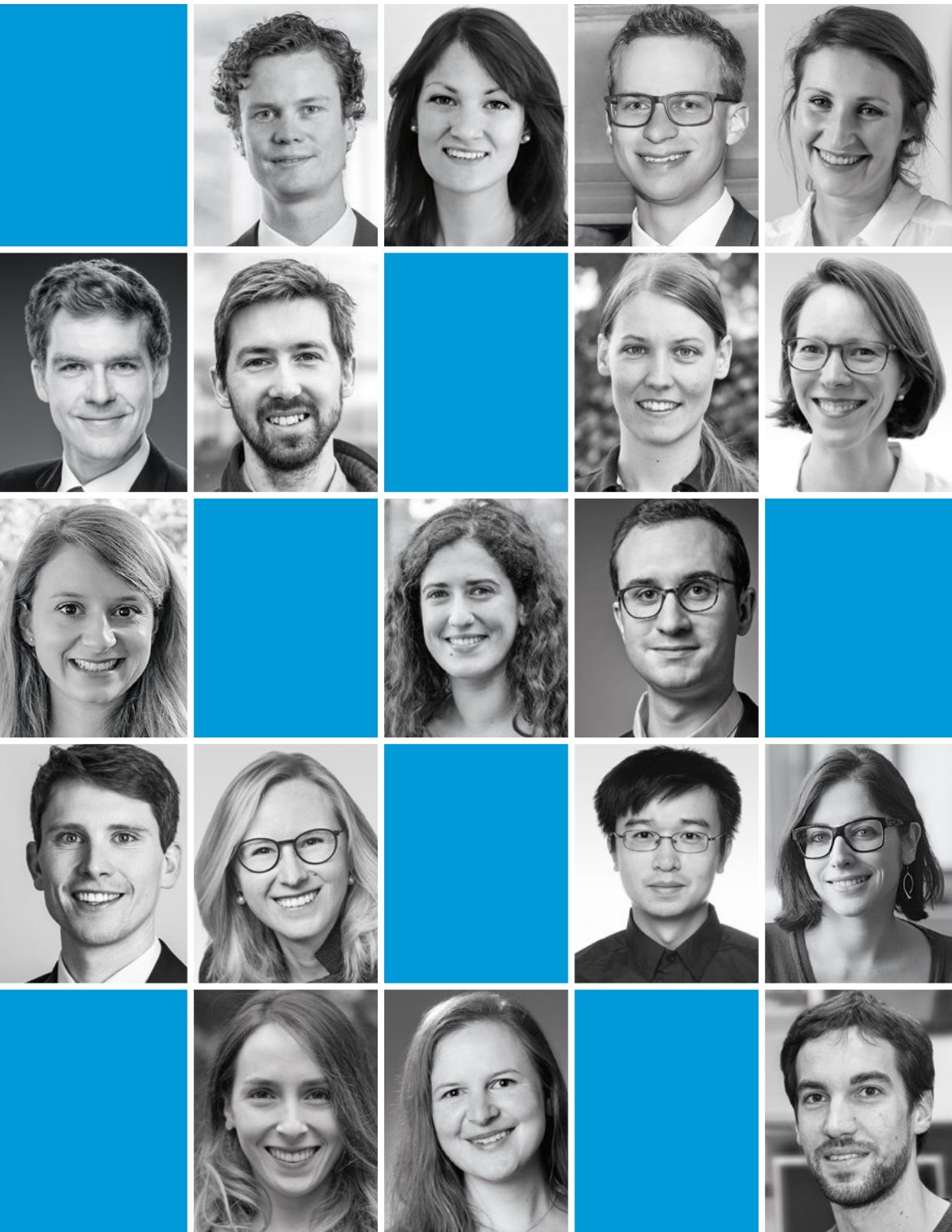
Outstanding!

Junior scientists
of the Max Planck Society
June 2019, Hamburg



Contents

Outstanding!

Every year at the Annual General Meeting, the Max Planck Society honours a select few from amongst its junior scientists whose achievements have particularly impressed us. The medal award ceremonies always take place during the meetings of the Sections; there, the talented young researchers are introduced to the Directors of their respective Sections and honoured. However, because their enthusiasm, research questions and personal plans are impressive and inspiring far beyond the Sections' boundaries, we would like to portray all the award winners once again in this brochure.

In addition, doctorates earned at a particularly young age deserve our attention: every year, the Max Planck Society's youngest doctoral candidate is awarded the Dieter Rampacher Prize.

But we do not only confer medals for outstanding doctoral theses at our Annual Meeting. We also honour exceptionally talented young scientists who will be given the opportunity to spend two years working alongside one of our Nobel Laureates in the context of a Fellowship.

Finally, it still remains a great privilege to honour a young scientist who will be entitled to spend two years researching in the Max Planck Society, with the support of a fellowship bearing the name of former Max-Planck President Reimar Lüst.

Often in the past, one of the Max Planck Society's awards for young scientists has marked the start of an exciting career either within or outside basic research. Of our more than 1,000 award winners, many have held Professorships at the world's most prestigious universities. But among the Otto Hahn Medal winners, for example, there is also a judge at the European Court of Justice as well as CEOs of large corporations and diplomats. The following pages do not only tell you about what has been achieved. Above all, we are introduced to the future here. My advice is: remember these names and faces, you will hear from them!

