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

JAN 2021

Welcome message

Dear alumni, students, friends and colleagues,
This issue of our annual Molbio Newsletter focuses on the pandemic and how it affects our lives since spring 2020. We included a COVID-19 Special (pp. 32-41) providing a forum for personal statements on how our students experienced the challenges imposed by distancing rules and online events, how labs gave their best to ensure training in scientific methods, and how the overall management of our program has been affected.

In spite of lockdowns, strict hygiene measures and sacrifices that had to be made by everyone, our Master's class of 2019/20 managed to complete all their courses and lab rotations according to the original schedules and excelled in their exams in August with the best total marks ever achieved in our program. Great job! We were in close contact with our newcomers from 15 different countries (p. 14) to keep them continuously informed about country-specific travel and visa regulations as well as our plans to launch the new semester with corona-related adjustments. Fortunately, all but two managed to arrive in Göttingen in time for our orientation weeks, where we welcomed them with pre-ordered food packages to survive the first days of quarantine at their new home. Monica and Eduardo, who got stuck in Egypt and Mexico (see their reports on pp. 36-37), were always connected to us via zoom and received numerous letters in support of their visa applications.

A big THANK YOU goes to the organizers of the Horizons 2020 meeting who did a fabulous job to revise their original plans and adjust the entire organization to make the first-ever virtual Horizons Symposium with Career Fair a great success. Likewise, we have been impressed how our students got involved in initiatives to organize online events such as the Quiz Night in November (Dilantha and his colleagues of the Phd/Postdoc Community at the MPI-BPC), an interaction session of the senior MSc batch with our newcomers (Vaishali and colleagues, p. 37), a virtual Pint of Science event (Rashi, Valentina and colleagues, pp. 43-44), or the creation of a local group of the junior division of the German Society for Biochemistry and Molecular Biology (Jannis, p. 45).

Welcome BBQ with the Molbio newcomers 2020

CONTENT

One of our former nominees for the Lindau Nobel Laureate Meeting, Shama, participated in the first ever 48-hour Online Sciathon during which she and her team created a google browser extension called authentiSci that rates the scientific validity of online mainstream media (pp. 46-47). Congratulation to the second prize they won in this competition!

As every year, our newsletter introduces you to our new students and graduates, honors their scientific achievements, reports on the careers of our alumni, and informs you about new and leaving faculty members. It also reflects on the success of the first round of our Alumni Mentoring Program (pp. 28-31), which mirrors the strength and potential of our established networks.

P. Rehling, M. Rodnina, S. Burkhardt

Discovery of a regulatory subunit...

Fatty acids are essential for life. Enzymes involved in fatty acid synthesis are functionally conserved from bacteria to humans. However, the structural arrangement of the enzymes varies drastically between bacteria, fungi and metazoans. The most intricate organization is found in fungi and certain bacteria such as Mycobacteria. It is referred to as the fungal type I fatty acid synthase (FAS). The fungal type I FAS is a 2.6 MDa protein complex. Six copies of two different subunits, termed alpha and beta (α6-β6), combine to form a barrel like structure. Within the barrel cavity, a mobile acyl carrier protein shuttles the substrates and growing fatty acyl intermediates between the catalytic domains.

Even though we know the structure of this complex, it is still not understood how the activity of the fungal FAS can be directly regulated. Considering the increasing prevalence of drug resistant fungi and mycobacteria, a better understanding of regulation of fatty acid synthesis could in turn have pharmacological implications.
In this study, we discovered a protein

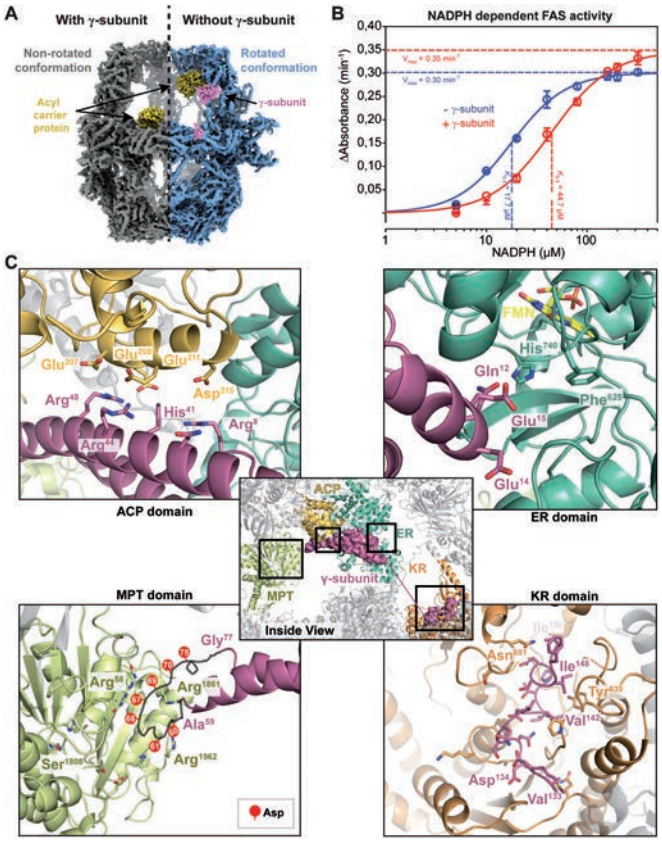


Fig. 1: γ-subunit affects the structure and function of the *S. cerevisiae* fatty acid synthase (scFAS) **(a)** FAS predominantly adopts a non-rotated conformation in the absence of the γ-subunit (left) and a rotated conformation (right) in its presence. **(b)** Substrate dependence for co-substrate NADPH in absence (blue) and presence (red) of the γ-subunit. Error bars represent SD. **(c)** The γ-subunit interacts with the acyl carrier protein (ACP; Top left) and occludes the binding of (1) NADPH at the enoyl-reductase (ER; Top right) and keto-reductase (KR; Bottom right) domains, (2) Malonyl-CoA at the malonyl transferase domain (MPT; bottom left).

PhD-(and MSc-) related publications 2020 (PhD students of the Molecular Biology program in bold type)

Beissel C, **Grosse S**, Krebber H (2020) Dbp5/DDX19 between Translational Readthrough and Nonsense Mediated Decay. Int J Mol Sci 21(3):1085

Chan KH, **Petrychenko V**, Mueller C, Maracci C, Holtkamp W, Wilson DN, Fischer N, Rodnina MV (2020) Mechanism of ribosome rescue by alternative ribosome-rescue factor B. Nat Commun 11(1):4106

Choo J, Schlosser D, **Manzini V**, Magerhans A, Dobbelstein M (2020) The integrated stress response induces R-loops and hinders replication fork progression. Cell Death Dis 11(7):538

Choudhury P, Kretschmer J, Hackert P, Bohnsack KE, Bohnsack MT (2020) The DExD box ATPase DDX55 is recruited to domain IV of the 28S ribosomal RNA by its C-terminal region. RNA Biol (online ahead of print)

...of the yeast fatty acid synthase

that binds to the *S. cerevisiae* FAS (scFAS) and characterized how it affects scFAS structure and function. When we purified the endogenous scFAS, we found that a small 17 kDa protein called Tma17 co-purifies with it. Since no stable scFAS binding protein was known, we then characterized the role of Tma17 in context of scFAS. We first confirmed that Tma17 specifically binds to scFAS by reconstituting this complex using recombinant Tma17 and scFAS purified from a Tma17 deficient yeast strain. In collaboration with the lab of Kai Tittmann, we then used kinetic assays to show that Tma17 regulates scFAS activity. Particularly, the affinity of NADPH for the scFAS is reduced by ~2.5 fold. Based on its regulatory role we termed Tma17 as the 'γ-subunit' of the scFAS.

To understand the molecular basis of FAS regulation by the γ-subunit, we resolved scFAS structures at ~ 3 Å resolution in the presence and absence of the γ-subunit using cryo-EM and X-ray crystallography. The structural data provides the mechanism of the γ-subunit's regulatory role. The γ-subunit affects the scFAS conformational landscape by stabilizing an otherwise low abundant 'rotated' conformation. Along with the conformation of the scFAS barrel, the γ-subunit also affects the localization of the acyl carrier protein. The γ-subunit interacts with three distinct active sites which impedes substrate binding.

Taken together, structural and kinetics data suggest a model where the γ-subunit restricts the conformational landscape of the scFAS and inhibits scFAS activity by simultaneously occluding substrate binding at multiple active sites.

The discovery of the scFAS γ-subunit provides a direct mechanism through which cells can regulate FAS activity and structure. In the future, *in vivo* studies would be important to better understand when and how fungi use this γ-subunit for FAS regulation. Finally, FAS binding segments of the γ-subunit could be used as templates to develop generalized fungal FAS inhibitors.

Kashish Singh completed his doctoral thesis in July 2019 in the lab of Holger Stark at the MPI for Biophysical Chemistry. Recently he joined the MRC Laboratory of Molecular Biology (LMB), Cambridge, UK as a postdoctoral researcher.

These results were published in Singh K, Graf B, Linden A, Sautner V, Urlaub H, Tittmann K, Stark H, Chari A (2020) Discovery of a Regulatory Subunit of the Yeast Fatty Acid Synthase. Cell 180(6):1130-1143

Cunha MI, **Su MH**, Cantuti-Castelvetri L, Muller SA, Schifferer M, Djannatian M, Alexopoulos I, van der Meer F, Winkler A, van Ham TJ, Schmid B, Lichtenthaler SF, Stadelmann C, Simons M (2020) Pro-inflammatory activation following demyelination is required for myelin clearance and oligodendrogenesis. J Exp Med 217(5):e20191390

Erijman A, Kozlowski L, **Sohrabi-Jahromi S**, Fishburn J, Warfield L, Schreiber J, Noble WS, Soeding J, Hahn S (2020) A High-Throughput Screen for Transcription Activation Domains Reveals Their Sequence Features and Permits Prediction by Deep Learning. Mol Cell 78(5):890-902.e6. Correction: Mol Cell 79(6): 1066

Fitzner D, Bader JM, Penkert H, Bergner CG, **Su MH**, Weil MT, Surma MA, Mann M, Klose C, Simons M (2020) Cell-Type- and Brain-Region-Resolved Mouse Brain Lipidome. Cell Reports 32(11):108132

Gomkale R, Cruz-Zaragoza LD, Suppanz I, Guiard B, Montoya J, Callegari S, Pacheu-Grau D, Warscheid B, Rehling P (2020) Defining the Substrate Spectrum of the TIM22 Complex Identifies Pyruvate Carrier Subunits as Unconventional Cargos. Curr Biol 30(6):1119-1127

How ArfB rescues the bacterial ribosome

A kinetic mechanism with structural snapshots

Protein synthesis is a central process of life, and one that requires complex machinery and a large amount of energy. This is why when ribosomes, the molecular machines at the center of translation, stall on defective mRNAs, the growth and survival of cells are heavily impacted.

One extreme case of stalling is when ribosomes reach the 3′ end of an mRNA and does not encounter a stop codon; canonical release factors cannot hydrolyze the peptidyl-tRNA and the ribosome is effectively trapped. Various mechanisms to rescue these non-stop stalled ribosomes have evolved in bacteria, the least well-understood of which is that of ArfB, or alternative ribosome-rescue factor B.

In this paper, we use a fully reconstituted *in vitro* translation system to purify non-stop stalled ribosomes, which we then mix with purified *E. coli* ArfB to study the kinetic parameters of ArfB-mediated ribosome rescue, using rapid kinetic techniques and fluorescence spectroscopy. We find that ArfB rescues ribosomes through a multi-step pathway, beginning with a rapid scanning step, in which ArfB binds quickly to ribosomes regardless of whether or not they are stalled at the end of an mRNA. This process is facilitated by the biophysical properties of ArfB, namely the intrinsic disorder of the C-terminal tail.

On its preferred substrate, which is ribosomes stalled on the end of an mRNA, the ArfB C-terminal tail is able to form specific electrostatic

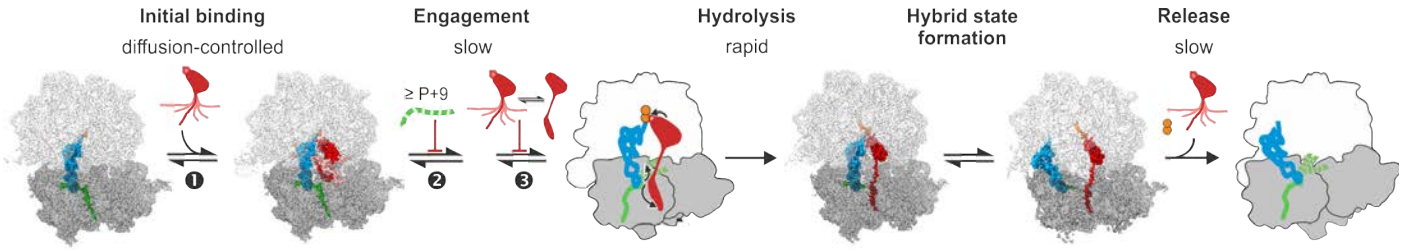


Fig. 1: Mechanism of ArfB-mediated ribosome rescue. Initial binding is fast and independent of mRNA length (1). The factor probes the mRNA entry channel; if there is mRNA extending past the P site, the mRNA must first move out of the mRNA entry channel (2), which occurs more slowly with longer mRNAs. The binding and folding of the ArfB C-terminal domain result in engagement (3), which allows the rapid hydrolysis reaction to occur via the GGQ motif, followed by peptide release, ribosome rotation and movement of the tRNA into the hybrid state, and ArfB dissociation.

Greer MS, Cai YQ, Gidda SK, Esnay N, **Kretzschmar FK**, Seay D, McClinchie E, Ischebeck T, Mullen RT, Dyer JM, Chapman KD (2020) SEIPIN Isoforms Interact with the Membrane-Tethering Protein VAP27-1 for Lipid Droplet Formation([OPEN]). Plant Cell 32(9):2932-2950

Hillen HS, **Kokic G**, Farnung L, Dienemann C, Tegunov D, Cramer P (2020) Structure of replicating SARS-CoV-2 polymerase. Nature 584(7819):154-156

Kilisch M, **Mayer S**, Mitkovski M, Roehse H, Hentrich J, Schwappach B, Papadopoulos T (2020) A GTPase-induced switch in phospholipid affinity of collybistin contributes to synaptic gephyrin clustering. J Cell Sci 133(2):jcs232835

Kondratiuk I, **Jakhanwal S**, Jin JL, Sathyanarayanan U, Kroppen B, **Pobbati AV**, Krisko A, Ashery U, Meinecke M, Jahn R, Fasshauer D, Milosevic I (2020) PI(4,5)P-2-dependent regulation of exocytosis by amisyn, the vertebrate-specific competitor of synaptobrevin 2. Proc Natl Acad Sci USA 117(24):13468-13479

interactions with the ribosome. This is observed as a much slower engagement step that limits the rate of hydrolysis. Thus, the intrinsic disorder within the ArfB molecule further contributes to its ability to discriminate between potential substrates.

In addition to the kinetic mechanism, we used cryo-electron microscopy to study the structure of ArfB bound to the ribosome. Due to the high resolution of the structure of ArfB in its active state, we are able to identify the exact specific interactions established between ArfB and the ribosome during the engagement step. Furthermore, we find that when the ArfB C-terminal tail is fully accommodated in the engaged state, any mRNA extending beyond the ribosomal P site must be diffused from the mRNA entry channel, lending visual support for our assertion that ArfB prefers ribosomes stalled on the end of mRNAs.

The combined information from our kinetics experiments and cryo-EM structures allow us to build a model of ArfB-mediated ribosome rescue. These conclusions have implications beyond the behavior of a single bacterial protein. While ArfB is found in about a third of bacterial genomes, its homologs are conserved in all eukaryotes.

In humans, the ArfB homolog is called ICT1, which is a mitochondrial protein essential for cell viability. Due to the strong structural similarities between ArfB and ICT1, the findings of our paper may well shed light on the function of ICT1 and possible mechanisms of ribosome rescue in human mitochondria.

Kai-Hsin Chan completed her doctoral research in summer 2020 in the group of Marina Rodnina at the MPI for Biophysical Chemistry, where she is currently continuing as a postdoctoral researcher.

Valentyn Petrychenko is a PhD student in the group of Holger Stark at the MPI for Biophysical Chemistry.

These results were published in Chan KH, Petrychenko V, Mueller C, Maracci C, Holtkamp W, Wilson DN, Fischer N, Rodnina MV (2020) Mechanism of ribosome rescue by alternative ribosome-rescue factor B. Nat Commun 11(1):4106

Kretzschmar FK, Doner NM, Krawczyk HE, Scholz P, Schmitt K, Valerius O, Braus GH, Mullen RT, Ischebeck T (2020) Identification of Low-Abundance Lipid Droplet Proteins in Seeds and Seedlings. Plant Physiol 182(3):1326-1345

Kroppen B, Teske N, Yambire KF, Denkert N, Mukherjee I, **Tarasenko D**, Jaipuria G, Zweckstetter M, Milosevic I, Steinem C, Meinecke M (2020) Cooperativity of membrane-protein and protein-protein interactions control membrane remodeling by epsin 1 and affects clathrin-mediated endocytosis. Cell Mol Life Sci (online ahead of print)

Lemus-Diaz N, Rinaldi Ferreira R, Bohnsack KE, **Gruber J**, Bohnsack MT (2020) The human box C/D snoRNA U3 is a miRNA source and miR-U3 regulates expression of sortin nexin 27. Nucleic Acids Res 48(14) 8074-8089

Linnemannstöns K, Witte L, Karuna MP, Kittel JC, Danieli A, Muller D, Nitsch L, Honemann-Capito M, Grawe F, Wodarz A, Gross JC (2020) Ykt6-dependent endosomal recycling is required for Wnt secretion in the Drosophila wing epithelium. Development 147(15):dev185421

From stills to movies

Analyzing and visualizing protein mobility in the synapses

The presynaptic terminal is one of the most intensely studied cellular compartments with multiple research groups focusing on expanding our understanding of its composition, development, and function. One demonstration of how much detail we know about synapse composition would be the well-known (at least by the MolBio students) "Göttingen page" of the "Molecular Biology of a Cell" textbook, where eye-catching illustrations of models of the synaptic vesicle and synaptic bouton, generated by the labs of Reinhard Jahn and Silvio Rizzoli, respectively, are presented. The models indicate the identities, copy numbers, and localizations of hundreds of key synaptic proteins.

While such models provide an immense amount of information on organization of the synapses, they are only still snapshots, and we generally have a sketchy view of the overall dynamic organization of the synaptic proteins and its regulation. During my PhD I tackled this issue by analyzing the mobility of various proteins in synapses, and ultimately generating an updated, "live" visualization of the synapse.

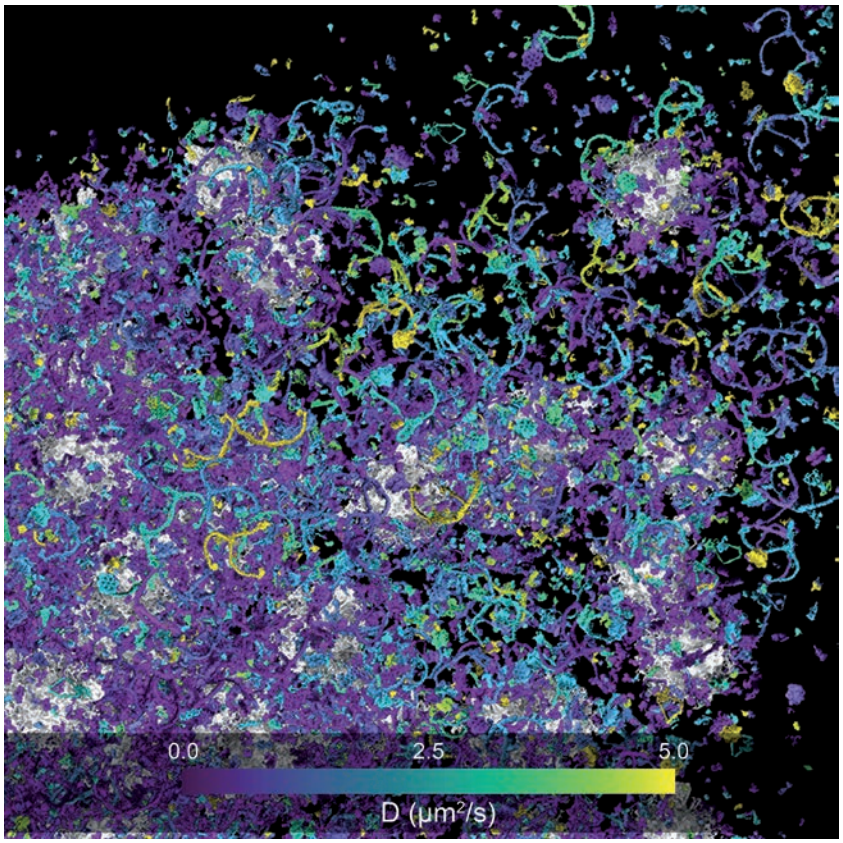


Fig. 1: A still representation of protein mobility in the synapse. A region at the edge of the synaptic vesicle cluster is shown. Organelles in grey represent synaptic vesicles. Various shapes correspond to different protein molecules, with each protein species having its own shape, as extracted from structural studies. The proteins are colored based on the diffusion coefficient of every individual molecule in every position.

