chemistry was awarded the **best poster prize** at the EMBO meeting "Recoding: Reprogramming genetic decoding" in Killarney, Ireland.

Karen Linnemannstöns, former PhD student in the group of Andreas Wodarz at the GZMB / University Medical Center Göttingen was awarded the **Klaus Tschira Prize** for Achievements in Public Understanding of Science.

Manuel Maidorn, PhD student in the group of Silvio Rizzoli at the University Medical Center Göttingen was awarded the **first prize** of the **Science Slam** at the Turkish-German Graduate Workshop in Istanbul.

Sina Mozaffari Jovin, former PhD student in the group of Reinhard Lührmann at the MPI for Biophysical Chemistry was awarded the **Otto-Hahn Medal 2013** by the Max Planck Society.

Patrick Müller, former PhD student in the group of Martin Zeidler at the MPI for Biophysical Chemistry was awarded an **ERC Starting Grant** for the „Quantitative analysis of Nodal/Lefty-mediated pattern formation“.

Sinem Saka, former PhD student in the group of Silvio Rizzoli at the University Medical Center Göttingen received the **International Federation of Societies for Microscopy (IFSM) School Award for Young Scientists** at the International Microscopy Congress, Prague,

Czech Republic. Furthermore, she was awarded a **Poster Prize** at the EMBO Workshop for Cellular Imaging of Lipids, Vico Equense, Italy.

Christian Schulz, former PhD student in the group of Peter Rehling at the University Medical Center Göttingen was awarded the **GZMB PhD Award 2014** by the Göttingen Center for Molecular Biosciences.

Sven Truckenbrodt, PhD student in the group of Silvio Rizzoli at the University Medical Center Göttingen received a **Society for Neuroscience Travel Award**.

different mentoring programs for early-stage researchers (p. 34).

The value of alumni networks should not be underestimated. In spite of the increasing number of graduates, our programs are still young so that it will take a few more years until a significant fraction of our alumni will have attained leading positions. In many cases it is already helpful though to simply know someone at the right place or in the right profession, no matter how advanced the position is, to benefit from the advice by colleagues who will always be willing to share their experience with their former fellow students and the later generations. We will do our best from the program's side to support any alumni networking activity and stay in touch.

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Student representatives

Sven Truckenbrodt was re-elected for another term as PhD student representative. He represents the Mol-bio PhD student community together with **Momchil Ninov**, who got newly elected for this position. **Charlotte Blessing** was elected as the representative of the MSc students of the 2014/15 class. We congratulate our student representatives and thank them for their commitment. Many thanks also to **Agata Witkowska** and **Ina Klusmann** for having represented the PhD and MSc student community during the previous term. There were also changes in the PhD student representation of the entire graduate school at the GGNB Board level: **Dragomir Milovanovic** and **Agata Witkoska** were the elected representatives for the 2014 term but didn't run for a second term because they approach the final stage of their doctoral research.

Honors and Awards - Faculty

Christian Griesinger, head of the Department of NMR-based Structural Biology at the MPI for Biophysical Chemistry was awarded the 2014 **AMPERE Prize** by the European Scientist Association AMPERE

Stefan Hell, head of the Department of NanoBiophotonics at the MPI for Biophysical Chemistry was awarded the **Nobel Prize in Chemistry** 2014. Furthermore, he was awarded the **Kavli Prize** in Nanoscience by the Norwegian Academy of Sciences and Letters, the Kavli Foundation, and the Norwegian Ministry of Education and Research.

Herbert Jäckle, head of the Department of Molecular Developmental Biology at the MPI for Biophysical Chemistry received the 2013 **International Science and Technology Cooperation Award** in January 2014 by the People's Republic of China. Furthermore, he was honored with the Argentinian State Award **Luis Federico Leloir-Prize for international Cooperation in Science, Technology and Innovation**.

Reinhard Jahn, head of the Department of Neurobiology at the MPI for Biophysical Chemistry was awarded the **Heinrich Wieland Prize** by the Boehringer Ingelheim Foundation.

Reinhard Lührmann, head of the Department of Cellular Biochemistry at the MPI for Biophysical Chemistry was honored with the **Lifetime Achievement in Science Award** by the international RNA Society.

Tobias Moser, head of the former Inner Ear Lab and the newly founded Institute for Auditory Neuroscience at the University Medical Center Göttingen, was awarded the **Gottfried Wilhelm Leibniz Prize** 2015 by the German Research Foundation (DFG) in December 2014.

Mary Osborn, former faculty member of the Molecular Biology program and head of the Research Group Cell Biology at the MPI for Biophysical Chemistry was awarded the **Federal Cross of Merit, First Class** (*Bundesverdienstkreuz 1. Klasse*).