Liutkute M, Maiti M, Samatova E, Enderlein J, Rodnina MV (2020) Gradual compaction of the nascent peptide during cotranslational folding on the ribosome. eLife 9:e60895

Liutkute M, Samatova E, Rodnina MV (2020) Cotranslational Folding of Proteins on the Ribosome. Biomolecules 10(1):97

McDowell MA, Heimes M, Fiorentino F, Mehmood S, **Farkas A**, Coy-Vergara J, Wu D, Bolla JR, Schmid V, Heinze R, Wild K, Flemming D, Pfeffer S, Schwappach B, Robinson CV, Sinning I (2020) Structural Basis of Tail-Anchored Membrane Protein Biogenesis by the GET Insertase Complex. Mol Cell 80(1):72-86

Metje-Sprink J, Groffmann J, Neumann P, Barg-Kues B, Ficner R, Kuehnel K, **Schalk AM**, Binotti B (2020) Crystal structure of the Rab33B/Atg16L1 effector complex. Sci Rep-UK 10(1):12956

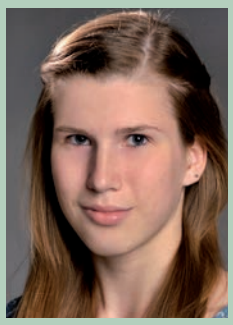
Osman S, Cramer P (2020) Structural Biology of RNA Polymerase II Transcription: 20 Years On. Annu Rev Cell Dev Biol 36:1-34

We started by measuring protein mobility of 47 different proteins in the synaptic boutons and axons of living primary hippocampal neurons using fluorescence recovery after photobleaching (FRAP). The obtained time constants indicated different mobility behavior of different proteins within the synapse, as well as differences in protein mobility in synapses and axons. While this already allowed comparison between the proteins analyzed, FRAP data are typically difficult to compare in independent studies where different experimental conditions might have been used. We wanted to obtain objective measure of protein mobility that can be applied to any further studies, such as diffusion coefficients of all analyzed proteins. Due to the unique geometry of the synapses, however, the commonly used approaches to extract diffusion coefficients from FRAP data could not be used here.

To account for synaptic geometry, we turned to *in silico* modeling. First, by relying on electron microscopy data, we generated a virtual 3D model of an average synaptic bouton. We then used Monte-Carlo simulation to model random protein movement with various speeds and binding capabilities within this 3D space. The generated trajectories were then used to simulate FRAP experiments, which we then compared with the FRAP experiments done on living cells. The trajectories of the models that resulted in the closest reproduction on real FRAP experiments were then used to obtain protein diffusion coefficients, as well as for the visualizations.
We found, that association with the synaptic vesicle cluster is the key factor that influences synaptic protein behavior. Synaptic geometry and the number of transmembrane domains also influence the mobility of membrane proteins, while no correlation with the molecular weight of the protein was observed in the case of soluble proteins. Interestingly, we also found significant correlations between protein mobilities and parameters such as the protein lifetimes or the nucleotide composition of their mRNAs.

The dataset we generated can be utilized by laboratories specialized in neuronal and synaptic modeling by introducing the protein amounts and mobilities in multireaction synaptic models, enabling synaptic modeling with substantially higher precision than in the past. In addition, our video visualizations can also be appreciated by general public, as well as can be used as educational tools at various levels of training of the next generations of biologists.

Sofiia Reshetniak is a PhD student in the group of Silvio Rizzoli at the University Medical Center Göttingen.



These results were published in Reshetniak S, Ussling JE, Perego E, Rammner B, Schikorski T, Fornasiero EF, Truckenbrodt S, Koester S, Rizzoli SO (2020) A comparative analysis of the mobility of 45 proteins in the synaptic bouton. EMBO J 39(16):e104596

Perego E, **Reshetniak S**, Lorenz C, **Hoffmann C**, **Milovanovic D**, Rizzoli SO, Köster S (2020) A minimalist model to measure interactions between proteins and synaptic vesicles. Sci Rep 10**,** 21086

Reshetniak S, Fernandez-Busnadiego R, Muller M, Rizzoli SO, Tetzlaff C (2020) Quantitative Synaptic Biology: A Perspective on Techniques, Numbers and Expectations. Int J Mol Sci 21(19):7298

Reshetniak S, Ussling JE, Perego E, Rammner B, Schikorski T, Fornasiero EF, **Truckenbrodt S**, Koester S, Rizzoli SO (2020) A comparative analysis of the mobility of 45 proteins in the synaptic bouton. EMBO J 39(16):e104596

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Schmidt CC, Stein A (2020) Off and On Again: De- and Reubiquitination during Membrane Protein Degradation. Mol Cell 79(2):203-204

A tiger can change its stripes

Making microRNAs from an old known snoRNA

Small RNAs are a set of non-coding RNA highly expressed and evolutionary conserved with a wide range of biological functions. They include small nuclear (snRNA) and nucleolar (snoRNA) RNAs, which take part in mRNA splicing and ribosome biogenesis, respectively, and microRNAs (miRNA) that regulate gene expression post-transcriptionally, making them key players in development, homeostasis, metabolism etc.

snoRNAs guide chemical modifications of rRNA during their maturation, which is a highly energy consuming process. However, some snoRNAs facilitate rRNA biogenesis working as scaffolds that allow the correct positioning of the pre-rRNA for its accurate processing. Such snoRNAs include U8, U13 and U3. The latter is a central component of the SSU processome and necessary for the formation of the 18S. Its genesis requires a complex set of assembly, processing and transport factors, very distinct from canonical modifying snoRNAs (Panel A).

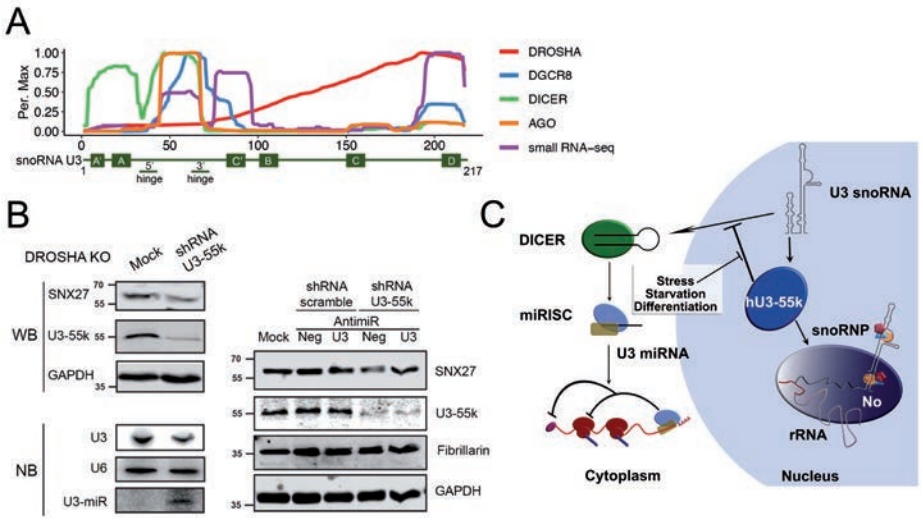

Fig. 1: (A) (PAR)-CLIP analysis of miRNA-associated proteins shown as normalised reads mapped to the U3 sequence (AGO – Argonaute) and small RNA sequencing. (B) Nothern blot from cells transfected with short-hairpin RNA (shRNA) targeting U3–55K or mock transfected, using probes for U3 snoRNA, U6 snRNA and U3-miR. Western blot displays cells transfected to express a short-hairpin RNA (shRNA) targeting U3–55K or a scrambled sequence and co-transfected with a miR-U3 anti-miR (U3) or control anti-miR (neg). (C) Proposed model of the biogenesis of U3 snoRNA and U3-miR.

Pol II transcribes U3 from an snRNA-like promoter, and similarly to splicing associated snRNA, U3 interacts with Exportin 1 (XPO1); its 7mG cap is trimethylated by TGS and interact with other processing factors. However, in contrast to snRNA, U3 showed no cytoplasmic phase and was considered an exception of XPO1 cytoplasmic transport. We thought

Schmidt CC, **Vasic V**, Stein A (2020) Doa10 is a membrane protein retrotranslocase in ER-associated protein degradation. eLife 9:e5694

Scott-Hewitt N, Perrucci F, Morini R, Erreni M, Mahoney M, **Witkowska A**, Carey A, Faggiani E, Schuetz LT, Mason S, Tamborini M, Bizzotto M, Passoni L, Filipello F, Jahn R, Stevens B, Matteoli M (2020) Local externalization of phosphatidylserine mediates developmental synaptic pruning by microglia. EMBO J 39(16):e105380

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then, (as it happens to other paradigm anomalies) either new examples find their way into the exceptions and create a different category, or the exception has to be re-assessed.

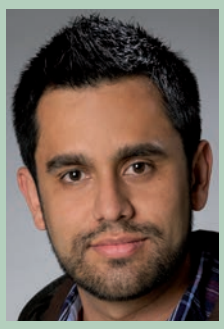
We discovered that indeed U3 is present in the cytoplasm, not as a snoRNA but as miRNA (U3-miR). Using CLIP-seq derived data and CRISPR-Cas9 KOs of miRNA associated proteins (DROSHA, DICER, XPO5 and AGO), we found that the 5' region of U3 interacts with miRNA factors to produce miRNAs and induced gene down-regulation (Panel A). Moreover, we discovered that U3-miR is a DROSHA independent and low proficiency miRNA.

Furthermore, we interrogated how the miR-U3 could be regulated. The knock-down of the specific U3 snoRNA protein U3-55K, which is involved in the regulation of U3 snoRNA levels in metabolic stress and cell differentiation; showed reduced expression of the U3 snoRNA with a corresponding increase of U3-miR, including the reduction of the U3-miR target SNX27 (Panel B).

We proposed a redrafted model for snoRNA U3 genesis, where after transcription, U3 has two pathways to follow: while the cell is actively dividing and requires an elevated amount of ribosomes, the U3-55k protein commits U3 into the nucleolus following the processing described almost two decades ago. Alternatively, when cells enter growth arrest upon metabolic cues, stress or final differentiation, the interaction of the U3-55k is reduced, rendering the snoRNA U3 to the cytoplasm. There DICER will process it into U3-miR, and possibly, will regulate development and differentiation, since high confidence predictions showed several transcription factors associated with growth (Panel C).

We consider that our data support for the first time a connection between ribosome biogenesis and the miRNA mediated post-transcriptional regulation via alternative processing of snoRNA U3, opening new possibilities to explore cross-talk of these pathways in pathological conditions such as cancer.

Nicolás Lemus Díaz completed his doctoral thesis in the group of Jens Gruber at the German Primate Center in Dezember 2017. Currently, he works as a postdoctoral researcher in the group of Markus Bohnsack at the University Medical Center Göttingen.



Lemus-Diaz N, Rinaldi Ferreira R, Bohnsack KE, Gruber J, Bohnsack MT (2020) The human box C/D snoRNA U3 is a miRNA source and miR-U3 regulates expression of sortin nexin 27. Nucleic Acids Res 48(14) 8074-8089

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A journey through the membrane

How aberrant proteins are removed from the endoplasmic reticulum

Secreted proteins and membrane proteins are synthesized in the endoplasmic reticulum (ER). This process is monitored by a quality control system termed ER-associated protein degradation (ERAD). Misfolded ER-luminal and membrane proteins are recognized as substrates and ubiquitinated by ubiquitin ligase complexes, moved into the cytosol and degraded by the proteasome.

How proteins are moved from the ER across the membrane into the cytosol, a step termed retrotranslocation, had been unclear. On the cytosolic side, the ATPase Cdc48 provides a driving force by pulling on ubiquitinated substrates. However, the events that happen within the membrane during retrotranslocation were elusive. To address this question, we reconstituted ERAD with purified components in artificial lipid bilayers. We investigated retrotranslocation of two fundamentally different substrates: (1) Soluble, luminal proteins that need to completely cross the ER membrane to reach the cytosol, and (2) membrane proteins whose transmembrane (TM) segments have to be extracted from the membrane. In *Saccharomyces cerevisiae*, ERAD is mediated by the conserved ubiquitin ligases Hrd1 and Doa10. Whereas Doa10 only recognizes membrane proteins as ERAD substrates, Hrd1 recognizes both luminal and membrane proteins.

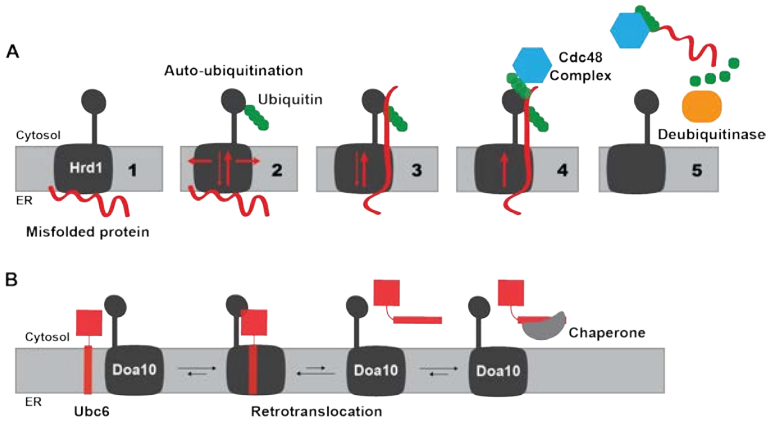


Fig. 1: (A) Model for retrotranslocation of a misfolded protein by Hrd1. (B) Model for Doa10 retrotranslocase activity. Doa10 facilitates release of Ubc6 from the membrane into the aqueous phase. The membrane-released state of Ubc6 can be stabilized by traps that bind to Ubc6, such as chaperones.

Hrd1 forms the retrotranslocation pore for luminal substrates

Recent studies suggested that Hrd1 is directly involved in the retrotranslocation of ER-luminal substrates, and that its function is dependent on auto-ubiquitination: a process where ubiquitin ligases attach polyubiquitin chains onto themselves. We used planar lipid bilayer electrophysiology and observed that Hrd1 forms an aqueous pore upon auto-ubiquitination. Strikingly, we found that deubiquitination of Hrd1 closes the pore, indicating that ubiquitination of Hrd1 acts as a reversible switch. Auto-ubiquitination causes the pore to open to relatively small sizes, and further binding of a misfolded protein to

Vasic V, Denkert N, **Schmidt CC**, Riedel D, Stein A, Meinecke M (2020) Hrd1 forms the retrotranslocation pore regulated by auto-ubiquitination and binding of misfolded proteins. Nat Cell Biol 22(3):274-281

Witkowska A, Spindler S, Gholami Mahmoodabadi R, Sandoghdar V, Jahn R (2020) Differential Diffusional Properties in Loose and Tight Docking Prior to Membrane Fusion. Biophys J (online ahead of print)

Witte L, **Linnemannstöns K**, Schmidt K, Honemann-Capito M, Grawe F, Wodarz A, Gross JC (2020) The kinesin motor Klp98A mediates apical to basal Wg transport. Development 147(15):dev186833

Wohlberedt K, **Klusmann I**, **Derevyanko PK**, Henningsen K, Choo JAMY, **Manzini V**, Magerhans A, Giansanti C, Eischen CM, Jochemsen AG, Dobbelstein M (2020) Mdm4 supports DNA replication in a p53-independent fashion. Oncogene 39(25):4828-4843

the luminal side of Hrd1 causes the pore to expand. Using Hrd1 incorporated into lipid nanodiscs and artificial vesicles (liposomes), we demonstrated that Hrd1 has an affinity for misfolded proteins on its luminal side. Upon autoubiquitination, a notably higher affinity binding site is formed on the cytosolic side of Hrd1. We propose a model in which the affinity difference between the luminal and cytosolic binding sites in Hrd1 drives the initial movement of substrates through the Hrd1 pore (Fig. 1A).

Doa10 is a retrotranslocase for membrane proteins

We next investigated how membrane proteins are extracted. We reconstituted Doa10 and its substrate Ubc6, a tail-anchored membrane protein, into liposomes. In the presence of a trap, such as a chaperone which binds to Ubc6, Ubc6 accumulates in the aqueous phase. Thus, our results show that Doa10 acts as retrotranslocase that facilitates the removal of a substrate's TM segment from the lipid bilayer into the cytosol (Fig. 1B). We showed that Doa10 can also accommodate short hydrophilic luminal segments, such as a streptavidin binding peptide (SBP)-tag attached to the C-terminus of Ubc6. Interaction of the SBP-tag with streptavidin inhibits Doa10-mediated retrotranslocation of Ubc6. Instead, Cdc48 is required for extraction. Importantly, streptavidin stays in the liposome lumen during this process. To dissociate streptavidin and the SBP-tag, bonds need to be broken that are comparable to the interactions within a folded protein. Thus, dissociation of streptavidin from the SBP-tag resembles unfolding. Concluding, Doa10 retrotranslocates luminal domains in an unfolded state. Cdc48 pulling on substrates on the cytosolic side leads to unfolding on the luminal side.

In summary, our results reveal that membrane-embedded ubiquitin ligases directly participate in retrotranslocation of ERAD substrates by providing a route through the ER membrane into the cytosol.

Claudia Schmidt completed her doctoral research in November 2019 in the group of Alexander Stein at the MPI for Biophysical Chemistry, where she she is currently continuing as a postdoctoral researcher.

Vedran Vasic completed his doctoral research in June 2019 under the supervision of Alexander Stein at the MPI for Biophysical Chemistry. Currently he works as a postdoctoral researcher at Roche Diagnostics in Penzberg/Munich.

These results were published in Schmidt CC, Vasic V, Stein A (2020) eLife 9:e5694 and Vasic V, Denkert N, Schmidt CC, Riedel D, Stein A, Meinecke M (2020) Nat Cell Biol 22(3):274-281

Wong LE, **Bhatt A**, Erdmann PS, Hou Z, Maier J, **Pirkuliyeva S**, Engelke M, Becker S, Plitzko J, Wienands J, Griesinger C (2020) Tripartite phase separation of two signal effectors with vesicles priming B cell responsiveness. Nat Commun 11(1):848

Zhang ZW, Will CL, Bertram K, **Dybkov O**, Hartmuth K, Agafonov DE, Hofele R, Urlaub H, Kastner B, Lührmann R, Stark H (2020) Molecular architecture of the human 17S U2 snRNP. Nature 583(7815):310-313

Science Abstracts 2020

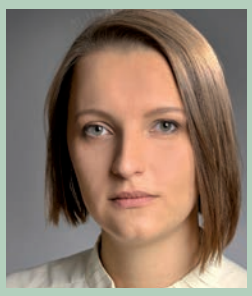
How do proteins fold in the cell?

Over the last 50+ years many PhD projects have been completed trying to understand the mechanism of protein folding, mostly by using purified proteins in solution. We were interested to explore the folding process as the protein is being synthesized by the ribosome, this type of folding is called cotranslational protein folding. We reviewed this relatively new field in our recent publication (DOI: 10.3390/biom10010097).

Most proteins fold in the range of μs or ms (very fast) meanwhile translation takes seconds or minutes (quite slow), and during translation this difference in timescales can allow the nascent chain to form multiple intermediates with unknown structures and unknown dynamic properties. By using biophysical (PET-FCS) and biochemical techniques (*in vitro* translation and SecM based force-profile assay) we identified the cotranslational folding trajectory of an alpha helical domain of the HemK protein (DOI: 10.7554/eLife.60895). During translation HemK forms several intermediate structures deep inside the limited space of the ribosome exit tunnel as well as outside of it. The folding is sequential - as each alpha helix is translated it compacts onto the previously existing structures. These intermediates are highly dynamic, undergoing multiple structural fluctuations in the range of μs.

During translation the complexity of these structures grows and their structural fluctuations slow down. However, the final compaction into the native structure occurs only when the domain is released from the ribosome. Our work for the first time characterizes the dynamic properties of cotranslational folding intermediates, adding new type of information to the field of cotranslational protein folding.

Marija Liutkute completed her doctoral thesis in the group of Marina Rodnina at the Max Planck Institute for Biophysical Chemistry and graduated in May 2020.



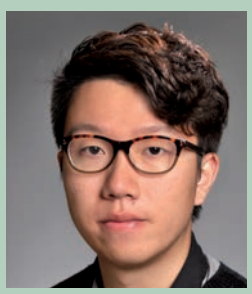
These results were published in Liutkute M, Maiti M, Samatova E, Enderlein J, Rodnina MV (2020) eLife 9:e60895

Molecular architecture of the human 17S U2 snRNP

Nuclear pre-mRNA splicing is catalyzed by the spliceosome. Recently, many cryo-EM structures of distinct spliceosomal complexes have been obtained. However, much remains to be learned about early spliceosome complexes. Indeed, at present no cryo-EM structures of the human spliceosomal E and A complexes or their major subunit, the 17S U2 snRNP, are available. The U2 snRNP plays an essential role in branch site (BS) selection during the A complex formation. In the A complex, the U2 snRNA forms a duplex with the BS nucleotides on the pre-mRNA (the U2/BS helix), in which branch site adenosine (BS-A), the nucleophile for step 1 of splicing, is bulged out and thereby selected. The U2/BS helix is then stabilized by U2 SF3B1 protein that adopts a closed conformation in the spliceosome.

Here, we determined the first structure of human 17S U2 snRNP by cryo-EM. Our structure reveals that SF3B1 is contacted by PRP5 and TAT-SF1 and adopts an open conformation in the U2 snRNP, and that the U2 snRNA nucleotides that base pair with the BS are initially sequestered in a branchpoint-interacting stem-loop (BSL) that is sandwiched between PRP5, TAT-SF1, and SF3B1. Thus, substantial remodeling of BSL and displacement of BSL-interacting proteins must occur to allow U2/BS helix formation. Taken together, our studies elucidate the RNP rearrangements that lead to stable association of the U2 snRNP with the pre-mRNA branch site, which is a key step during early spliceosome assembly.

Zhenwei Zhang is a doctoral student in the group of Holger Stark at the MPI for Biophysical Chemistry.



These results were published in Zhang ZW, Will CL, Bertram K, Dybkov O, Hartmuth K, Agafonov DE, Hofele R, Urlaub H, Kastner B, Lührmann R, Stark H (2020) Nature 583(7815):310-313

Mechanism of protein-guided folding during spliceosome activation

Eukaryotic genes are generally transcribed as pre-mRNA, in which protein-coding exons are interrupted by non-coding introns that must be excised prior to translation. The molecular machine carrying this process is the spliceosome, a dynamic complex consisting of 5 small nuclear ribonucleoproteins (snRNPs) and over 100 proteins. For each round of splicing, the spliceosome is assembled anew on its pre-mRNA substrate. The catalytic center of the spliceosome is formed during a phase known as activation, in which dozens of proteins are exchanged and U2/U6 spliceosomal RNAs are heavily remodeled to establish a catalytically essential RNA triple-helix.

At present, the role of proteins in aiding the folding of the spliceosome's catalytic center is not well understood. To probe this transition in detail, we used cryo-EM and cross-linking mass spectrometry to determine the molecular architectures of spliceosome assembly intermediates stalled at distinct stages of activation. The resulting structures exhibit partially formed catalytic centers and suggest stabilizing roles for several proteins previously not characterized in any spliceosomal structures.

Our findings provide novel snapshots into the activation step of the human spliceosome by revealing the stepwise folding of its RNA-based catalytic center and the role of various proteins in guiding this process.

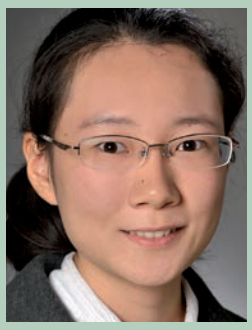
Cole Townsend is a doctoral student in the group of Holger Stark at the MPI for Biophysical Chemistry.

These results were published in Townsend C, Leelaram MN, Agafonov DE, Dybkov O, Will CL, Bertram K, Urlaub H, Kastner B, Stark H, Lührmann R (2020) Science 370(6523):eabc3753

Pro-inflammatory signaling is required for myelin regeneration in the central nervous system

Myelin is the multi-layered membrane wrapped around axons, which speeds up the conduction of action potentials. In demyelinating diseases such as multiple sclerosis, remyelination often fails to complete. Patients can get neurodegeneration and disability as the disease progresses. Remyelination requires the proliferation and migration of oligodendrocyte precursor cells (OPCs) to the lesions, and the differentiation of OPCs into oligodendrocytes that remyelinate axons. Microglia/ macrophages – immune cells in the CNS – remove damaged myelin from the lesions, mediate inflammation, and secrete cytokines and growth factors that regulate OPC responses for remyelination. I first found defective generation of new oligodendrocytes and impaired remyelination after lysolecithin-induced myelin injury in mice that are deficient of MyD88, the canonical adaptor for pro-inflammatory signaling of toll-like receptors. Using cell culture, I unraveled defects in phagocytic signaling and degradation of myelin debris in MyD88-deficient microglia. We conducted proteomic analysis of cultured microglia exposed to purified myelin debris, and identified the tumor necrosis factor (TNF) α as a candidate molecule mediating remyelination. We found that the lack of MyD88-dependent inflammatory signaling causes reduced generation of the pro-inflammatory molecule TNF-α in demyelinated lesions, impaired degradation of myelin debris in microglia/ macrophages, maladaptive inflammation and defective remyelination; TNF-α induces the generation of pre-myelinating oligodendrocytes. Therefore, pro-inflammatory signaling is required for the clearance of damaged myelin, oligodendrogenesis and remyelination.

Minhui Su completed her doctoral thesis under the supervision of Mikael Simons in November 2018. Currently, she works as a postdoctoral scholar at Stanford University.



Cunha MI, Su MH, Cantuti-Castelvetri L, Muller SA, Schifferer M, Djannatian M, Alexopoulos I, van der Meer F, Winkler A, van Ham TJ, Schmid B, Lichtenthaler SF, Stadelmann C, Simons M (2020) J Exp Med 217(5):e20191390

New Students

Master‘s class 2020/21

Gantavya Arora, India
BSc, Sri Venkateswara College, University of Delhi

Luis Camacho, Costa Rica
BSc, University of Costa Rica

Eduardo Cienfuegos Pecina, Mexico
BSc, Universidad Autónoma de Nuevo León

Nilanjan Ghosh Dastidar, India
MSc, University of Hyderabad

Monica Yasser Gobran, Egypt
BSc, German University in Cairo

Béla Goertz, Germany
BSc, Humboldt University of Berlin

Paulius Greicius, Lithuania
BSc, University of York

Milena Ivanišević, Serbia
BSc, University of Belgrade

Oğuz Can Koç, Turkey
BSc, Boğaziçi University

Alexandra Kolodyazhnaya, Russian Federation
BSc, Novosibirsk State University

Priya Kumar, India
MSc, Indian Institute of Technology Bombay

Sumeru Panta, Nepal
BSc, Sri Venkateswara College, University of Delhi

Kimberly Quililan, Philippines
BSc, University of the Philippines Diliman

Rahul Shaha, India
MSc, Indian Institute of Technology Bombay

Nikola Todorov, Bulgaria
BSc, University of York

Juan Camilo Torres Bonilla, Colombia
BSc, Hochschule Bonn-Rhein-Sieg

Josefa Torres, Chile
BSc, University of Concepción

Dimitra Tsouraki, Greece
BSc, National and Kapodistrian University of Athens

Lidiia Tynianskaia, Russian Federation
BSc, Ruprecht Karl University of Heidelberg

Applications 2020

In 2020, 612 students from 75 countries applied.

Germany 10 / West Europe 18
East Europe 65
North America 11
Central/South America 23
North Africa 51
Central/South Africa 77
Asia, Near East 43 / Far East 314

Çağıl Urhan, Turkey
BSc, Middle East Technical University

Malena von Elling-Tammen, Germany
BSc, Georg-August-Universität Göttingen

Zehra Vural, Turkey
BSc, Izmir Institute of Technology

Lucia Winkler, Germany
BSc, Georg-August-Universität Göttingen

Yumeng Zhan, P. R. China
BSc, China Agricultural University

PhD projects started in 2020

Arjun Bhatta
Structure-function studies of human mitochondrial proteins.
Patrick Cramer, Peter Rehling, Kai Heimel

Aybeg Günenç
Structural and Mechanistic Interrogation of the fatty acid biosynthesis machinery.
Holger Stark, Kai Tittmann, Henning Urlaub

Rohan Kapoor
Molecular physiology of synaptic sound encoding.
Tobias Moser, Erwin Neher, Silvio Rizzoli

Nicole Kleiber
Inverstigation of the dynamics of RNA modifications in the nucleus/cytoplams and in mitochondria of human cells.
Markus Bohnsack, Claudia Höbartner, Peter Rehling

Florian Mayr
Characterization of the antigen receptor signal transduction to the survival of Burkitt's lymphoma.
Michael Engelke, Alexis Caspar Faesen, Lutz Walter

Mehar Monga
Functional Characterization of Otoferlin.
Julia Preobraschenski, Silvio Rizzoli, Holger Stark

Vella Nikolova
Novel mechanisms to modulate the activity of the tumor suppressor p53.
Matthias Dobbelstein, Argyris Papantonis, Heidi Hahn

Atmika Paul
Deciphering the role of TGF-ß signaling in maintenance of genomic integrity in pancreatic cancer.
Holger Bastians, Jürgen Wienands, Rüdiger Behr

Alexander Rotsch
Mechanism of host cap snatching by Influenza RNA polymerase.
Patrick Cramer, Stefan Pöhlmann, Till Ischebeck

Jennifer Struck
FCharacterization of proton-gradient dependent neurotransmitter uptake by synaptic vesicles.
Reinhard Jahn, Claudia Steinem, Silvio Rizzoli

Yuliia Tereshchenko
Enhancing the maturation of iPSC-derived primate cardiomyocytes using hormones.
Rüdiger Behr, Stefan Jakobs, Ufuk Günesdogan

Chairini Thomé
Characterization of factors involved in large ribosomal subunit biogenesis in humans.
Katherine Bohnsack, Ralf Ficner, Jörg Stülke

Yajie Zhu
Resolving chromatin interaction and transcriptional networks in mammalian nuclei.
Argyris Papantonis, Johannes Soeding, Tim Beißbarth

Graduated Students

The Masters of 2020

Arjun Bhatta
(*Patrick Cramer*)
Structure of the human mitochondrial RNase P protein complex.

Margarita Chudenkova
(*Peter Rehling*)
Molecular analysis of mitochondrial disease models.

Vladyslav Dembrovskyi
(*Johannes Söding*)
The EukBook project: Large-scale search for novel eukaryotic proteins from public sequencing data.

Iga Grządzielewska
(*André Fischer*)
Deciphering the functions of lncRNAs in the CNS.

Aybeg Günenç
(*Stark Holger*)
Biochemical strategies to arrest large macromolecular complexes at different functional states.

Kai-Lin Hong
(*Sai Reddy*)
Bispecific antibody engineering in mammalian cells by multi-step genome editing.

Rohan Kapoor
(*Tobias Moser*)
The role of RIBEYE and Piccolino in the molecular physiology of inner hair cells.

Selay Kaya
(*Henning Urlaub*)
Evaluation of Peptide Pre-fractionation Methods for the LC-MS/MS.

Nicole Kleiber
(*Markus Bohnsack*)
The roles of dynamic RNA modifications in regulating gene expression.

Hong-Yu Lee
(*Alexander Stein*)
ER expansion as a tool to boost membrane protein yields - characterization of p180 overexpression phenotypes in *S. cerevisiae*.

Florian Mayr
(*Michael Engelke*)
The role of Jun N-terminal kinase-related signalling pathways in the survival of Burkitt's lymphoma B-cells.

Mehar Monga
(*Reinhard Jahn*)
Characterization of protein-protein interactions in SNARE mimicking.

Vella Nikolova
(*Matthias Dobbelstein*)
The role of oncogenic RAS signaling in the response of colorectal carcinoma cells to kinase inhibitors.

Alexander Rotsch
(*Patrick Cramer*)
Structural-functional studies of nucleosome-BRD4 interactions.

Jennifer Struck
(*Reinhard Jahn*)
Encapsulation of a novel Cl-sensor in proteoliposomes.

Siqi Sun
(*Till Ischebeck*)
Investigation of the lipid droplet targeting of two protein families.

Yuliia Tereshchenko
(*Rüdiger Behr*)
Effect of hormonal treatments on the maturation of induced pluripotent stem cell-derived cardiomyocytes.

Carlos Vanegas Torres
(*Stefan Pöhlmann*)
Detection and molecular characterization of a novel LCMV isolate found in captive New-World monkeys – tissue distribution, neurotropism and zoonotic potential.

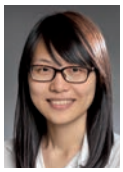
Marcel Werner
(*Patrick Cramer*)
The effect of cyclin-dependent kinase 7 (CDK7) inhibition on transcription regulation in human cells.

Yajie Zhu
(*Argyris Papantonis*)
Investigation of the lipid droplet targeting of two protein families.

Evi Zhuleku
(*Reinhard Jahn*)
A method for the immunoisolation of functional VGAT-specific synaptic vesicles.

The Doctors of 2020

Kai-Hsin Chan
Mechanism of ribosome rescue by alternative release factor B.
(Rodnina, Tittmann, Bohnsack)



Yi-Tse Liu
The role of plasma membrane lipids in plant stresses adaptation.
(Feußner, Lipka, Schwappach)

Oleh Rymarenko
Sequence space and properties of XPO1-dependent nuclear export signals.
(Görlich, Bohnsack Soeding)

Aleksandar Chernev
Identification of peptide-RNA heteroconjugates by mass spectrometry.
(Urlaub, Bohnsack, Beißbarth)

Marija Liutkute
Monitoring dynamics of protein nascent chain on the ribosome using PET-FCS.
(Rodnina, Enderlein, Tittmann)

Sung-Hui Yi
Kinetic analysis of mammalian translation initiation.
(Rodnina, Bohnsack, Tittmann)

Kolja Eckermann
Evaluation of genetic engineering and genome editing tools to develop multifactorial reproductive sterility or killing-sperm systems for the improvement of the sterile insect technique.
(Wimmer, Wodarz, Dosch)

Isaac Fianu
Reconstitution of the Integrator complex and its interaction with paused transcription elongation complex of Pol II-DSIF-NELF.
(Cramer, Tittmann, Görlich)

Mohammad Ghaem Maghami
Development, characterization, and application of RNA catalysts for *in situ* labeling of target RNA molecules.
(Höbartner, Rodnina, Jakobs)

Current profession and location of our PhD alumni

Profession

Academia / Research (51%)
Professor, PI, academic staff 7%
Group leader, senior scientist 9%
Postdoc 32%
Science management 2%
Other 1%

Private & Public Sector (39%)
Scientist, team leader, manager R&D 13%
Staff, team leader, manager non-R&D 16%
Science coordinator 5%
Consulting 5%

Other Profession (7%)
Media, publishing 3%
Patent attorney 2%
IT, software development 1%
Self employment 2%

Other (3%)
Other professions, internships, job applications, family management etc. 3%

Country Distribution

Europe (78%)
Austria 1%
Belgium 1%
France 1%
Germany 57%
Luxembourg 1%
Malta 1%
Netherlands 2%
Norway 1%
Poland 1%
Spain 1%
Sweden 1%
Switzerland 4%
Turkey 1%
United Kingdom 6%

North America (16%)
Canada 3%
United States 13%

Asia / Australia (6%)
Australia 1%
China 1%
India 2%
Iran 1%
Morocco 1%
Qatar 1%
Saudi Arabia 1%
Singapore 1%

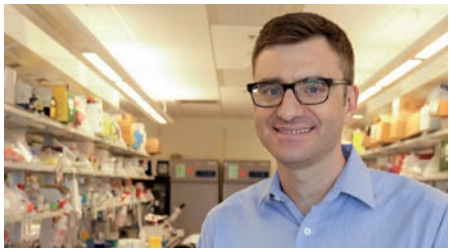
What happens at the Precision Cardiology Lab?

Making an impact for patients pre- and post-COVID: Innovation in cardiovascular disease

How can cutting edge science deliver meaningful impact for patients? This has been my guiding question ever since I graduated from the Molecular Biology Program in 2010. As I reflected over the Christmas break how this quest shaped decisions I made in my career to date, I felt a sense of gratitude and pride. Why? It led me to a spot that gave me the privilege to contribute: As I write this, we are still witnessing the most devastating pandemic in memory. COVID-19 has cost more than 1.9 million lives and resulted in the most profound economic shock of our and our parents' generation. The need to deliver actionable insights, therapies and vaccines has been the most urgent and dauting biomedical task the world has ever seen – and I find my team in a place to contribute.

How did I end up in that spot? After my finishing my PhD thesis with Prof. Markus Wahl at the MPI-BPC in Göttingen, I had a short postdoctoral stint at the EMBL in Heidelberg before joining Bayer's Pharmaceutical division in Berlin. As a Laboratory Head at Lead Discovery, I was responsible for leading protein biochemistry and biophysics activities for several early research projects across all therapeutic areas. In five years I served in this role, I had the opportunity to dive deep into drug discovery projects in cardiology, oncology, hematology, and gynecological therapies. Following therapeutic projects progress from early research into advanced lead optimization and ultimately into clinical development was a great experience. It is well known that drug discovery is a lengthy, tedious and attrition-prone endeavor. I am thus fortunate to have contributed to a project that made it to Phase 2 clinical trials.

In 2016, I took a sabbatical from bench research and accepted the role as Chief of Staff for the Head of Pharma R&D.



Christian (left) and his team of Bayer scientists at the Broad Institute

Working for a top manager who oversees several thousand R&D employees was a true change of scenery and allowed me to view life science research and development from a bird's eye perspective. As I supported the R&D leadership team in many operational and strategic topics such as strategy reviews, budget reviews and competitive intelligence, my most exciting project was a strategic cardiovascular R&D initiative in which we achieved approval for an expansion to Cambridge, MA, which also included my current role.

My son is a huge Boston Celtics fan, so when I told him and the rest of the family in 2018 there was an opportunity with my job at Bayer to move to the states, he was as enthused as I was. Back as MolBio Master's student, I had the opportunity to perform research for my Master's thesis in California at Stanford (a great opportunity enabled by Prof. Reinhard Jahn), so returning to the U.S. was certainly appealing. But what really led me to Boston were two things: 1) the thrill to build something unique and 2) to get out of my comfort zone – early target discovery was not a focus of my scientific career prior to joining industry. For me, such a stretch assignment is a privilege – building and leading a team of researchers focused on tackling the leading global killer, cardiovascular disease.

So, what is happening at the Precision Cardiology Lab? The human heart is made up of various cell types: cardiomyocytes, fibroblasts, immune cells, endothelial cells, vascular smooth muscle cells and several others. This rough breakdown is insufficient to understand the causes of complex cardiovascular diseases at the cellular level. The goal of the Precision Cardiology Lab is to harness single-cell RNA sequencing to delineate subtypes of heart cells whose

Christian Stegmann
completed his doctoral research in the group of Markus Wahl at the MPI for Biophysical Chemistry. He graduated from the Molecular Biology Program in January 2010. After a short postdoc at the EMBL he joined Bayer Pharmaceuticals in Berlin as lab head, followed by a position as Chief of Staff of the Head of Pharma R&D. In 2018 he moved to Boston where he is currently Senior Director Preclinical Research and Head of the Precision Cardiology Lab Broad Institute & Bayer.

What happens at the Precision Cardiology Lab? (continued)

function or dysfunction we can link to a disease. We set out focusing on two areas: heart failure and atrial fibrillation. Heart failure indicates a state in which cardiomyocyte function is diminished. The heart is able to temporarily compensate for this lower performance, but this puts extra strain on the heart, leading ultimately to failure.