Silvio Rizzoli, head of the Department of Neuro- and Sensory Physiology at the University Medical Center Göttingen received an **ERC Consolidator Grant** by the European Research Council.

Halyna Shcherbata, head of the Research Group Gene Expression and Signaling at the MPI for Biophysical Chemistry was honored with the **EMBO Young Investigator Award** by the European Molecular Biology Organization (EMBO).

Mikael Simons, member of the University Medical Center Göttingen and head of the Research Group Cellular Neuroscience at the MPI for Experimental Medicine received the **Alzheimer Research Award** 2014 by the Hans und Ilse Breuer Foundation.

Faculty changes in 2014

Joined the program

Steven Johnsen was appointed as Professor for Translational Cancer Research by the University Medical Center Göttingen. He returned to Göttingen from the University Medical Center Hamburg-Eppendorf, where he was

heading a research lab on epigenetic regulation of tumorigenesis and stem cell differentiation as an Associate Professor in Tumor Biology. Steve received his PhD from the Mayo Clinic College of Medicine, Rochester, Minnesota, USA in 2002.

From 2003 to 2006 he worked as a postdoctoral fellow at the Center for Molecular Neurobiology in Hamburg, before he moved to the European Molecular Biology Laboratory (EMBL) in Heidelberg to continue his postdoctoral research. In 2007 he joined the Faculty of Medicine within the Department of Molecular Oncology at the Göttingen Center for Molecular Biosciences (GZMB) as an assistant professor ("Juniorprofessur"). During his time in Göttingen he already supervised several PhD students, including students of the Molecular Biology program. His current research focuses on the role and regulation of chromatin modifications in controlling transcription and transcription-coupled nuclear processes during tumorigenesis. The primary interest of his research group is the monoubiquitination of histone H2B (H2Bub1) which appears to serve a tumor suppressor role in breast cancer and is tightly associated to active gene transcription.



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

Current faculty members

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

University of Göttingen - Chemistry: Claudia Höbartner, 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 Dobbstein, Roland Dosch, Uwe Groß, Jörg Großhans, Heidi Hahn, Steven Johnsen, Tobias Moser, Tomas Pieler, Peter Rehling, Silvio Rizzoli, Blanche Schwappach, Michael Thumm, Jürgen Wienands

European Neuroscience Institute: Oliver Schlüter

MPI for Biophysical Chemistry: Henrik Bringmann, Patrick Cramer, Wolfgang Fischle, Dirk Görlich, Christian Griesinger, Helmut Grubmüller, Stefan Hell, Herbert Jäckle, Reinhard Jahn, Stefan Jakobs, Michael Kessel, Reinhard Lührmann, Ahmed Mansouri, Marina Rodnina, Reinhard Schuh, Halyna Shcherbata, Holger Stark, Henning Urlaub

MPI for Experimental Medicine: Nils Brose, Klaus-Armin Nave, 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

Faculty changes in 2014

Joined the program

Patrick Cramer was appointed as Director at the Max Planck Institute for Molecular Biology in 2014 where he set up the new Department of Molecular Biology. He joined the faculty of the Molecular Biology Program in the same year. Patrick Cramer concluded his doctorate at the University of Heidelberg and the EMBL Grenoble in 1998, followed by two years of postdoctoral research at Stanford University. Since 2001 he was professor of biochemistry at the University of Munich (LMU) where



he served as director of the Gene Center from 2004 to 2013. His current research aims at an understanding of the molecular mechanisms of gene transcription and the principles of genomic regulation in eukaryotic cells, using integrated structural biology and complementary functional studies. His group also developed functional genomics methods and computational approaches to unravel the cellular mechanisms of genomic regulation. These efforts led to a first molecular movie of transcription and provided insights into gene-regulatory cellular networks. He received numerous awards and honors, including the Gottfried-Wilhelm-Leibniz Award of the DFG (2006), the Ernst-Jung-Preis für Medizin (2009), the Medal of Honor of the Robert Koch Institute (2010), the Feldberg Foundation Prize (2011), and the Cross of Merit of the Federal Republic of Germany (2012).