The second area of focus is atrial fibrillation - when the myocardium contracts irregularly, the flow of blood is uneven, which can increase the risk of thrombosis. In patients, this can result in life-threatening complications such as stroke or pulmonary embolism. We deploy single cell transcriptomics on a unique tissue bank of explanted human hearts from healthy donors and from patients in various disease conditions. In each tissue sample, we examine between 40,000 and 50,000 individual cells and in each cell we can map expression of up to 4,000 genes. Our expectation is that these data will allow us to better understand how heart disease progresses and give us greater clarity in for drug target discovery as well as biomarker discovery which are crucial in the development of new therapeutics for cardiovascular diseases.

When COVID-19 hit, we had just concluded and submitted our first major project: A single cell atlas of the healthy human heart, meanwhile published in Circulation [1]. As we had just kicked off in-depth sequencing of diseased heart samples, we quickly pivoted our analytical focus to a COVID-19 relevant question: The ACE2 receptor is expressed on cardiomyocytes and it turns out to be highly relevant in the pathogenesis of COVID-19. As the number of described COVID-19 cardiac injury cases rose, we took an in-depth look at ACE2 levels in patients with dilated and hypertrophic cardiomyopathy using snRNAseq. We swiftly wrote up a manuscript and published these findings [2]. In addition, we started working on a number of targets for potential therapeutic projects to tackle symptomatic COVID-19 and other viral diseases that can be associated with acute respiratory distress syndrome.

One perk of working at the Broad Institute is that your kids learn to extract DNA from strawberries at a young age: Eric (10) and Antonia (7)

What makes our collaboration unique is that we bring together leading academics from the Broad Institute and industry researchers from Bayer to work side by side in various disciplines: our team consists molecular biologists, physicians, pharmacologists and bioinformaticians. Before COVID-19, cardiovascular diseases were the number one killer world-wide. Did you know that heart disease is the leading cause of death among women in the US? In 2018, nearly 400,000 deaths among women were caused by heart disease and stroke. At the same time, women typically perceive the risk of dying from cardiovascular disease as lower than that of dying from breast cancer. It is concerning that in women, the awareness that heart disease is the leading cause of death among women has further declined in the last 10 years [3].

If there is a chance to deliver impactful innovation for patients with cardiovascular disease, we will be ready to jump on it here at Broad Institute. Our scientific teams are completely integrated. When you walk through the lab, you can't tell who is a Bayer and who is a Broad Institute scientist. It is also a terrific opportunity for early career researchers deciding between academia and industry to see both world – being exposed to top-notch industry research while getting published in high-ranking journals.

As I head back to the lab after the Christmas break, I can't wait to see the latest data from the team. I am optimistic that 2021 will be a good year in our efforts to deliver meaningful impact for patients.

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Some things won‘t (phase) separate

Recently, over a video call, a dear friend asked me how it looks like to have a lab under the pandemic. Answering, I realized that my only experience as a team leader is, in fact, under the pandemic. In January 2020, I started the lab, focusing on liquid-liquid phase separation at the synapse within the German Center for Neurodegenerative Diseases (DZNE) at the Charité Campus in Berlin.

Team members preparing the cold room for the Holiday Season. From left to right: Dragomir Milovanovic (Group leader), Chinyere Logan (Master student), Franziska Trnka (Master student), Florian Aust (intern); front, Christian Hoffmann (postdoc)

But let us look back. After finishing the IMPRS Molecular Biology program and kissing the “girl” in front of the old town hall in Göttingen, I took a one-way ticket to the US. Well, sort of, with frequent returns to Göttingen. Apart from vivid science, my stay at Yale encompasses a time of a unique political era. Letting go of the Max-Planck PhD/Postdoc Community in Göttingen left me quite unsatisfied and brought me into helping build the Yale Postdoc Association. Organizing Horizons and being part of student and postdoc communities in Göttingen and New Haven were truly valuable experiences for building and developing teams, which is now one of my main tasks as a group leader. Whenever you visit New Haven, my absolute must do’s are taking a sip of a freshly brewed True-Blue (Blue State Coffee shop) and getting a ticket for a show in the Yale Cabaret Theater. Two things I miss most, besides great friendships and spectacular science.

Here in Berlin, the first couple of months were centered around figuring out the space and purchasing the equipment (from pipette sets to reagents to chairs). Interestingly, our ÄKTA chromatography system arrived on the day when the first nation-wide lockdown was announced in March. Afterwards, things changed a lot for everyone: minimal operation mode, shift work, virtual lab meetings, and other known buzz words. Nevertheless, during summer, we managed to have our first lab retreat – canoeing in the “jungles of Spreewald.” Hard to believe, but my beloved team members literally lost a rotation student and me for a couple of hours in the branched channel system of the river Spree. No worries: A joint-lab rescue mission was successful, boss saved, the lab continues, a student finished rotation. During this year, my greatest realization was how important it is to recruit talented people with a sincere drive for science and who are, at the same time, fun to work with.

Despite the distance and these challenging times, Göttingen Campus continues to play such an important role in my daily experience. During the summer, we managed to do some joint experiments in Göttingen, teaming up with some old friends and establishing new friendships. I am very fortunate to join the SFB 1286 community on Quantitative Synapto-

Dragomir Milovanovic
completed his doctoral thesis in the group of Reinhard Jahn at the Max Planck Institute for Biophysical Chemistry. He graduated from the Molecular Biology Program in October 2015, followed by a postdoctoral research position at Yale School of Medicine in the laboratory of Pietro de Camilli. Since January 2020, Drago is a group leader for molecular neuroscience at the German Center for Neurodegenerative Diseases (DZNE) in Berlin.

Some things won't (phase) separate (continued)

logy, which paves the path for great interactions and scientific exchange in the years ahead. For example, a talented Bachelor's student from the Biochemistry program is currently doing an internship in my team.

Scientifically speaking, the research focus of the lab is organized in two tracks. First, we are interested in how the principles of phase separation – a process that drives the formation of tiny oil droplets in the lunch portion of our soup – help explain the nerve terminal organization at the large, mesoscale level. In the second line of research, we study how the material properties of synaptic proteins (e.g., fluid condensates vs. insoluble aggregates) trigger distinct signaling responses.

Finally, I feel deeply grateful for all the experiences, friendships and interactions during my educational and research journey, where especially my time in Göttingen had a major impact. Looking forward, I continue to follow my scientific curiosity and, hopefully, motivate my team members to pursue their own paths.

Honors and Awards

Faculty Members
(current and former)

Patrick Cramer has secured an ERC Advanced Grant for the third time. Furthermore, he was elected by the National Academy of Sciences, USA and was awarded the Otto-Warburg Medal of the German Society for Biochemistry and Molecular Biology.

Ivo Feußner has been included in the 2020 list of „Highly Cited Researchers", referring to the most cited scientists in their field worldwide.

Reinhard Lührmann was awarded an honorary doctorate by Freie Universität Berlin.

Marina Rodnina was awarded the Albrecht Kossel Prize of the German Chemical Society (GDCH). She was also elected as a member of the Academia Europaea.

Students
(current and former)

Ida Jentoft has been awarded a PhD fellowship by the Boehringer Ingelheim Fonds in 2019 (we didn't mentioned in our last newsletter).

Simone Mayer is now a fellow in the WIN College of the Heidelberg Academy of Sciences and Humanities.

Amanda Schalk received a $150K supplemental award on an NIH small business grant for her company. Her startup also received an additional $2.4M in non-dilutive NIH small business grant money in 2020. She is PI on both of those grants. Amanda was also Scientist of the Month in July for the Association of Women in Science - Chicago who also asked her to record a podcast that was published in fall 2020. She also received the Early Career Innovator award from them for her work on developing a less immunogenic and therefore safer cancer therapeutic for acute lymphoblastic leukemia that has potential to expand to other cancer indications.

Neva Caliskan was awarded an ERC Starting Grant of up to €1.5 M over five years of funding.

Mohammad (Farbod) Ghaem Maghami was awarded a summa cum laude distinction for his doctoral thesis and defense.

In addition, summa cum laude was awarded for the PhD defenses of **Kai-Hsin (Cathie) Chan**, **Kolja Eckermann**, **Oleh Rymarenko** and **Sung-Hui Yi**.

Congratulations!

The Churn

Tenure-track path and the value of the program network

I recently got hooked on "Expanse". The show is great - watch it if you get a chance. My favorite line from the show is something that I find myself repeating to all my trainees and junior faculty friends: "Float to the top or sink to the bottom. Everything in the middle's a Churn." Right now, I am in a Churn, working tirelessly to float up to tenure. Will I miss the Churn once I (hopefully) get tenured? By all means, yes- this is where the fun stuff happens!!!

My Churn started in 2005, when I applied for the Molecular Biology Program. I was fresh off the Biology degree at the University of Sarajevo, in Bosnia and Herzegovina. I really, really, REALLY wanted to be a molecular biologist so I could study molecular basis of behavior, but my country had no labs or science to support that. As you can imagine, program interviews were overwhelming and all other recruits had a ton of (modern!) lab experience. However, everyone was also incredibly down to earth and helpful. For example, Anja Krauss sent me Watson's Molecular Biology of the Cell after the interviews (and hosted me later after I moved to Göttingen), an act of kindness I will never forget.

After I came back to Bosnia and Herzegovina, I was unsurprised to find out that I was waitlisted. I took that as a success, cried for a day (because yes, rejections are always hard), and started looking for jobs in Sarajevo. Late summer found me (still) unemployed and completely mind blown when I received an email from Steffen Burkhardt telling me that the program had a spot. I had a couple of weeks to get a visa, graduate and somehow get ready for moving to another country in between. Thanks to my mom and sister, I made it just in time. As I mentioned before, a friendly face met me at Göttingen Bahnhof, Anja Krauss, who graciously hosted me for a couple of weeks at her place and showed me the Göttingen ropes. The first year of the program was hard: new culture, new language, new people, science (everything was new), impostor syndrome, bad weather, bicycles, no jaywalking, fluorescent sauces in Nord Mensa, quark (I still don't know what it is), you name it! I was also the first Bosnian and Herzegovinian admitted to the program, and the weight of that small country was on my shoulders-I had to represent. But, bit by bit-or should I say, culture night by culture night-I built friendships that last to today.

Top left: Katharina Hoff (MolBio) and I during one of her many visits to the USA. Top right: Achim Werner (MolBio), Marija Herholz (Neuro), Amanda Schalk (MolBio) and I during a trip to Chicago. Bottom left: Seong Joo Koo (MolBio) visiting Boston. Bottom right: Alex Poulopoulos playing a Boston host.

After the first-year exam, one of my best friends (Marija Herholz née Sumakovic, Neuro program) persuaded me to apply for a NEUREST Marie Curie fellowship. She said "you lose nothing by sending an application" and I find that to be the most useful piece of advice for academia, period. Both Marija and I got the fellowships, and I joined Lutz Walter's lab through MolBio and Eberhard Fuchs' lab through NEUREST for a collaborative PhD project and a part of my Churn that defined me as a scientist. I worked tirelessly to find footing in neuroscience as the topic of my PhD was brain development and plasticity. I earned a badge of honor by my Neuro program friends by performing patch clamp in marmoset monkey brain slices. I was grateful for the close relationship between the MolBio and Neuro programs and at some point, the line between them completely disappeared.

After graduation, I started looking at postdoctoral positions. This is the first time I realized the extent of "the program". I was deciding between staying in Germany or going to the USA, and the lab I interviewed in the USA

The Churn (continued)

had an ENI-alum postdoc that was married to a Neuro-alum (Massimiliano Stagi and Laura Swan). During my interview, I saw a talk by another Neuro alum (Michael Kunst), who saved me from a miserable night at Hartford airport when I later moved to the USA. A graduate student in the lab I interviewed for was acquainted with Mrinalini Hoon (Neuro; the student and I became best friends after I moved). To top it all up, another Neuro alum (Jessica Wittnam) Google mapped the good coffee places and eateries so I am not completely lost when I land.

I started my postdoc in New Haven at Yale University in 2011 and little did I know I would come to rely on program alums when my postdoc lab moved to Tufts University in 2013. Alexandros Poulopoulos and Nikhil Sasidharan (Neuro program) were postdocing at Harvard at the time, and hosted me for every single apartment hunt. Alex went on the faculty job market in the USA ahead of me and was an excellent source of information about the application and interview process. I received a job offer in 2019 from the University of Virginia after 3 years on the job market. Academic positions in the US work different from Europe and (again) I was lucky to have program friends to talk about this.

My Churn is at it's hardest now. I am running my own lab that studies molecular mechanisms of learning and behavior, and that I had to build it during 2020 (nuff said!). I am not submitting a lab picture because we have not had a single in-person lab meeting or a gathering and Zoom screenshots are lame. But I am submitting a collage of my favorite memories (mostly from the USA) with my program peeps, because that's what this assay is about. We all have grit and perseverance, but very few can brag about the extent of their scientific network like Göttingers.

Left: My "support group" from Göttingen: Andrew Woehler (Neuro), Marija Herholz and Achim Werner. Right: Nikhil Sasidharan (Neuro) and I while recording a birthday message for Marija Herholz in Boston.

Fittingly, the first panel I organized featured Amanda Schalk (MolBio), the first talk invite I received as an assistant professor came from Tabrez Siddiqui (MolBio), the first editorial board involvement came from Nashat Abumaria (Neuro, former Fuchs Lab colleague), and the first reagent I ordered and used in my lab were NanoTag nanobodies (Felipe Opazo, Neuro). We even have a slack group for Göttingers in North America, dubbed (again, fittingly!) "Göttingers Assemble!"

To all of you just starting out, the connections you make now will last a lifetime. I hope you will all be in the position where 1000 words is not enough to name every person in the program that you connected with. Embrace the Churn - you're not alone in your float to the top.

Adema Ribic completed her doctoral thesis in the group of Lutz Walter at the German Primate Center. She graduated from the Molecular Biology Program in November 2009. In 2011, Adema moved to New Haven, CT, USA to work as a postdoctoral scientist at Yale School of Medicine. From 2016 to 2019, she continued her research as project lead and research scientist at Tufts University School of Medicine in Boston. Since January 2020, Adema is Assistant Professor at the University of Virginia, Department of Psychology, Charlottesville, VA, USA.

Professor position: An offer you cannot refuse?

I graduated from the MolBio program in 2009 and moved to University of Greifswald on my own DFG funding in 2010. Back then, I was following my boyfriend Mario (the things we do for love...) who had accepted a tenured professor position in Greifswald. Subject-wise it was very good fit for both us that I began working with and for him.

Mario had been applying for many professor positions while I was finishing my PhD. Some application processes were still open when he received the offer from Greifswald. It was back then crystal clear to us that this was „an offer that cannot be refused". You do not turn down your first professor position!

Katharina, her husband Mario and their daughter

Ten years later, we are both still in Greifswald. We are married and have a 4 years old daughter, a beautiful dog and a cat "with character".

Our personal "dual career deal" in Greifswald was initially sweet. I had my own grant and Mario had negotiated with the dean that I would have a chance to apply for a tenured staff scientist position. There was no job guarantee, but it was very clear that the option would come in time before my magic 12 years for limited-time contracts would expire.

That job opening came a lot earlier than expected because a dear colleague suddenly died. It turned out that our „sweet deal" with the dean had not been agreed upon with our institute. Negotiations with the institute were tough, it's a math and computer science institute – and I am a molecular biologist. But an agreement was found: Mario traded two PhD positions in order for me to get a shot at applying for the tenured scientific staff position. It all worked out, I got the job. We were relieved. It had been our only true long term option for staying in Greifswald, together. But at the same time we were very aware that from then on, "our group" was basically the two of us.

For several years, this worked out okay: we had PhD students and postdocs on several grants. But shortly after our daughter was born, we hit a dry spot. We had no third party funding, anymore. I was on parental leave, afterwards Mario was on parental leave - and then we both returned. Mario needed groundwork to be completed in preparation for his grant proposals, and he tried to delegate that towards me. I wanted to work on my own projects that had been kind of side-lined during parental leave, and I was working my own grant proposals. Big conflict. We did not like the situation. Therefore, I started to apply for other positions: if I would leave the group, Mario would regain the PhD positions. Or maybe I'd find a job that would be even better than his, maybe I'd be able to convince him to trail along?

I sent out a couple of applications, mostly for professor positions. I got invited for "the talk" and trial lectures several times. But I did not receive "the offer".

And then I saw this perfect job advertisement on ResearchGate: tenure track professor position in bioinformatics in the Netherlands. The surroundings of that position looked very attractive. Usually, I dread calling the hiring committees to ask for further information, but here I was optimistic and we immediately got along on the phone. The entire application process went by smoothly and very fast: initial interviews by video, lecture & talk on site, more interviews on site. I had a very positive feeling. And I really liked people at the hiring department. Shortly before Christmas 2019, they offered me the job. It was an odd mix of happiness and panic. I really wanted this job, and I did not know what to do with my family.

Kid, dog and cat were not really an issue. But would Mario be able to find a job in the Netherlands? He was unwilling to give up his current position "for nothing". Which is understandable.

The hiring committee had become aware of my family situation shortly before they made the offer. In the

Professor position: An offer you cannot refuse? (continued)

Netherlands, you don't negotiate the hiring package for professor positions in the same way as in Germany. It is usually a "take it or leave it" offer with a short decision time. But our Dutch colleagues tried their very best to create an option for Mario. For a short time, I actually believed that this might all work out, that we might be able to move there, together. But shortly later, we understood that it would be nearly impossible for Mario to permanently remain in the Dutch academic system and he withdrew his application.

Sailing in the Baltic Sea

I very seriously considered to move to the Netherlands, alone. Leaving my husband and our daughter in Greifswald, trying to commute once or twice a month (it's about 12-14 hours one way by train). It was a dreadful thought. I didn't really want to do that. But you don't get offers for professor positions every day. The first professor position is usually an offer that you cannot refuse. It came down to a question that I never wanted to answer: What matters more to me, career or family?

I believe we should not have to decide between family and career. But beliefs don't help if you have to decide.

I began to discuss with friends and colleagues what it would take to make my position in Greifswald more attractive. Greifswald university certainly wouldn't be able to offer me a professor position. And I was already on a permanent contract. I was looking for more scientific freedom. A higher salary would be "nice", but it was never the money that made me apply for other jobs. If we could somehow re-obtain one of the PhD positions that Mario had given up, then we wouldn't be "alone" in our group. We would have someone with lower teaching workload, someone who could help us in writing the papers that are necessary for new grant proposals.

I asked around: can I negotiate with my home university? It turned out that this is very uncommon for scientific staff. But I booked a coaching with the DHV, spoke to friends in the academic system, scheduled an appointment with our gender equality officer, discussed with my mentors. Everyone told me that I wouldn't stand a chance to negotiate for that PhD position. I heard sentences such as "I would negotiate with your husband, but I won't negotiate with you!"

It turned out that they were all wrong. A deal was made. It has been agreed on several details, the most important one being that this PhD position will be associated with my own position, permanently.

Knowing this, I still felt really bad about declining the job offer from Netherlands. It was kind of my dream job, after all. But I had created another dream job environment for myself at University of Greifswald. Plus I got to keep my family in one place. And all together, this felt and still feels good.

For me, the professor position was an offer that I was able to refuse, after all. It's kind of sad because I really root for more women in higher academic positions.

But maybe it wasn't my last chance for a professor position, after all. The entire process triggered me to finally submit my habilitation thesis, and that will be one more asset on my CV when the next attractive job advertisement in closer geographical proximity will arise...

Katharina Hoff completed her doctoral thesis in the Department of Bioinfomatics (Burkhard Morgenstern) at the University of Göttingen. She graduated from the Molecular Biology Program in October 2009. In summer 2010, she moved to the Greifwald to continue as a postdoctoral research associate. Currently, Katharina is still a research scientist at the University of Greifswald. Katharina is married and has one daughter.

New Beginnings

How we found our way after the academic roadmap ended

Chemically speaking, life cannot exist at equilibrium. We strive towards it, but it is the distance from equilibrium that keeps everything around us going. While this dynamism might not always be tangible, there are moments when we leap with faith into the unknown.

I've had a few of those. Leaving home to study molecular biology in Ankara might have been the first. Certainly, coming to Göttingen for the IMPRS Molecular Biology was an adventure into uncharted territory. I expected the top-notch education and exciting research opportunities. But I couldn't have begun to imagine what else this beautiful German town had in store for me.

Kevser, Maximilian and their son Aras

The seven years I spent in Göttingen were the most transformative of my life. I met amazing people, all of whom, in their different ways, gradually changed my perspective on the world. I made close friends that substituted family and have been a safety net away from home. Most importantly, I found my companion for life: Maximilian. Three weeks into our MolBio lectures, we knew that we liked each other a lot. Little did we know that 10 years later we would be welcoming our child into this world.

After completing his Master's, Max went to Potsdam for his PhD and hence began our long distance relationship. After five years of weekend commutes, getting married, and having made Deutsche Bahn just a little richer, we finally reunited in Göttingen. At the time I was doing a postdoc, continuing my PhD project. A couple of years into his PhD, Max already knew that he wanted to do something else entirely. He started job hunting in various fields and soon got a position as a programmer in the pristine (!) city of Mannheim.

My transition had been somewhat harder. Although my (crystallography) project hadn't gone well, I still couldn't throw the towel in. It gave me a strange kind of kick to be doing something intellectual. I defined myself as a researcher and liked that image. But with no publications to show for my six years of research, I knew that the odds were against me having a sustainable career in academia. I didn't want to spend the coming years chasing a very slim opportunity only to wind up exactly where I was then, just a little older. So I took my next big leap of faith, leaving academia.

Job hunting was arduous. Lab experience didn't count as much in non-research positions, and the lack of work experience on my CV was certainly a hurdle. I also limited my job search to the Mannheim area, because I simply didn't want to have a long-distance relationship again. I don't believe in fate but I do believe that we are guided through life by the options we've been presented with at any given time. And we ought to make the best of them.

My first job was at a global contract research organisation (CRO) as an in-house clinical research associate. This entry level position required nothing more than a bachelor's degree and good English and German skills. But I was astounded to discover that a lot

Kevser Fünfgeld (née Gencalp) was a PhD student in the group of Dirk Görlich at the MPI for Biophysical Chemistry, where she continued as a postdoc after her graduation in October 2014. From 2017 to 2018, Kevser worked as in-house clinical research associate for PRA Health Sciences. Currently, she is project manager at Universitätsmedizin Mannheim.

Maximilian Fünfgeld graduated from the Molecular Biology MSc Program in 2011. After his doctoral research at the MPI of Molecular Plant Physiology in Golm he worked as software developer and IT consultant for PTA. Currently, he is heading the Medical Data Integration Center at Universitätsmedizin Mannheim.

New Beginnings (continued)

of my co-workers were PhDs like me. It made me aware of the surplus of PhDs out there, and how the system is incapable of properly utilizing this valuable human resource. At this job I was able to get an insight into clinical research from an operational perspective: how clinical trials are organised and how the regulatory framework looks like. Although the field is quite interesting, I wasn't content with either the scope of my duties or the company's HR policies and started looking for other positions.

In the meantime, Max really found his element in computer science and decided to do a Master's degree to re-establish himself in this field. He reduced his hours at work to accommodate lectures and, after his first year, a new job opportunity presented itself as a researcher at the Mannheim Medical Faculty, University of Heidelberg. The newly established Department of Biomedical Informatics was also looking for a project manager; I applied and was hired. So we became coworkers. Although I was sceptical at the beginning, it turned out to be quite easy and pleasant to work together.

We always knew that we wanted to have a family, but the infamous question - "when is the right time?" - was hanging in the air for a long while. With all the career reorientation going on, we didn't feel confident enough to have kids. On the other hand, it was clear that none of us was getting any younger and efforts to find the right time were proving useless. In our current positions we came to a point where we could plan ahead a couple of years, and decided there was no point in postponing further.

I was still on probation when I got pregnant. My employer was very supportive when we informed him. My plan to take an entire year off for parental leave was also no problem at all. We made arrangements for a substitute who took over my duties before my leave. After a relatively smooth pregnancy full of anticipation and excitement our son, Aras Julian, joined our family on a Halloween night. Within the blink of an eye, our lives revolved around this new person, who was utterly dependent on us for everything. With time and support from our families we got used to our new arrangements. It is the greatest of our new beginnings so far.

Leaving research left a certain void at first, but this also created room for other luxuries. I especially appreciated not worrying about getting scooped or losing a project while I was on maternity leave. The job was taken over by someone else, and there will still be other projects to handle after my return. We don't worry as much about finding employment in/around the same city, nor about the short term contracts. That void quickly filled with things outside of work, like the quality time spent with friends, the hobbies we never had time to pursue, and now with our family. We are looking forward to watching Aras, our individual careers and our family grow and flourish.

Kevser Fünfgeld

What do you mean by this? Be clear in your CV

Way back in the very beginning, when Steffen was pitching the Molecular Biology program on interview day, one of the things that caught my attention and eventually contributed to my decision to come to Göttingen was the strong alumni network. And so, when the coordination office decided to encourage active engagement between students and alumni through a mentorship program, I immediately dusted off my CV and applied.

A key factor for me in finding a mentor was the fact that I am from Taiwan. Not being from Europe means that on top of everything else, I have to consider visa issues, culture, racism, and language barriers when it comes to career choices. It was extremely important to me that my mentor has the same kind of experiences as I do and can empathize with my concerns. Because the Molecular Biology program is so international, Steffen was able to find me a mentor with the exact background to fit my requirements in Dr. Anand Radhakrishnan.

As soon as I read his profile, I was extremely excited to get to know Anand. Unfortunately, due to scheduling conflicts, I was unable to attend the workshop, and Anand could not make it to the kickoff event. However, this turned out to not be an issue at all. We arranged a teleconference call over Webex in October of 2019, where we exchanged background information and immediately set out an agenda and scheduled weekly calls through March 2020. On a side note, this arrangement turned out to be excellent practice for the way we have to work in this pandemic!

From the very first call onwards, Anand challenged me to articulate my goals and preferences, and to justify them in no uncertain terms. Whenever I made a vague statement about a job that I considered applying for, he grilled me on what I imagined it to be, disabused me of any illusions, and walked me through the job description so I could learn to read between the lines. In this way, we worked throughout the winter of 2019 improving my CV – which, by the way, now looks entirely different from the one I used to apply for the mentorship program. I learned which action verbs to use when describing my work experience, and how to highlight the skills I gained from various extracurricular activities. Every time Anand asked "what do you mean by this?" was when I would realize that in being too vague, I was missing an opportunity to show how closely my experiences and skills might match a potential job description.

After we were both satisfied with my CV and cover letters, we switched to monthly calls and moved on to discussing specific job listings, and even practicing case interviews. Anand shared a prioritization system to make sure that when the time came, I could keep rolling out the applications efficiently. "It's a numbers game." He would say, emphasizing that if I just keep applying, at some point I would get a reply. After I defended my thesis in June, we agreed to cancel the regular calls, but Anand very generously assured me that I could call whenever I needed advice, which is exactly what I did when I freaked out upon receiving my first invitation to a job interview.

Anand has been a mentor in every sense of the word, and his advice has helped me in every stage of the job search process. I am incredibly grateful to him and to the program for creating this opportunity, and would strongly recommend every MolBio student to sign up.

Kai-Hsin (Cathie) Chan completed her doctoral research in summer 2020 in the group of Marina Rodnina at the Max Planck Institute for Biophysical Chemistry. In March 2021 she will start as Consultant at Scitaris, a pharma and biotech strategy consulting firm.

Anand Radhakrishnan graduated from the Molecular Biology MSc Program in 2003 and completed his doctoral research in 2007 under the supervision of Reinhard Jahn at the MPI for Biophysical Chemistry. Currently he works as Services Manager DACH, Digital Science at Thermo Fisher Scientific in Munich.

Paving the way from postdoc to pharma

To reflect on our mentoring relationship we addressed a couple of key questions. Please find our statements (Miroslav Nikolov as the mentor, Vedran Vasic as the mentee) below.

Why did you join the alumni mentoring program?
MN: My way into industry was relatively easy, partly because of my scientific background, but also to a large degree because I had friends and former colleagues to guide and motivate me. I was very grateful for the insider insights, and I promised myself I will pay it forward, and have taken every opportunity to do so since. Doing it in a structured way, within a mentoring program, gave it a more clear sense of purpose and responsibility. Even more so because I would be supporting someone from my PhD alma mater!

VV: Towards the end of my PhD, I became interested in doing research in industry as an alternative to academia. I knew I still wanted to be a scientist and I thoroughly enjoyed doing basic research during my PhD, but for my next career step I wanted to have a more direct impact on patient's lives. Before I applied for positions, I wanted input from an established scientist in industry, preferably someone with a similar background to mine. The mentorship program offered me the opportunity to be paired with such a mentor, so joining was an easy decision.

What were your expectations going in?
MN: My aim was to demystify the industry job hunting and application process, and give an insider view of what we do. The academic and industry (research) worlds are as much diametrically different as they are nearly the same. Where these differences and similarities lie is not always clear from the outside, and is crucial for informed career goals and decisions. For me, I also expected a chance to further develop my coaching and communication skills, in a setting that's very different from my everyday management tasks.

VV: I hoped to obtain a good understanding of what a research career in industry looks like, both the day-to-day work and the general career path. I also wanted to learn about the application and interview process from an insider. My expectations were definitely surpassed. My mentor, Miro, was able to shed light on everything from research and career aspects to the application and hiring process. This led me to decide on a career in industry and helped me tremendously during my applications and interviews.

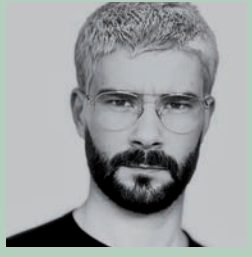
How did you structure the mentoring?
MN & **VV**: We met virtually about once a month and discussed topics ranging from how industry research works, to how to write a successful and targeted CV and cover letter. Our meetings were relaxed and informal. Once Vedran reached the stage where he was ready to start applying for positions, we discussed his CV, cover letter, and interview skills in great detail.

Was the outcome worth it?
MN: Absolutely, having played a small part in Vedran's successful job hunt was very gratifying, especially because he accepted a position at Roche, not very far from where my group is. We are now both working towards the same goals - research and development of exciting new therapeutic molecules. I was also very happy to get to know Vedran, and to reconnect with the MolBio program through him. I would gladly be part of the mentoring program again.

VV: The outcome could not have been better! I started a Postdoc position at Roche in September of 2020 and I credit Miro and the mentorship program with a significant part of that success. I am very excited to now work on cutting edge therapeutics at one of the world's best pharmaceutical companies. I highly recommend this mentoring program to all PhD students.

Vedran Vasic completed his doctoral research in June 2019 under the supervision of Alexander Stein at the MPI for Biophysical Chemistry. Currently he works as a postdoctoral researcher at Roche Diagnostics in Penzberg/Munich.

Miroslav Nikolov completed his doctoral research in October 2012 under the supervision of Henning Urlaub at the MPI for Biophysical Chemistry. Currently he works as senior scientist and lab head at Roche Pharma Research and Early Development (pRED) in Penzberg/Munich.



Learning about a career in science policy

How to make sure that “future you” doesn’t have to do all the work

The problem
Everyone reading this text either has been or is going to be in this situation: deciding the next steps in their professional life. For some this situation resolves very easily, while for others it comes as soft as a brick wall. Making the decision on what to do after the PhD is often avoided, because burying your head in the sand feels like a more welcoming solution - a classic scenario where ‘future-you’ will deal with this. The pioneering alumni mentorship program was set up looking exactly at this issue to encourage the ‘present-you’ help ‘future-you’. It is a platform where those that have gone through this phase can advise and support those currently living it - and it was exactly in this context that Marija and Cadu were paired.

The context
Marija was entering the last half year of her PhD, when the mentoring program first started. She immediately jumped on board. After filling out a short questionnaire and sending in her CV - that she now knows was not very good at all - she was picked for the mentorship program and was matched with Cadu.

Cadu had been back to Europe for about one year, after several years in San Francisco, when he learnt about the mentoring program. After signing up, the only condition put was to be matched with someone with an upbeat attitude and a positive outlook - and that had some passing interest in science policy. This is how he was matched with Marija.

The situation
The mentorship program was structured in a way that left a lot of room for flexibility and interpretation. We could set our own milestones, format and pace. The same is true for the modes and frequency of communication, which was great, after all we are all fighting with impending deadlines - be it thesis submission or work program drafts. And indeed, we made use of this flexibility as a couple of meetings had to be moved about. This flexibility also allows for a proper relationship pacing - at moments, having a chat once a month is good enough, and at others, every 10 days.

The resolution
Independently of the career track one finds themselves in, there is one question that is quite tricky: can you explain what exactly you do? It is easy to think about what a paediatrician does, or what quality control is all about - but when it comes to explain what exactly one does, the question becomes an entirely new animal. This is even more pronounced when what is being discussed is a possible career path - details do matter, certain nuances become crucial. The mentoring program posed this challenge to everyone.

Being a mentor is as much about listening and giving advice, as it is about learning about oneself. In order to give valuable input, one needs to think about their options and decisions. When talking about career advice, it is beyond simply stating the ways of filling a job application - it is also about identifying which part of it would be the best fit, which skills to learn, and which skills one should already have. When Cadu and Marija had their first chat on science policy, it was about getting to know how both could have a productive interaction, but also about narrowing the scope of the topic and, perhaps most importantly, tackling the elephant in the room: can

Marija Liutkute completed her doctoral thesis in the group of Marina Rodnina at the Max Planck Institute for Biophysical Chemistry and graduated in May 2020.

Carlos Eduardo (Cadu) Lima da Cunha completed his doctoral research in June 2013 under the supervision of Marina at the MPI for Biophysical Chemistry. Currently he works as policy officer at the European Commission.

Learning about a career in science policy (continued)

a life science researcher actually do policy? Invariably, the conversations went to abstract discussion points then to concrete actions - and to Cadu's amusement, pretty much following the way a good policy discussion should be.

Marija found it extremely exciting to learn about a career in science policy. The possibility to ask questions in a trusted and confidential environment brought answers to what a policymaker does, how researchers can participate and actively contribute to the process, and also the steps that a certain policy package undergoes before it goes to legislation. In the end, this process is actually very close to scientific research. Talking about specific necessary skills also helped to understand how to structure a CV and how to write cover letters. Learning about profiles of other people involved in the several possible careers in science policy exemplified the possibilities and flexibility of this career path.

Finally, in a now distant time before the COVID-19 pandemic hit Europe, Marija and Cadu were lucky enough to organize a visit to Brussels. Marija visited one of the European Commission buildings, visited Cadu's office, and, as one cannot miss when meeting a policy officer, they had a long conversation over one or two cups of coffee.

Our Molbio student representatives

MSc student representatives

Congratulations to our newly elected MSc student representatives **Josefa Torres** (upper photo) and **Lucia Winkler** (lower photo). You already gave us a lot of feedback and input to help paving the way for our newcomers under the difficult circumstances of the ongoing pandemic. We appreciate your committment very much.

Many thanks to our former MSc student representatives **Frederike Maaß** (upper photo) and **Chairini Thomé** (lower photo). You represented your MSc class at the onset of the corona pandemic, facing all the associated challenges at a time, when no experience could guide us to take the right decisions.

PhD student representatives

Congratulations to our newly elected PhD student representatives **Katarina (Ina) Harasimov** (upper photo) and **Gaurika Garg** (lower photo). You joined our "task force" on behalf of the Molbio program committee to develop a feasible concept to revise our three-stage admission process under the current circumstances, replacing the written subject test by short online interviews and helped to prepare the student-hosted online info meetings for our prospective newcomers. We appreciate your dedicated support very much.

Many thanks to our former PhD student representatives **Salma Sohrabi Jahromi** (upper photo), **Rashi Goel** and **Valentina Manzini** (lower photo). You were a powerful team taking the initiative for numerous events such as hiking tours with 70 participants to the Harz mountains, a summer BBQ, seminars for our MSc students on "A guide for a happier PhD experience" or the 2020 Pint of Science event (see also p. 43). Amazing how you engaged in even more responsibilities such as representing the GGNB at the board level (Salma) or even the entire Max Planck PhDNet (Rashi; see also p. 42).

Welcome, dear newcomers - Experience reports

Happy to be here

When I received the admission letter I was so happy that I could never imagine what the pandemic was waiting for me. Before my arrival to Göttingen I had to overcome some obstacles first. It took me several months to get a visa appointment and my flight was cancelled a couple of times, but fortunately, I was able to travel to Germany on time.

Once I arrived and met my classmates, we faced social distancing rules that made it more difficult for us to meet all together at the same time. However, it was still possible for us to do things in smaller groups, so we used to meet at the city center every week and I took the chance on weekends to travel with friends to other cities and go hiking. Luckily, our lectures and methods courses were held in presence, so we used our breaks to have lunch and coffee together. We also organized an online game night once, which was very fun and we will repeat soon. Even with the restrictions I had a beautiful Christmas time, and now I can still visit my friends or go hiking to the forest, which makes me very happy. I know this situation will not last forever and I am waiting for the moment when we can meet all together again!

Josefa Torres earned her undergraduate degree in Biochemistry at the University of Concepción, Chile. After she joined the Molecular Biology Master's program in September 2020, her fellow students elected her as their student representative.

Teaching in the time of Corona - How was Molbio teaching affected by the pandemic?

The current pandemic crisis has led to changes in the main aspect of the everyday Molbio life, that is the way the lectures, tutorials and methods courses are offered. While most MSc programs around Europe turn to exclusively online teaching, it was a relief for us that the Molbio program managed to keep a great part of teaching an in-person experience.

Instead of the traditional GZMB seminar room, our lectures are given at the larger Ludwig-Prandtl hall at MPI-bpc. We now sit at desks 1.5 meters apart from each other and wear masks throughout the lectures. However, to minimize personal contact with the tutors, the tutorials are offered online via Zoom.

Similarly, most of the methods courses were offered in person, except for the bioinformatics ones, which we attended online. For everyone's safety, we were subjected to Covid tests every week in order to join the labs. Additionally, we had to comply with the regulations for the maximum number of people allowed to work simultaneously at the same place. Therefore, we were split into small groups, wearing masks and keeping distances during the courses.

In this challenging year, the Molbio program is compelled to keep up with constantly changing restrictions. However, the efforts of the Coordination office and the program committee ensured that the quality of the theoretical and practical training we get is not even in the least compromised. Thank you all!

Dimitra Tsouraki did her undergraduate studies at the National and Kapodistrian University of Athens (N.K.U.A.), Greece. She earned her Bachelor of Science degree in Biology.

Welcome, dear newcomers - Experience reports (continued)

A new life

Moving abroad may seem scary, with equal amounts of expectations and fears during your first days. Plenty of people living abroad can attest that a new culture may be challenging, particularly for those of us travelling from a far-off land. New food, new cultures, and a new language may be overwhelming at first. Luckily for us, most fears were quickly dispelled thanks to the support provided by the program and the friendships blossoming between colleagues.

Göttingen is a town full of kind and welcoming people. The variety of cultures and people in the city provide an incredible amalgamation of flavors and experiences. From small talk in the grocery store to helping you get up after falling off your bike and checking you are not hurt (first-hand experience). The German stereotype of serious and humorless people is constantly proven wrong. As with any country, there is an expectation for you to learn the language. However, most people are patient and appreciate you trying, even when you run out of German.

Even though Covid has been challenging for us all, we have tried to make the best out of local pleasures such as Glühwein and walks on the forest. All you need to enjoy yourself is an open mind, and willingness to interact with the city.

As a side-note, if getting a bike, invest on a helmet.

Luis Camacho completed his Bachelor's studies in Microbiology at the University of Costa Rica in San Pedro Montes de Oca, Costa Rica. At the time he participated in the admission process it was still possible to participate in the interviews held in Göttingen.

Finally, in Göttingen

It was around 10 in the night, and I was travelling from Frankfurt to Göttingen for the first time. As the train rushed through the darkness outside, I sat there pondering how extraordinary the last few months had been.

It was in mid-March when I received the admission offer from the IMPRS Molecular Biology program. I was bubbling with joy! The entire prospect of being part of an international cohort and interact with some of the renowned researchers had kept me excited for weeks.

Fast-forwarding to June-July, when most of the world is in a lockdown due to the pandemic. All the previous planning had to be re-done. During this time, most of us (the new Mol. Bios) encountered some unique situations. From checking on the issuing of visa to booking flights, each had its share of ups and downs.

One important thing to acknowledge is the help and support we received from the Molecular Biology program office members.

Life teaches us through our experiences, and looking back, I find that the one thing that helped us ride through was the hope to overcome these obstacles and move ahead.

Nilanjan Ghosh Dastidar earned his Bachelor's degree from the University of Calcutta in Kolkata, India. By the time, he joined our program, he had already completed his Master's studies in Biochemistry at the University of Hyderabad.