www.uni-goettingen.de/en/164534.html

Left the program

Moritz Rossner accepted an offer for a W2 professorship by the University of Munich (LMU), where he is now heading the “Molecular Neurobiology” group within the Department of Psychiatry. He joined the Molecular Biology program in 2012, when he was leading the Gene Expression Group in the Department of Neurogenetics at the Max Planck Institute for Experimental Medicine. Moritz Rossner did his doctoral thesis project at the Center



of Molecular Biology Heidelberg (ZMBH). From 1999 to 2002, he was a postdoctoral research associate and project leader at Axaron Bioscience AG, Heidelberg, heading the project group “Novel Technologies”. In 2010, he completed his habilitation in developmental and behavioral neuroscience at the University of Göttingen. His research investigated the generation and analysis of transgenic mouse mutants in order to understand individual gene functions in the adult brain, employing mouse genetics, molecular/biochemical and behavioral techniques. His current interest aims at combining mouse models and genetic sensors to better understand the molecular adaptations of gene-environment interactions relevant for psychiatric and neurological diseases.

www.uni-goettingen.de/en/215200.html

Andreas Wodarz accepted an offer for a W3 professorship in Cell Biology at the University of Cologne, where he is now heading a group within the Institute I for Anatomy. Andreas Wodarz received his doctoral degree from the University of Cologne in 1993. From 1994 to 1997 he worked as a postdoctoral research fellow at the Howard Hughes Medical Institute, Stanford University. In 1997, he became a junior group leader at the Heinrich Heine



University Düsseldorf, where he also concluded his Habilitation in Genetics. In 2004, he was appointed as head of the Department of Stem Cell Biology (from 2010: Department of Anatomy and Cell Biology) at the University of Göttingen Medical Center. His research focuses mainly on different aspects of the asymmetric division of neural stem cells and the molecular control of cell polarity. In this context, his group also investigated the function of the Wnt signal transduction pathway in the regulation of planar cell polarity and cell adhesion. The model organism of his research was mainly the fruit fly *Drosophila melanogaster*, as it is easily accessible to genetic manipulation and is very well suited for cell biological analyses using high-resolution light microscopy.

www.uni-goettingen.de/en/58057.html

15th Anniversary and International Alumni Day

The most frequent response to the invitation for our 15th Anniversary was: "Are you sure? Fifteen years already? It feels as if we had our 10th Anniversary celebrations just yesterday". Yes, time flies indeed. From 29 to 31 May 2015 our "twin programs" and International Max Planck Research Schools for Molecular Biology and Neurosciences will celebrate their 15th Anniversary. For many PhD graduates of our first generation of students it will also be the 10th Anniversary of their PhD thesis defense.

Our celebrations will start in the University Aula with a scientific keynote lecture by Stefan Hell, who was awarded the Nobel Prize in Chemistry 2014. Stefan Hell is a faculty member of both programs and many of our alumni will certainly look forward to listening to the exciting story that led to the development of super-resolved fluorescence microscopy. Subsequently, the president of the University of Göttingen, Ulrike Beisiegel, will officially open the 15th Anniversary celebrations to which all current and former members, colleagues and friends of our graduate programs are cordially invited.

Our celebrations mark the end of the Neurizons week (www.neurizons.uni-goettingen.de; 26-29 May 2015), which gives our alumni the opportunity to



combine their return to Göttingen with a scientific meeting, organized by the PhD students of the Neuroscience program.

Saturday is reserved for our International Alumni Day. In the morning, all alumni are invited to participate in guided tours on the Göttingen campus. These site visits include highlights of the university's collections such as the cast collection of antique sculptures or the art collection. An introduction into the work of the Center for Retrospective Digitization Göttingen (GDZ) is also worthwhile visiting. On the North Campus, site visits are offered to the newly built Max Planck

Institute for Solar Systems Research, a collaboration partner in the recent Rosetta mission and comet landing of Philae (www.mps.mpg.de/en/Rosetta), to the Laser-Laboratorium Göttingen, which acts in close cooperation with research institutions and industrial enterprises in the area of application-orientated laser research, and to the Microscopy Lab of Stefan Hell at the MPI for Biophysical Chemistry.

The day continues with the Alumni Career Forum, intended to promote the interaction of our alumni among each other across the different generations and disciplines. This forum also gives our current students the opportunity to meet the graduates of former years and benefit from their experience.

One key element of the International Alumni Day is a series of "Vision Talks", for which we invited distinguished guest speakers. In their talks, the speakers will provide their personal views on current and expected future developments in their field with reference to the professional perspectives of our alumni. The three vision talks will merge into a podium discussion.

Of course there will also be plenty of time to meet friends and colleagues, talk about the "good old days", enjoy a barbecue dinner and have fun. On Sunday, our 15th Anniversary celebrations and alumni meeting ends with a hike to the nearby Plesse Castle for a farewell brunch in the inner courtyard. Bright sunshine has been arranged for this weekend too. We look forward to meeting everyone in May and to celebrating together.

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