Night gathers, and now my watch begins…

Online classes from the other side of the world

2020 was weird in almost every aspect. It forced us to change our way of life, our way of having fun, and above all, our way of studying. Online classes stopped being an exception, and they became the rule. I had the feeling that things would not be weirder, and then, this year proved me wrong. During March I had the privilege to be invited to the interviews for admission to the Molecular Biology program. I came back to my city, Monterrey, Mexico, on March 9th, in the middle of the uncertainty of a distant health crisis. COVID-19 outbreaks in Italy seemed far away from us; two weeks later, our lockdown began. Soon after, in April, I had one of the happiest moments, when I received the mail with my admission letter to the Molbio program. Happiness transformed into uncertainty when I realized that the German Embassy in Mexico City had suspended all the appointments for Visa applications.

I saw the things with optimism: the classes would begin until September, so there was time enough for the crisis to end. But the crisis only became worse, and while other countries managed to decrease the number of cases, Mexico suddenly was the fourth country with more deaths due to the pandemic. By August, it was clear that I would not be able to arrive in Göttingen on time for the orientation week. However, in one of our conversations, Steffen told me that my late arrival would not be a problem for me: the restrictions in Göttingen were though, and many courses would be held online. The only issue for me would be the time difference: seven hours between Mexico and Germany. Hence, I saw the challenge with optimism and excitement, and I began my night adventures on September 14, with the 17th Horizons in Molecular Biology.

A time difference of seven hours means that when in Göttingen is 8 a.m., in Monterrey is 1 a.m. To change my day-night cycle was interesting. I had to use black paper on my windows, to be able to sleep in the afternoons, and powerful light bulbs, to be active at night. I have to confess that it was easier said than done. Going to sleep in the afternoon became a very hard task, and waking up at midnight was even harder. However, despite the challenges, I looked on the bright side. I had the full support of my parents, my siblings, and my girlfriend during this adventure. I could not ask for more.

I have finished the first part of my course. I have learned so much, that I surprise myself when I look back to a few months ago. Yes, frustration knocks on my door every other day. It is hard for me to follow the rhythm of my classmates, especially during the practical courses, which were adapted to an online modality after a great effort by the hosting laboratories. Asking questions during the classes is sometimes hard, and the audio and image issues, inherent to the virtual sessions add another layer of complexity to the challenge. I think the fact that I am not alone in this endeavor motivates me a lot. Both, my friend from Egypt, Monica Gobran (Molbio program), and my friend from Mexico, Carolina Quintanilla Sánchez (Neuro program) are in the same situation as me. A great achievement for us in this crazy 2020 was to overcome the challenges of taking online a course as complex and intensive as the Molbio/Neuro programs.

I am very thankful to the many people who made a great effort to help us with our studies: Steffen, Kerstin, and all of the Molbio and Neuro organizing teams. I am also very thankful to my classmate, Paulius Greicius from my Molbio class, who worked every class to ensure that Monica and I have an excellent connection in every class.

Nowadays, I am very motivated. I am about to start my first lab rotation, working in silico with the group of Prof. Dr. Holger Stark. The German Embassy in Mexico City has opened again its Visa Office, and now I have my appointment ready on February 8th. I realized that we, the class who had to adapt to online life, will have interesting additional skills for the dry lab. I trust we will be able to take the lessons we had to learn in 2020, to contribute to Science in a novel way. We were locked for months, and now, it is time to think outside the box.

I hope to be in Göttingen by early March, so soon my watch will be ended.

Eduardo Cienfuegos Pecina from Mexico is an MSc student of the 2020/21 class.

How a pandemic changes your life

E.M. Foster, an English fiction writer, once said "We must be willing to let go of the life we have planned, so as to have the life that is waiting for us." I am a big fan of planning. I plan everything. I plan what I want to do tomorrow, next week, month, and year. I have been planning my wedding for so long, and I am actually single. I make lists for lists I need to make. I have always thought that I can avoid unwanted circumstances by planning very well. The darker the future looked like, the more I was motivated to plan ahead to protect myself from whatever might happen. Little did I know, that when Covid-19 introduced itself to my life, how my "planning philosophy" would change, and how I would actually agree with Mr. Foster.

In order for me to talk about how exactly Covid-19 has affected my life, as a student, a researcher, and a human being, I have to go back a few years ago.

Four years ago, I was a second year Bachelor student in the German University in Cairo. I was studying pharmacy, but I was attracted at most to the molecular machines and mechanisms that are inside of our bodies. I then decided that I want to pursue research when I graduate. As a long-term planner, I started to make a list of programs I want to apply to when I graduate. The Molecular Biology Msc/PhD program offered by Georg-August University together with Max Planck Institute was on the top of my list.

One year ago, I have just submitted my master's program application and I was then waiting for my acceptance. At that time, I was very nervous, will I get accepted into my dream program? A great city, great community, great research, and great curriculum, what more could I have wanted?

When I received my acceptance e-mail. I was at home, in the middle of my final year midterms period, studying. I saw the e-mail and I teared a bit. I was overwhelmed with joy. It has been such a hard period, and I needed something good to happen. I really like it when the world shows us mercy and when the things that are happening actually make sense. I have done my best to get accepted, and I actually got accepted; this logical flow of events makes me satisfied with life. However, everything that happened after that day would be described as anything but "logical".

In short, Covid-19 happened. My life was turned upside down. I stopped going to college, my graduation date got delayed, and the German Embassy in Cairo was closed. I could not meet my friends to seek the support I needed, and we had to switch to a virtual version of our encounters. My master's studies started, but I was not able to travel on time as I could not get my study visa on time, I had instead to switch to a virtual version as well, listening to and watching my colleagues and my professors. Everyone in the Molecular Biology office did his/her best to soothe my anxiety, to show compassion, and to make me feel welcome. I did feel all of these things, and I was grateful, but still, I wished that my planning philosophy and the "logical flow of events" notion would have proven themselves true; I wished I was there.

Thankfully, three months later, I applied for my study visa, and today, I am waiting to receive my visa and finally travel to the place I dreamt about for the last year.

After months of living with the persistent danger of Covid-19, and after contemplation of the period I stayed home in Cairo, while my colleagues were pursuing their studies in person, I discovered that, indeed, "We must be willing to let go of the life we have planned, so as to have the life that is waiting for us." A pat on the back from a friend in the darkest times might be great, but seeing them overcoming the distance obstacle to tell you that they are here is also great. A laugh with your colleagues while attending your in-presence lecture is amazing, but seeing them trying to make the webcam just in the right place for you to see what is happening is simply overwhelmingly beautiful.

Getting accepted to one of the most renowned master's programs in your field is absolutely wonderful, but witnessing the humane side of the office's coordinators is very heart-warming. By the end of 2020, I believe that planning is good. However, the life that is waiting for you when all your plans fail might also be good. It might actually prove better, even. Maybe the flow of events does not need to be "logical" in order to make me satisfied, maybe I can now call it "the wondrous flow of events".

Monica Gobran from Egypt is an MSc student of the 2020/21 class.

A hands-on cell culture methods course...

...without accidental infection biology events

For many years now, we have enjoyed welcoming students of the IMPRS Molecular Biology Program to our department each November for methods courses in Cell Culture. Normally, groups of six students arrive directly from their lectures and we spend two days clustered in front of the cell culture hoods, gathered beside the FACS machine, looking down the microscope together and closely watching the harvesting of primary cells from tissues.

As well as the enormous advantages of gaining hands-on experience with new techniques in a real lab environment, an important aspect of these methods courses is to provide a context for interactive discussions, brainstorming and troubleshooting. Cognisant of the importance of maintaining distance and reducing interactions in the current pandemic, but also reluctant to sacrifice the benefits of in-person methods courses, it quickly became clear that we needed to radically re-think our approach this year.

A few coffees and a bit of creative thinking later, we had a plan! If the students worked in pairs and rotated around different experiments in separate rooms, then we would be able to safely offer the same experimental experience as in previous years.

This experimental program could readily be combined with introductory presentations, theoretical sessions focused on topics beyond the scope of a two-day methods course as well as detailed discussions about the results obtained.

To ensure that students did not miss out on the interesting immunologist's perspective on cell culture, normally offered in a parallel cell culture course run by the Wienands department, Michael Engelke kindly agreed to join our course, contributing his expertise on advanced cell sorting techniques and their relevance in diagnostics.

Another aspect, especially important for us, was how to enable the students not able to travel to Göttingen yet to join in with our course. Looking remarkably awake despite big time differences, Eduardo and Monica joined all our theoretical sessions via Zoom. From a presenter's point of view, it was a new and inspiring experience to ask a question to students in a seminar room in Göttingen and have answers shouted in from Egypt and Mexico!

Despite a few delays during transfection experiments, an exchange of microscopes between courses and a FACS machine that wanted to go into the weekend already on Friday morning, everyone persevered and made this year's cell culture courses a special experience and a success. Who knows what challenges will come along in the future, but hopefully this year's experiences with adaptation of the cell culture course will stand us in good stead to deal with them.

Katherine Bohnsack is a group leader in the Department of Molecular Biology at the University Medical Center Göttingen (UMG), a project leader in SFB 1190 and an associated member of SFB 860.

Markus Bohnsack is a Professor of Molecular Biology at the UMG, speaker of the Göttingen Graduate Center for Neurosciences, Biophysics, and Molecular Biosciences (GGNB) and speaker of the GGNB doctoral program "Molecular Biology of Cells".

Both are jointly offering introductory methods courses to the Master's students of the Molecular Biology Program.

Challenges to the IMPRS management

If I had to explain the spirit of the Molbio Program with a few words, it would be best described by a friendly, supportive and close interaction among its well-established scientific and social networks. Beyond all the ongoing scientific exchange, collaborative projects and counselling, regular retreats, excursions, culture nights, graduation and anniversary celebrations are an inherent part of our life on campus. Personal contact and teamwork matters! Since the onset of the pandemic, it has become our job to continuously remind everyone of following the hygiene rules, keep a distance, stay at home, don't visit our office, don't have parties and avoid travels. This can be quite a frustrating task, but we tried to make the best out of it and to keep everything on course.

Only a few days after the last Molbio interviews in March, the first lockdown was announced calling for immediate action. For our Master's class this meant that lectures, tutorials and seminars had to be converted into online sessions. Ongoing lab rotation projects were changed to home office projects. We also launched a call for new ideas to ensure a good choice of feasible rotation projects for the third round. The plenary and individual counseling sessions I offer to our MSc students every spring also had to be zoom-based. To address the concerns of many students, we offered the possibility of optional internships after the exams and made the starting date of MSc thesis projects more flexible. With all these measures, our MSc students managed to pass the first year without major damages. They could take their exams in August, although distributed over several rooms, wearing masks in the hallways, keeping all windows open, and following a seat order grouping students living at the same place next to each other while keeping a 2-meter distance in any direction.

For the seniors working on their MSc thesis, the lockdown scenario collided with the final stage of writing up their results. Here we were able to respond with extended submission deadlines and additional funding.

Apparently, COVID-19-related restrictions also affected all PhD students. Only a few days after the start of the first lockdown we managed to change the GAUSS-wide PhD regulations to provide a legal framework for all special measures to be taken. The revised regulations allowed for an initial three-month extension of all thesis submission deadlines (plus additional flexibility if needed), online PhD defenses and TAC meetings. Additional regulations had to be created for on-site disputations in presence. Over the following weeks, most professional skills workshops and even some methods courses could be converted into an online format. The counselling sessions and CV checks by our Career Service also continued online. New pages on our websites provided continuous updates on COVID-19-related new measures and further useful information.

While everything seemed to be more or less on track by early summer, my major concern was a smooth and successful start for our newcomers. For the first time ever, we met all new MSc students already in May via zoom to better understand their concerns and inform them about our plans for the winter semester. Colleagues in our team turned into experts regarding visa, travel and quarantine regulations and provided all newcomers with up-to-date country-specific information. We circulated shopping lists and purchased basic supplies on their behalf, preparing starter packages to survive the quarantine. For students living in single-room apartments we even filled a van with newly purchased mattresses and blankets. The buddies meeting the newcomers at the station received taxi vouchers to ensure safe transfers to their new homes. Face and FFP2 masks were included in the welcome packages.

The orientation weeks started with info meetings in separate seminar rooms for the Molbios and Neuros connected via zoom which also kept Monica and Eduardo from Egypt and Mexico and Nilanjan on his way to an Indian airport connected. As our traditional excursion to the Grenzlandmuseum, our dinners and welcome buffet had to be cancelled, we invited our Molbio newcomers to a BBQ event. Some of the German language courses took place in person, others were offered online.

After a careful check of room size and air turnover rates we decided to move the Molbio lectures to the Ludwig-Prandtl hall at the MPI-BPC. With two additional labtops we ensured that our students abroad didn't miss any lecture and even had the same view on the lecturer. Tutorials and short presentations took place online. Most wet-lab methods courses could be held in person, often keeping our student abroad connected via zoom, for which many of the hosting labs had to revise their course concepts (a big thank you to all of them!). Thanks to the committed and tireless work of colleagues at the MPI-EM and MPI-BPC, our students were among the first to participate in weekly COVID-19 tests. Fortunately, the majority of lab rotations could start off in January 2021 as planned, although compromises had to be made regarding reduced bench-work under strict safety regulations. Despite all organizational efforts, the dynamic situation and risk assessment still requires continuous adjustment and we look forward to returning back to a normal life, keeping up the Molbio spirit of teamwork and mutual support.

StB

The show must go on - Molbio in corona times

I think it is fair to say that one year ago, at New Year's Eve of 2019, most of us imagined 2020 to be quite different. The first couple of months in the Molbio program had passed and I had, overall, a very good time. I was excited to start my first lab rotation and was looking forward to many more culture nights and parties with my fellow Molbios and Neuros.

Fast forward to the beginning of March, while we were beginning our second lab rotations and were busy practicing dances and songs for Indian culture night, corona became an ever more dominant topic in our daily lifes. The Indian culture night, planned for 7th of March, had to be cancelled. On March 11, the WHO officially declared COVID-19 as a pandemic and two days later Angela Merkel recommended to avoid social contacts wherever possible. When I visited my parents that weekend I already felt very uncomfortable in the train. During my journey back to Göttingen on Sunday evening I got an email from my hosting lab telling me that I should not come to the lab the next morning.

Luckily, the transition into the lockdown went very smoothly. The next morning, my PI called me. He and my supervisor had already thought of a bioinformatics project I could do instead of wet lab work. The lecture series continued without any interruption, switching from in-person lectures to zoom lectures over the weekend. Additionally, Steffen gave very clear guidelines for how to continue the lab rotations: if no wet lab work was possible, we should continue the rotation within the given timeline with theoretical work, data analysis or a literature review. Indeed, over the next two weeks almost all the labs shut down. At the beginning, this break from a 10-hour daily routine felt like a welcome pause, but while some of us were able to work on interesting theoretical projects or analyze data, others had rather little to do and soon missed the opportunity to work in the lab. With the Molbio MSc courses taking only one year, many had the feeling that they were missing out on an important part of their education, especially if you had chosen your second lab rotation to learn a specific wet lab method.

A controversial discussion of the current situation among us students led to a poll to see what everyone thought of the situation. It turned out that most of us were actually okay with leaving the schedule as it was, as Steffen had suggested. Additionally, some wanted the opportunity to do an additional lab rotation after the exam, starting their master's thesis later. Steffen asked the labs to offer modified projects that could be done under the current conditions, i.e. mostly bioinformatic projects or literature reviews, although some labs allowed at least a bit of lab work as the first wave slowed down in June.

During July and August, when we prepared for the exam, social distancing was much easier (though maybe not always helpful for our mental health). It even gave me a reason to look forward to the exam because I would actually meet my fellow Molbios face to face (with distance of course) – Kerstin and Steffen had managed that everyone could take the exam in person at the GZMB building. After a break in September, we got the opportunity to do another (optional) internship before starting our Master's thesis to catch up on any method we had wanted to learn during the second or third lab rotation. By now, we have started our Master's or PhD projects and keep our fingers crossed that labs remain open during the next months.

Overall, corona meant missing out on experiences: wet lab work, lectures and German classes got replaced by staring into computer screens. Instead of having culture nights, birthday parties and game nights we occasionally met someone for a walk on the Stadtwall. With regards to our education, I think we were quite lucky thanks to the efforts of Steffen and Kerstin, and our supervisors. I didn't finish my cloning, but on the other hand I got to practice R and I even had the opportunity to contribute to my supervisor's lockdown review. With regards to social events, almost nothing happened after the lockdown had started. That was partially our own fault. We were all too preoccupied with other things to organize online culture nights or other socially distant events. On the other hand, even the best zoom party cannot replace an Indian culture night. Nevertheless, I think that we Molbios got through the corona times reasonably well: we didn't have to worry about our financial situation, finished our degree without delays, and the lockdown started when we already felt at home in Göttingen. In contrast to students from other programs, I never felt anxious about whether or how the program would continue because Kerstin and Steffen always passed us the latest information, and because I knew they would make sure that the program could continue as well as possible no matter the circumstances.

Jannis Anstatt is a Master's student in the Molecular Biology Program. He is currently working on his Master's thesis under the supervision of Stefan Jakobs at the Max-Planck Institute for Biophysical Chemistry.

Interaction session with Molbio newcomers

COVID-19 has proven to be a challenging time for everyone, including the students for whom 2020 was a year of transition, for example the newcomers in the Molbio 2020/21.

While we and our previous batches had the opportunity to spend our initial months indulging ourselves in the vibrant city of Göttingen, our juniors found themselves in a city under strict lockdown policies. As expected, this limited their interaction with their batchmates to online sessions. They did not even get a chance to interact with their seniors to guide them through the transition period. We think this was a serious disadvantage for them, considering that our IMPRS student and alumni network consists of a group of very helpful and experienced people from diverse research interests.

Due to Covid-19 restrictions, the internationally recognized Molecular Biology symposium 'Horizons 2020' was organized on a virtual platform by the Molbio students. While the online conference included very informative scientific talks and was indeed very successful, the students from the 2020/21 batch missed out the welcoming chance of attending the various fun sessions like beer-party, after-conference dinner sessions and speed dating programs that are generally arranged in Horizons off-site. Since Steffen graciously makes arrangements for all newcomers to attend the event, it is a great opportunity for them to network with the speakers, seniors, including master's and PhD IMPRS alumni and the professors on campus alike. This makes the transition of moving to a new place much smoother.

This year, however, it was very different for the Molbios. No such multiple get-to-know sessions, not even self-organized ones, like visits to the city lake, meetings in the city center or evening drinks with the previous batches, etc were possible. Although, thankfully our coordinators and professors did their level best to make the offline- to online transition seamless, I felt nothing can replace face-to-face interactions.

The open-air barbeque sessions and the online sessions organized by Molecular Biology coordination office allowed the Molbios to interact within themselves but not with us or any other seniors. The conflicting schedules and busy lives make the planning of these sessions with the senior batches a bit of an arduous task for the organizers, so I thought why not initiate such an endeavor myself.

Ironically, the idea to organize an online meeting for our batch (Molbios 2019/20) and the newcomers came from the juniors only, albeit indirectly! A few of them whom I knew personally as I was their pick-up at the Göttingen station, or they live in the same village dorm as me would randomly message me. They would inquire about basic things like information about specific labs or how to handle a particular formality or something else related to our course structure. That is when I had the sudden realization that many others might also be struggling with these questions. So, I along with my batchmates, organized an online session with the new batch of Molbios.

The online meeting kicked off beautifully with introductions of everyone going on with some chit-chat, followed by several breakout sessions. Initially, the breakout rooms were created randomly to give everyone a chance to freely interact. Later, we moved on to targeted and smaller group sessions. The groups were decided based on the questions juniors were interested in, for e.g., juniors suggested which labs they were curious about and the seniors with experience in that particular lab were grouped together. This was followed by groups based on queries the newcomers had, regarding certain aspects which only specific seniors were well equipped to handle. The session ended with random bigger group sessions and just idle chatting to get comfortable with each other, covering a wide range of topics from labs, to seniors, food, German language and life in Göttingen in general.

The enthusiastic batch of juniors combined with actively participating and engaging seniors made the online session a huge success! Further contact regarding any topic was encouraged by every senior and all-in all the meeting concluded on a positive note, with everyone already looking forward to the next one.

I believe such sessions are a necessity to maintain healthy contact, so that we all can keep in touch and stand by each other in these difficult times. How different our lives have become? But I guess learning to adapt in such challenging times is what will make us stronger!

Vaishali Goyal is a Master's student in the Molecular Biology Program. She is currently working on her Master's thesis under the supervision of Matthias Dobbelstein at the University Medical Center Göttingen.

Seize the day during the pandemic

1st of April 2020. The pandemic was ragingly spreading. We got one-month extension with a stipend for Master thesis. I hadn't secured a PhD position yet.

In the beginning, I admired the time to experience the solitariness free from social anxiety during the lockdown. However, as it continued, the more suffocated I felt. What choked me was not viruses, but loneliness – indescribable, chaotic loneliness. Parties were gone; people were separated; our graduation ceremony was near canceled. I didn't even remember how many days had passed since I visited my boyfriend. Neither would I count. I was in a desolated island where loneliness drained me until my vigour vanished.

Sluggish and disheveled, I was lying on my bed, contemplating my life. Good memories flashed in my mind about our AP (Argyris Papantonis) lab - the family-like atmosphere created by all lab members and the inspiration after each discussion with Akis, our beloved boss. That was one ordinary day of my third lab rotation with Akis. I was tortured as a green hand by some cryptic errors in analyzing genomic data. I had been attempting to resolve those problems independently, believing that I was not inept. But the reality was cold-blooded as always. So frustrated, I reported my work progress to Akis with no progress but a bitter face pronounced. When I was about to step out of his office, I heard his calling my name, "Don't take upon everything yourself. Just come to my office when you need help." At that moment, I knew I was not alone.

I missed the time when specialized knowledge, as well as life wisdom, was circulated among us lab members. Vividly I remembered, my colleague Adi has taught me something about relationships: every boyfriend has his imperfection. If you don't accept his, you will end up tolerating others'. So does a lab. But some imperfection is fatal for me.

Yajie Zhu, PhD student

Since I has set a determined mind to shift into a dry lab, I do need a bioinformatical community for development, which AP lab could not offer at that time. So, I decided to leave, despite an attachment for it. Nevertheless, I was not sure where to go. Life was an ocean full of uncertainty. Uncertainty exacerbated my loneliness.

Gradually, I realized we were facing a loneliness epidemic world over. It was time to make a difference, no matter how small with my individual effort, by regaining control over life. Then a motto popped up from my principles: seize the day. I realized my loneliness actually resulted from isolation from the present. Instead of worrying about the unpredictable future, I opted to live in the present, setting a small goal – to get my Master thesis well-done – and rebuilding flow, a state of full immersion in the current.

The first step was to resume a balanced life. The daily exercise proved the key. My 9 m^2 room was never an ideal place for sports, for I hurt myself by either kicking the table legs or hitting the ceiling lamp. That was when I took to dance Zumba on our terrace or go jogging around Uni-sport. I didn't feel so awkward about my neighbors observing my stiff and clumsy movement while dancing. The funny scene aroused smiles on their faces as a reminder that I was rewired with the world. Besides, doing sports brought me serenity, which revived my brain when it shut down because of the overuse of a writing mode.

I should admit I was not born as a scientific writer. The scientific writing course taught by Dr. Camin Dean in our MSc program had added to my writing skills but still, it was not easy. Thus, to further improve myself, I took "Writing in the Sciences" courses from Coursera, which guided me on a less struggling path. Even though the deadline was looming, I insisted on taking the courses for half an hour each day. Sometimes when my Muse was away, I stopped writing and read some papers to get her back.

When I got tired from writing, I cooked some specials: traditional Chinese dim sums such as Baozi (steamed buns) and Qingtuan (green dumplings). The spirit of Baozi is the yeast. Obviously, the pandemic caused a rocketing demand for it apart from toilet papers, leaving me shocked in front of empty shelves of supermarkets. I felt pity for myself: I, who had survived a series of cruel do-

Yajie Zhu is a PhD student in the group of Argyris (Akis) Papantonis at the University Medical Center Göttingen.

Seize the day during the pandemic (continued)

it-or-die competition in China, should battle for yeast in Germany! Knowing most goods might be refilled the other morning, I got up at 6 am, rushed into Rewe, grabbed a box of fresh yeast, and went home with peace. It is a long protocol to make such kind of food, not so sophisticated but quite patience-consuming. Such effort was beyond my flatmates' understanding, who asked me "Why not just mix everything and put it into an oven? Then a cake is done". Well, the truth was that cooking gave me a kind of engagement, a sense of achievement. I could rid myself of any nuisance for a while and just enjoy that moment when a flour cat was born at my hands. The loneliness faded.

Time flew. The last several days were always stressful but became less stressful with the help of my supervisors, Ed and Akis. Ed is a full-fledged post-doc capable of designing genius algorithm and composing music pieces. He reviewed my thesis and offered constructive comments, according to which I revised it and sent it to Akis for a final revision. The revised hardcopy, scattered with Akis' cute but methodical handwriting, remains in my bookshelf as one of my favorite collections.

Yajie and her PhD supervisor Argyris Papantonis

Several hours before the deadline, I submitted the thesis, an old saying emerging in my mind: exert the utmost of human abilities, and then resign the rest to the decree of Heaven.

The master study was around the end. I was still uncertain about my Ph.D. study. Then things changed one day when I attended the lab meeting as usual. Akis told me my thesis had impressed Prof. Johannes Soeding, my second referee, that he offered to be my co-supervisor. His lab designs statistical and computational methods. I got to know some people there during my first rotation at Prof. Patrick Cramer's lab, my office sharing the same floor as Johannes' lab. Those people are so united and friendly. But friendly people don't make a hard-core dry lab novice-friendly, so I didn't consider it initially. But now this lab could ideally compensate for the lack of enough supervision in bioinformatics. Another good news was, Ting, a new post-doc experienced with Hi-C data analysis, was joining Akis' lab. Our bioinformatician group has been expanding!

That was the ending. Things settled. I decided to stay, altogether with the lab of Akis and the Molbio program for my PhD. Jean-Paul Sartre said, "There is only one day left, always starting over: it is given to us at dawn, and taken away from us at dusk." If you are not sure where to land, seize the day to build a ship until it is ready to set sail.

The world is going through this together

Covid-19 flipped my 2020 upside down. I didn't get to see my family or my friends. I was waiting for the self-isolation to stop me cold in its tracks with regards to my functionality and moods. Instead I realized that it was a way to connect with others more authentically. A chance for us to be open and talk about our fears and comfort levels and for everyone's voice to be heard and for people to do what feels right for them. It gave me the opportunity to show more kindness to myself when my milestones were pushed for a month or two. Oh yeah. I'm not a failure. There was a global pandemic going on. It also made me realize that my fears are always there, but I have the choice in whether or not I let them control me. The ability to quickly adapt to new priorities and surprises that I am immersed in with entrepreneurship were applied during COVID. And I remembered that amidst the extra stress, there were ways I could take care of myself with walks and finding beauty in the world and people around me. It was a reminder that instead of being alone, that the world is going through this together. It brought me joy to be supportive to others and to be able to ask for support when I needed it. I am not alone and on my own. We're in this together.

Amanda Schalk

Amanda Schalk graduated with a PhD from the Molecular Biology Program in 2011. Currently she works as co-founder and chief operating officer at Enzyme by Design Inc. in Chicago, IL, USA.

My journey as Max Planck PhDNet Rep

I was having lunch in Mensa with my friends and colleagues Sonja and Linda. Linda was the internal representative of MPI-BPC back in 2019. Sonja and I were complaining about the closure of the Otto Hahn library. We personally liked to go to the library occasionally and found the services offered by the librarian quite useful. We wanted the institute to come up with ways to preserve the services offered by the library. During that discussion, Linda turned to me and said 'if you care about these issues and would like to bring a change, why don't you yourself volunteer for the Max-Planck Institute (MPI) PhDNet representative post? The call is ongoing, get elected and bring a change'. It was such a simple statement that it left me thinking the entire day.

With that thought, I decided to run for the elections, I prepared a bunch of issues I felt about, and given my experience with organizing our graduate program's annual symposium 'Horizons' and having served as a graduate school PhD representative, I decided to take this opportunity further. Additionally, I had always been curious about how the Max Planck PhDNet functioned, and I thought that this might be a good learning experience about structural and administrative work that goes on behind the scenes.

Soon I was elected as the external PhD representative of MPI-BPC to the Max Planck PhDNet. PhDNet is the network of all PhD candidates of the Max Planck Society (MPS) across Germany. It provides opportunities to be a part of various working groups and contribute towards making the lives of doctoral researchers in MPIs a more joyous ride. As soon as my term started, I got a chance to attend the General meeting where I met representatives from all the MPIs across Germany. It was quite an exciting experience to meet proactive and extremely smart minds who would brainstorm and work towards planning events for the entire year.

PhDNet Group Photo: Linda Olsthoorn, Ninadini Sharma, Dilantha Perera, Rashi Goel, Gaurika Garg (from left to right). Missing from photo: Vitalii Mudryi

Snapshot of a PhDNet Zoom meeting during the Covid-19 pandemic with Prof. Marina Rodnina, Managing Director of the MPI-BPC.

We raised a call for a team of internal representatives and we ended up with a team of 5 representatives and me. Our term started with monthly meetings and we came up with a variety of ideas to bring people together. We installed a suggestions box where we received a few suggestions and were happy to see people from the institute engaging with the process. We organized a New Year's Party as soon as we started in January, 2020, which turned out to be a major success. While we were planning other parties and social events, the Covid19 situation struck Germany and in March we were already going in a lockdown.

This was a period I realized the importance of leadership much more. Tough times called for actions. Many people reached out to me about their own challenges during this phase. Many felt stressed about work, the uncertainty about their projects and career. The decreased input on the project, interaction with colleagues and constantly being worried about families who might be in risk prone areas, certainly reduced the productivity and morale of doctoral researchers. We were also missing social events such as 'Happy Hour' on Fridays. Hopefully, the zoom calls, data analysis, reading, enjoying the sun, beer/tea events via zoom, journal clubs, counselling sessions and tons of online resource material kept people going and kept them sane. The extension of contracts and PhD submission deadline did make many of us more comfortable about the situation.

We organized a 10-hour online LinkedIn workshop where about 20 PhD and post docs from the institute participated to learn about profile building and outreach strategies via LinkedIn. During the lockdown period, we organized a GöHub event which aimed at bringing researchers from all the five Max Planck Institutes in Göttingen together. There we had a talk and discussion centred around Open Access policies. We had regular meetings, with Prof. Rodnina, the managing director of the institute, and brought out the points and challenges that people had been bringing to us, especially during the pandemic. We were quite happy with the support the institute was offering. In fact, after attending few online meetings and lear-

Rashi Goel is a PhD student under the supervision of Reinhard Jahn in the Department of Neurobiology at the MPI for Biophysical Chemistry.

My journey as Max Planck PhDNet Rep (continued)

ning about other MPIs across Germany, I was quite thrilled to see our institute's response and fast adaptability.

After an entire crazy year of 2020, I learnt many things. I learnt the importance of having a mediator and representative community, to whom people can reach out openly and communicate their problems/ideas to the administration. Struggles during PhD should not be underestimated, and it calls for more empathy, togetherness and voicing the concerns. We also got data from the ongoing PhDNet survey at that time and were able to concretely see the issues that our institute was facing. Strong voices and fast decision making became a key to navigate everyone in these uncertain times when we were in a situation where everyone, including leaders, didn't know what to do at first. The opportunity to serve as a representative to the Max Planck PhDNet has been a huge learning opportunity for me. I learned more about myself, possible styles of leadership and points where I could improve. For example, delegation of responsibilities seems easy, however under stressful conditions, it may not be straightforward. I realized how I could do it better in future. I also realize the importance of having great people around, like that conversation with Linda in Mensa where it all started, people who can motivate you, and drive you through the process. The effort soon becomes effortless and rather fun.

Rashi Goel

Pint of Science - from pubs to your couch

Valentina´s experience - "Vale!! This event looks cool. Want to participate together in organizing it?". This is how I first came to know about the Pint of Science Festival, in October 2019. Rashi saw this entry in the Gauss Newsletter and immediately thought of including me. We have been enjoying organizing events together in the past, and this seemed fun!

Science in a pint, how? Pint of Science (PoS) is a festival that takes place across 400 cities and 24 countries, and originated in the UK. In 2012, two British neuroscientists started organizing an event called "Meet the researchers", where the public could listen and meet the researchers working on motor neuron disease and multiple sclerosis. This turned out to be a great success, and the PoS events just grew bigger in the next few years. The idea is that scientists present their research to non-scientists in a very simple way, in an informal setting such as a pub. The very relaxed atmosphere (and the presence of beer) allows the participants to ask any question without fear. PoS is a great way to increase scientific awareness and curiosity, and it is open to people of all ages and professions.

Organizing the first PoS in Göttingen was a roller-coaster. Me and Rashi met the rest of the volunteers in October. We were all quite pleased to see that most, if not all, the group leaders we had in mind as speakers were very happy to participate in the event. We were able to invite successful scientists and great presenters, and everybody seemed very excited for the whole idea. In little time, we were even able to find two different pubs that agreed to host the event for no extra charge! We were working very hard thinking about games, ice-breakers, and whatever else was necessary for a successful event in the pubs. But little did we know that a global pandemic was on the way. At the end, we moved the event online and it was still a great experience!

Pint of Science organizing committee with PhD students from various programs in Göttingen: Anna Sinterhauf, Rashi Goel, Magda Redondo, Lujane Slitin, Roos Voorn, Valentina Manzini (from left to right)

What did I learn? The importance of science communication, especially because I believe that us, as scientists, should be able to share our work and scientific knowledge to both scientists and the public. Too often, the scientific process is somehow quite isolated from society, and this leads to common misconceptions among non-scientists. By communicating our science in an easy, understandable way (and preferably in front of a pint of beer), I believe we could lower this gap between science and public.

Valentina Manzini is a PhD student under the supervision of Matthias Dobbelstein in the Department of Molecular Oncology at the University Medical Center Göttingen.

Pint of Science - from pubs to your couch (continued)

Rashi´s experience - Organizing Pint of Science 2020 was an opportunity for me to interact more with my best friend Valentina. Few doctoral researchers saw Pint of Science events in another city and decided to bring it to Göttingen. It seemed like a great idea to combine Science and socialize with speakers over beers in a pub! It is something I had seen in the US and wanted in Germany too.

Pint of Science organizational meeting during the Covid-19 pandemic

Pint of Science events take place over a few days in May every year. One does not need any prior knowledge and can attend talks on topics over a wide range. We hosted three events, one per evening.

The first evening was about 'Beautiful Mind', where we had fantastic talks by neuroscientists Prof. Stefan Treue who spoke about mechanisms of visual perception and Prof. Lucia Melloni who shed light on consciousness. We had over 70 participants from across the world and this already gave us a jolt of adrenaline for the rest of the event. In fact, we had the greatest number of concurrent participants across all the events in different cities in Germany.

The second event centered around 'Our body'. Dr Patapia Zafeirou spoke about generating organoids and its role in developing therapies and Dr Antje Ebert explored methods of differentiating iPSC's to beating heart cells. The two speakers enlightened the audience with the technique of genome editing and CRISPR -Cas9. This second evening was quite peculiar. Both the young women scientists talked honestly about roadblocks in science and yet inspiring us to follow our hearts.

The final evening concluded with the talk of Prof Emanuel Deutschmann on the topic 'Our Society'. His talk about network structures in this globalized world and the chance of global solidarity fit perfectly in the context of the ongoing pandemic.

Organizing the first Pint of Science had many challenges and making such an event online was not easy. We brainstormed about how to engage people, make it intuitive and provide a safe zone for people to interact just like in a bar. We got paranoid about advertising it enough, so we advertised it on news, radio, personal contacts, graduate programs, and respective institutes. The Pint of Science central team also helped us in dealing through these organizational issues.

What did I learn? I learnt the importance of having great friends with whom you can discuss and convey ideas aloud. I learnt the importance of having a fantastic graduate school. It brought us closer and let us experience the 'Horizons symposium', which made us confident that we could work together. I learnt the power of adaptability.

We were afraid of changing the essence of the event by bringing it online. On the contrary, it turned out to be huge. Our families attended it and they finally got a hint of what we do in our lives. Later, we got fantastic reviews from our audience.

Rashi Goel is a PhD student under the supervision of Reinhard Jahn in the Department of Neurobiology at the MPI for Biophysical Chemistry.

Connecting young life scientists

Among Molbio students it is known that Göttingen is home to an extraordinary number and variety of labs working in the field of molecular life sciences. However, what took me much longer to realize during my first year in Göttingen is the equally high number of bachelor's and master's degrees in this field: more than ten programs offer bachelor, master and doctoral degrees in the area of biomolecular and biomedical sciences. Nevertheless, so far, I only encountered students from other programs if we happened to work in the same lab.

Screenshot of the jGBM Göttingen group on twitter

After realizing how many life science students we have on the Göttingen campus who are neither Molbios nor Neuros, I thought back to my time at the Ruhr-University Bochum where I did my bachelor's degree. In Bochum I was part of the local group of the junior-GBM, jGBM for short, the junior division of the German Society for Biochemistry and Molecular Biology (GBM).

Other than organizing talks and meet the prof-sessions, the jGBM was also a great opportunity to meet students from other years and other programs. Especially contact with PhD students whom I had previously known only as tutors in lab courses, proved to be invaluable to gain insights into how science actually works on a day-to-day basis, something about which I as a bachelor's student knew almost nothing. Another exciting event was our trip to the 2019 Mosbacher Kolloquium, the annual conference of the GBM. A great coincidence, the 2019 Kolloquium was organized by Stefan Raunser from Dortmund and Stefan Jakobs from the MPI-bpc here in Göttingen, in whose lab I am now doing my master's thesis.

Remembering my time with the jGBM Bochum, I decided to set up a Göttingen local group as a platform to connect bachelor's, master's and PhD students from the many different local programs in the molecular life sciences. To do so was surprisingly straightforward: I contacted the federal spokespersons of the jGBM to tell them about my idea, which they supported straightaway. They invited me to the autumn meeting of the heads of local groups from all over Germany where I learned a lot about the events and plans of other local groups – not least how they manage to keep their group active in a time without face-to-face events. Furthermore, I contacted the heads of the jGBM group from Hannover who offered to start a partnership with us to help the Göttingen group getting started. Then, after recruiting a few friends, we were ready to start!

As of now, the jGBM Göttingen is officially up and running. We have already grown a bit and are always happy about new members! We meet once a month for our "Stammtisch" and host a biweekly Thesis Thursday where we invite students to speak about the story behind their Master's thesis (at the moment both via zoom). Furthermore, we plan to organize other events and excursions as soon as the current situation permits it.

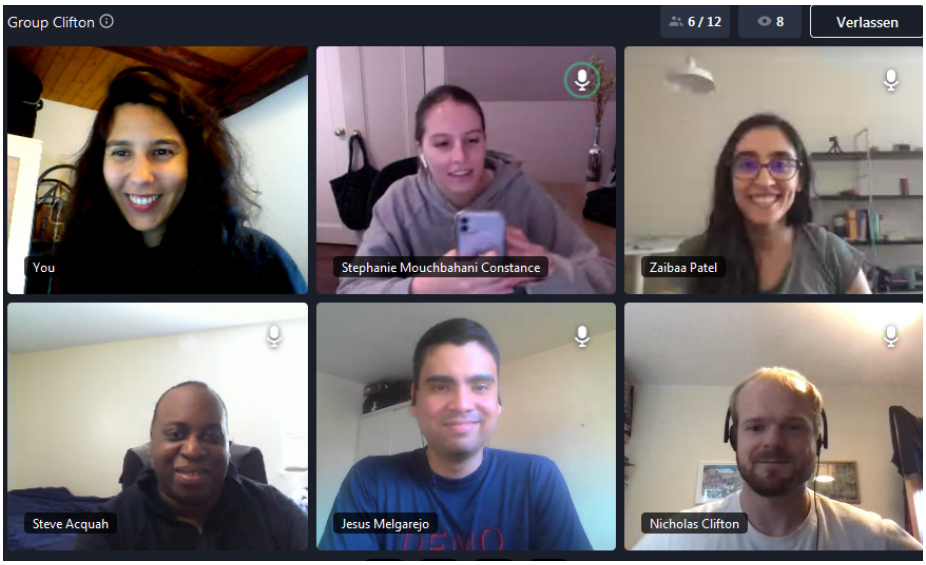
If that sounds interesting to you, you can contact us via email (goettingen@junior-gbm.de) or simply follow us on facebook, Instagram and twitter (jGBM Göttingen) to learn about upcoming events.

Jannis Anstatt is a Master's student in the Molecular Biology Program. He is currently working on this Master's thesis under the supervision of Stefan Jakobs at the Max Planck Institute for Biophysical Chemistry.

Online Sciathon @Lindau Nobel Laureate Meeting

A weekend challenge and the fight against fake news

The Lindau Nobel Laureate Meeting 2020 organized the first ever 48-hour Online Sciathon this summer. A competition in which the participants were asked to develop an idea to tackle science related issues over a weekend. We were asked to gather in teams of eight people. The topics were broad but all aimed to develop and support a new approach for global, sustainable and cooperative open science. Science ethics, communicating science and global warming, publish results Open Access and data to repositories, work transparently and truthfully, support talents worldwide, communicate to society and engage in education.



The Sciathon team, distributed over six countries, working together online for 48 hours

Spread of misinformation

In my team we decided to focus on communicating science to society. In particular, we focused on developing a tool to rate the validity of science-related content in the media.

As you know, internet and social media have allowed easy access and spread of information. However, this came with the pitfall that also disinformation, misinformation, and emotional polarization spreads really fast. In particular, the desire to capture readers' attention is prioritized over objective relating of information.

This is particularly true when science research is being reported to a lay audience by the media. The content is sometimes misinterpreted or falsely reported and this is causing an extreme divergence of public opinion and scientific consensus. Unfortunately, it has happened already too often that, for example, the headlines of a media article deviate from the main findings of the original research paper, and people were led by the online media to believe incorrectly. This reflects an issue that has been happening for decades and is only getting worse (antivax, climate change denial is just the tip of the iceberg), having dramatic consequences on society and global health.

To address this problem, we decided to create a tool to bridge the direct communication between scientists and the broad public in an easy and effortless manner. With this we hope that we can contribute to mitigating the bias and misunderstanding that commonly derives from misreported scientific literature on online platforms.

A 48h online Sciathon

At the kick-off of the Sciathon we spent some minutes getting to know the other members of our team. We were a team of international scientists based in Germany, UK, USA, Canada, Japan, Belgium (you can imagine the time zone difference) and started right away brainstorming on the topic. We decided to create a browser extension that scientists can use to rate the science-reported news on mainstream media and that the lay audience can use to check the rated scientific validity of that content.

Each person of the team had different skills and strengths. Working on an extremely short deadline, the distribution of tasks was made naturally. Each one focused on one task: programming the browser extension, creating a website, working on the design. The final output to show to the jury was a two-minute video, that also had to be created during these 48 hours. Directing, filming, editing.

Shama Sograte Idrissi
did her PhD with Silvio Rizzoli at the University Medical Center Göttingen. She graduated from the Molecular Biology Program in October 2019. In 2018 she was successfully nominated for the Lindau Nobel Laureate Meeting.

Online Sciathon @ Lindau Nobel Laureate Meeting (continued)

We tried to work as much as possible during these 48 hours. Therefore, we organized ourselves to have a catch-up meeting every six hours with web-cam and microphone on. This meant eating in front of the computer, seeing each other's life behind on the camera, partners and flatmates moving in the background while we were focused on work. We were rotating, going to sleep in one time zone, while the person in the other time zone taking over the started tasks. We also had some pretty good laugh, I mean we were also exhausted by the lack of sleep.

Shama Sograte Idrissi

I was impressed by how much we managed to create in just 48 hours. The motivation and the hard work were kept constantly high and it worked! Within only 48 hours we created a google browser extension that rates the scientific validity of online mainstream media. We called it authentiSci and we were awarded the second prize of the competition.

AuthentiSci

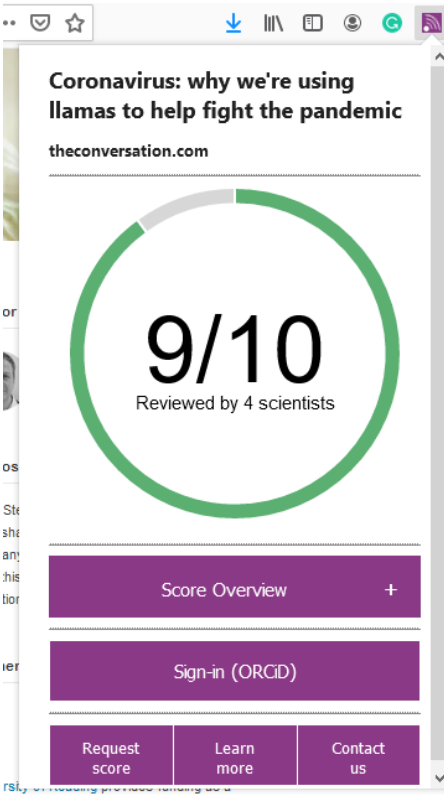
How does it work? The scientist reads some news reported on the mainstream media and rates their scientific validity.

Is the article info based on scientific research? Did the journalist misinterpret the main finding? Are the findings up to date? The answer is translated to a score on a scale from 0 to 10 where 0 represents an untrustworthy information and 10 a reliable information. The scores from different scientists for a particular article are then averaged and stored in a database. The reader of that article, having the browser extension installed, can get access to this score to learn about the scientific opinion on that particular article. AuthentiSci does not want to rate the original research, but how it was reported in this article.

Compared to other existing fact checking initiatives, authentiSci is a crowd-sourced initiative, i.e. the whole scientific community provides the data and not a single individual. It requires minimal commitment from a single person, and the data on the scientific validity can be reached globally (we plan to provide the access to the browser extension in multiple languages).

After the Sciathon, we thought that the project should move forward. We expanded the use of the browser extension on different browsers (Chrome, Firefox and Internet Explorer for the moment).

Right now, we are working to increase authentiSci's visibility to scientists, the public and bodies who could be interested in helping in the fight against fake science-related news. We want to add a commenting function, so that the



Screenshot of the authentiSci browser extension on a specific article

scientists can, if they want, also add more details on their rating.

We are organizing a rating event competition to encourage scientists to rate the online contents through authentiSci. Stay tuned for more info by following the twitter account @authentiSci
In the meantime, what can you do to help fight against fake news? Promote, read and adjust local press releases of your research. Limit what you share: check the original research, check alternative reports of the same story. Get involved in public engagement: scientists have responsibility in ensuring that important discoveries are communicated. Use online tools such as authentiSci to provide feedback on existing media!

Horizons around the world

Tales from the first ever online Horizons Symposium

The 17th Horizons in Molecular Biology symposium, organized by the students of the IMPRS for Molecular Biology was held from 14th to 17th September 2020; and abiding with pandemic fashion, it was- you guessed it right- online! While preparations were already underway for an in person conference, with all our speakers confirmed to fly down to Göttingen for four days of scientific exchange and lots of fun, the move to an online format was inevitable and despite some bumps, rather smooth.

The Horizons 2020 organization team at an early stage, when distance didn't need to be considered

As a student organized conference, the aim of Horizons, since its inception, has been to provide a platform where graduate students can interact with established PIs in a less formal setting, listen to their spectacular scientific work but also get to know their stories and the obstacles they have faced. Therefore, we wanted the online conference to be as interactive as possible. After trying and testing multiple platforms, the team finally decided to use BigMarker for hosting the conference.

The first day of the conference was marked by the Career Fair, wherein we invite speakers who did not take the academic route after their PhD, to share their journeys and provide graduate students with an idea of the multiple paths available to them post their PhDs. This year we had some amazing speakers from scientific publishing, industry, animation and entrepreneurs. Richard Sever, the founder of bioRxiv, one of the leading preprint servers in biological sciences, tuned in from Cold Spring Harbor and explained to the audience the idea of preprints, their advantages and the myths surrounding them. We had Erika Shugart, the CEO of the American Society of Cell Biology who has had an illustrious career in scientific communication talking to us about the skills and experience one might need in order to make it in the field. Christian Tidona, the founder of BiomedX, joined us from Heidelberg, talking about a career at the interface of academia and industry involving intuitive, innovative projects. Shama Sograte Idrissi, a MolBio alum, talked about authentiSci, a platform she has co-founded to combat scientific misinformation. Each session was followed by a Speed Dating where participants had the opportunity to talk more with the speakers and come on screen to ask their questions. As part of the Career Fair we also have workshops that aim to provide students with soft skills that they might miss out on in the lab. This year, we had Joanne Kamens from Addgene, helping us introverted, shy students with our networking skills and Martijn Bijker, guiding us on how to brush up our CVs for a transition to the pharmaceutical industry.

As part of our academic talks, we had the honour of hosting Prof Richard Henderson, the winner of the 2017 Nobel Prize in Chemistry as our keynote speaker. We also had talks by many

Organizers on site during the online meeting

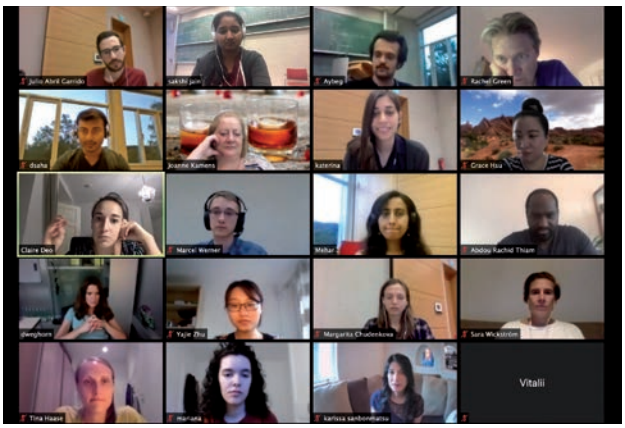
Horizons around the world (continued)

distinguished researchers with path breaking scientific work. Ramanarayan Krishnamurthy gave an amazingly engaging talk about chemical evolution using the story of 17 camels as the backdrop. Abdou Rachid Thiam talked about lipid droplet biogenesis along with explaining how to make good mayonnaise. Rachel Green presented highly convincing information on the role ribosome collision might play in cellular stress response. The panel discussion which focused on scientific publishing, the rise of preprints and the road to open access, drew some very interesting takes from our speakers, ensuring an insightful conversation. An interaction session with the speakers at the end of the conference got us great feedback on the symposium and gave us the opportunity to interact with them on a more personal level.

We also had some amazing grad students presenting their scientific work; great talks by Prashant Rawat, Anna Arutyunyan and Claudia M. Fusco. A virtual poster session was also organized via Zoom and the participants could browse through our graphical abstract gallery and then go poster hopping.

Horizons 2020 had over 350 registrations, with participants tuning in from 60 countries. We also had a session- 'Horizons Sunrise'- to interact with fellow students across the world and share our triumphs and challenges as PhD students.

After a successful, first ever online Horizons conference, preparations are already underway for Horizons 2021. The unpredictability of the Covid-19 situation has led us to start our planning for both an in person symposium and an online one. Invitations have been sent out and we are excited to already have confirmations by Grant Jensen, Ron Diskin, Kalina Hristova, Casey Green and Joshua Rosenthal. For further updates on speakers, workshops and other information regarding the conference, please visit our website horizons-molbio.de. Save the date 13th to 17th September 2021 and join us for four days of interesting and insightful scientific conversations. See you at the 18th Horizons in Molecular Biology!



The Horizons 2020 Organizing Team

Horizons speakers 2020

Pedro Carvalho, Claire Deo, Rubén Fernández-Busnadiego, Rachel Green, Kristina Haase, Richard Henderson, Samie Jaffrey, Eugene Koonin, Ramanarayanan Krishnamurthy, Jay Mellies, Jane Mellor, Jan-Michael Peters, Argyris Politis, Abdou Rachid Thiam, Karissa Sanbonmatsu, Adi Stern, Kikue Tachibana, Sara Wickström, Donate Weghorn, Maximina Yun

New Faculty

Joining the program in 2020

Marieke Oudelaar is a newly appointed member of the Max Planck Institute for Biophysical Chemistry, leading the Lise Meitner Group Genome Organization and Regulation. Marieke received her PhD degree from the University of Oxford, where she continued her research from 2018 to 2020 as a junior research fellow. The aim of her research is to understand how three-dimensional chromatin structures are formed and how the cis-regulatory elements function within this context to control gene expression. To this end, her group develops high-resolution Chromosome Conformation Capture (3C) techniques, which they use in combination with other genomic techniques, genetic perturbations, and computational approaches. They focus on the interplay between genome organization and regulation during mammalian differentiation, and how perturbations in these processes contribute to human disease, including cancer. As a new faculty member of the Molecular Biology program, Marieke contributes to the Master's curriculum with a lecture on chromatin structure and a DNA methods course. In addition, Marieke and her group offer lab rotation projects.

https://www.uni-goettingen.de/en/634577.html

Michael Meinecke received his doctoral degree from the University of Osnabrück in 2007 before he joined the group of Harvey McMahon at the MRC - Laboratory of Molecular Biology, Cambridge, UK as a postdoctoral fellow. In 2012, Michael continues his research as an independent group leader at the University Medical Center Göttingen (UMG). One year later, he became a junior professor of molecular membrane biology at the European Neuroscience Institute Göttingen. Since 2017, he is a professor of membrane biochemistry at the Department of Cellular Biochemistry at the UMG. Michael's group studies the effects that membrane proteins have on membrane structures. They are also interested in the effects that different membrane morphologies have on the distribution and localization of membrane proteins into clusters and micro-domains. Taking a multidisciplinary approach, his group uses model membranes to reconstitute the structure and function of organelles *in vitro* and then correlate these results with *in vivo* imaging techniques. They are particularly interested in ion-channels and apply biochemical and biophysical approaches to study the function and regulation of ion-channels on a single molecule level. During his time as an independent group leader, Michael has already hosted a Molbio PhD student and is currently supervising another Molbio PHD projects. As a full Molbio faculty member he took over the lectures on posttranslational modification and biological membranes, previously taught be Blanche Schwappach.

https://www.uni-goettingen.de/en/359107.html

Current faculty members (University of Göttingen and UMG)

Biology
Sarah Adio, Gerhard Braus, Rolf Daniel, Ivo Feußner, Ralf Ficner, Christiane Gatz, Ufuk Günesdogan, Kai Heimel, Till Ischebeck, Wilfried Kramer, Heike Krebber, Volker Lipka, Burkhard Morgenstern, Stefanie Pöggeler, Jörg Stülke, Kai Tittmann, Marcel Wiermer, Ernst Wimmer

Chemistry
Andreas Janshoff, Claudia Steinem

Physics
Jörg Enderlein, Dieter Klopfenstein

Agricultural Sciences
Bertram Brenig

Medicine
Mathias Bähr, Holger Bastians, Tim Beißbarth, Markus Bohnsack, Matthias Dobbelstein, André Fischer, Uwe Groß, Heidi Hahn, Michael Meinecke, Tobias Moser, Argyris Papantonis, Peter Rehling, Silvio Rizzoli, Michael Thumm, Jürgen Wienands

Leaving the program in 2020

Roland Dosch joined the Molecular Biology Program in 2010 when he started his research as a group leader in the Department of Developmental Biochemistry (Tomas Pieler). Roland contributed to the Molecular Biology course program with a lecture on zebrafish and a methods course on expression analysis. He hosted numerous lab rotations, joined several Molbio PhD retreats and served on various thesis advisory committees of Molbio PhD students. As part of our long-standing scientific cooperation of the Feinberg Graduate School in Rehovot, Israel, he also joined us for visits of their Life Sciences Open Day at the Weizmann Institute of Science. Roland left the institute in summer 2020. We thank him for his contributions to the Molecular Biology Program and wish him all the best.

Blanche Schwappach joined the Molecular Biology Program in 2010 when she moved to Göttingen from the UK, where she worked as a Wellcome Trust Senior Research Fellow at the Faculty of Life Sciences, University of Manchester. Blanche was appointed as a Professor of Biochemistry and Director of the Department of Molecular Biology at the University Medical Center Göttingen (UMG). In addition, her group became associated with the Max Planck Institute for Biophysical Chemistry. From 2017 to 2020, Blanche served also as Dean of Research for the UMG.

Her research focused on different aspects of membrane protein biogenesis and its integration into the physiology of organs such as the brain or the heart. Her group studied the early life of tail-anchored proteins that are post-translationally targeted to the endoplasmic reticulum for membrane integration. Other projects addressed the role of sorting motifs during the passage of ion channels and neurotransmitter receptors through the secretory pathway, biogenesis and trafficking under (patho)physiological conditions in genetically tractable model organisms such as yeast or mouse, or GFP-based physiological analysis of small molecules and ions in cellular compartments, tackling the question how ion channels and transporters contribute to different physicochemical milieus inside cells.

In the Molecular Biology program, Blanche contributed to the Master's curriculum with lectures on post-translational modification and biological membranes. Her Department also offered methods courses on DNA and Cell Culture. Two Molbio PhD students graduated under her supervision and she served on the thesis advisory committees of numerous other doctoral candidates of our program, providing mentoring and advice.

In spring 2020, Blanche moved to Hamburg to assume the Dean's position at the University Medical Center Hamburg.

We thank Blanche for her dedicated support of our program and wish her all the best for her new position.

Current faculty members (Non-university institutions)

Max Planck Institute for Biophysical Chemistry
Patrick Cramer, Alexis Faesen, Dirk Görlich, Christian Griesinger, Helmut Grubmüller, Stefan Hell, Reinhard Jahn, Stefan Jakobs, Peter Lénárt, Reinhard Lührmann, Marieke Oudelaar, Marina Rodnina, Jochen Rink, Melina Schuh, Johannes Söding, Holger Stark, Alexander Stein, Henning Urlaub

Max Planck Institute for Experimental Medicine
Nils Brose, Klaus-Armin Nave

German Primate Center
Rüdiger Behr, Stefan Pöhlmann, Lutz Walter

Return to "new normality"

As outlined in our COVID-19 special of this newsletter, the past year involved not only a lot of online teaching but also many additional sacrifices to keep infection rates low. It started with the cancellation of the Indian Culture Night in March 2020, in which our students had already invested a lot of time and effort. Since then all subsequent culture nights, which we usually enjoy almost every month, had to be cancelled. Likewise, we could neither hold our joint Molbio/Neuro anniversary retreat in Berlin last summer nor celebrate our 20th anniversary in fall. The MSc graduation ceremony could not take place and all PhD graduations in the University Aula along with the traditional march to the Gänseliesel had to be cancelled. The GGNB Science Day and the meeting of our scientific advisory board were postponed.

Who would dare to make any predictions how and when we will reach a situation of "new normality"? While the "second wave" in Germany seems to come to an end, the timeline for vaccinations remains vague and new mutants of the corona virus spread rapidly.

What can be our resume for the moment? After almost a year of experience, we are much better prepared to respond to the continuously changing pandemic situation. The regular COVID-19 screening offered by the Göttingen Campus to all students and employees helps together with the three-level COVID-alert scheme to minimize risks and make general regulations more transparent and predictable for everyone. We look forward to a gradual return to classroom teaching in spring, hoping that a Molbio retreat with a limited number of participants will be feasible in the near future. We also may consider more outdoor social events and would be delighted to resume our series of culture nights later in the year, though they may look different from those in the past. How the Horizons 2021 meeting will look like is still difficult to predict.

During the past months, everyone has been forced to explore new or existing tools for online communication. While many of us feel tired staring on a computer screen for yet another zoom session, some values of the online tools are appreciated and likely to be continued after the pandemic. Short business meetings with participants across the campus are easier to manage, information can be shared and notes can often be taken more easily during online sessions. Long distance travels of trainers or collaboration partners can be minimized. Currently, our three-stage admission process is ongoing and had to be set up from scratch replacing the worldwide written subject test with short online interviews (for the first time held together by teams of faculty members and PhD students), as well as replacing lunch info meetings and student dinners with our applicants by online events.

How soon will we reach a newly defined normality and how will it be defined? Many uncertainties remain but we are confident that we are well prepared to protect our students from major disadvantages by maintaining a high and reliable level of research oriented training, education and support.

StB

Anniversary needs to wait

Dear current and former members of the Molecular Biology and Neuroscience programs, dear colleagues and friends! We very much regret to tell you that our 20th Anniversary celebrations in Göttingen, which had originally been scheduled for September 2020 and then had to be postponed to September 2021, cannot take place because of the ongoing pandemic. Too many uncertainties remain and all members of our program committee agreed that a three-day celebration with hundreds of people is unrealistic this year.

We look forward to celebrating our 25th Anniversary with you and will keep you informed about our plans.

StB

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