I extend my congratulations to all award winners and hope you enjoy reading about them.

Yours sincerely,

Martin Stratmann
President of the Max Planck Society

Impressions of the 2018 awards ceremony in Heidelberg at the Annual General Meeting of the Max Planck Society

Impressions of the 2018 awards ceremony in Heidelberg at the Annual General Meeting of the Max Planck Society

The Otto Hahn Medal

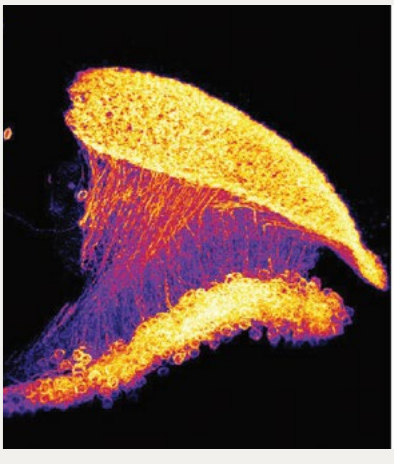
The Max Planck Society has honoured up to 30 young scientists and researchers each year with the Otto Hahn Medal for outstanding scientific achievements since 1978. The prize is intended to motivate especially gifted junior scientists and researchers to pursue a future university or research career. The award is presented during the General Meeting in the following year.

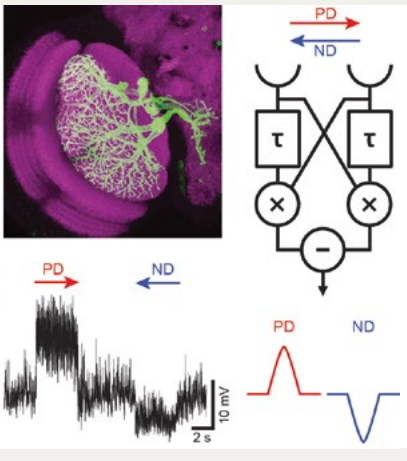
Biology
& Medicine
Section

Georg Ammer, PhD

for elucidating the neural circuits underlying Drosophila motion vision

Max Planck Institute of Neurobiology, Martinsried
Research field: Neurobiology,
Neural Circuit Computations
Current activity: Postdoctoral Fellow at the
Max Planck Institute of Neurobiology, Martinsried





My topic of interest

I want to understand how neural circuits in the brain perform basic computations that allow them to extract meaningful information from the environment. As a model system, I investigate the visual system of the fruit fly Drosophila.

My motivation

I think, especially in neuroscience, the closer one investigates a specific scientific problem, the more knowledge and approaches from diverse scientific disciplines become necessary to solve it. On the one hand, this provides the opportunity for extending one's own scientific horizon, but also leads to fruitful collaborations with colleagues who have more expertise in a certain subject. It is this aspect of science that I enjoy most and that keeps me motivated.

My next professional station

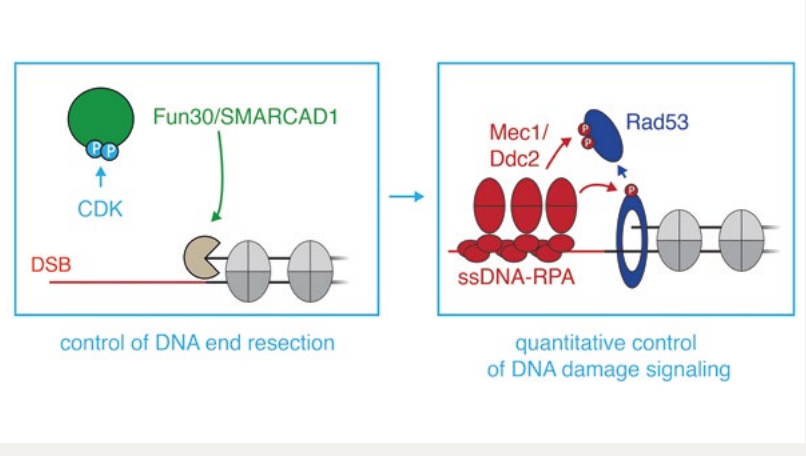
I am currently working on a new research project in my PhD lab, in which I investigate the computational roles of electrical synapses in the fly brain. I would like to continue working on this topic in the future.

Biology
& Medicine
Section

Dr. rer. nat. Susanne Bantele

for elucidating the control of repair of DNA Double Stranded Breaks during the cell cycle and delineation of the underlying molecular mechanism

Max Planck Institute of Biochemistry, Martinsried
Research field: Genome Stability and DNA Repair
Current activity: Postdoctoral Fellow at the University of Copenhagen, Novo Nordisk Foundation, Center for Protein Research, Denmark (from August 2019)



My topic of interest

Thousands of DNA lesions hit each cell on a daily basis. My research is aimed to understand the molecular mechanisms employed to recognize such lesions and estimate the cellular damage load in order to elicit an effective repair response. A particular focus lies on the cell cycle-regulation of those mechanisms, and the establishment of novel genetic tools to manipulate this regulation.

My motivation

In the past decades, many of the proteins constituting the DNA damage response were discovered, yet we know very little about their molecular interplay and regulation. I am inspired by the fundamental research dedicated to study this regulation on the molecular basis, as I believe that understanding basic principles is the key to all advances in the applied sciences.

My next professional station

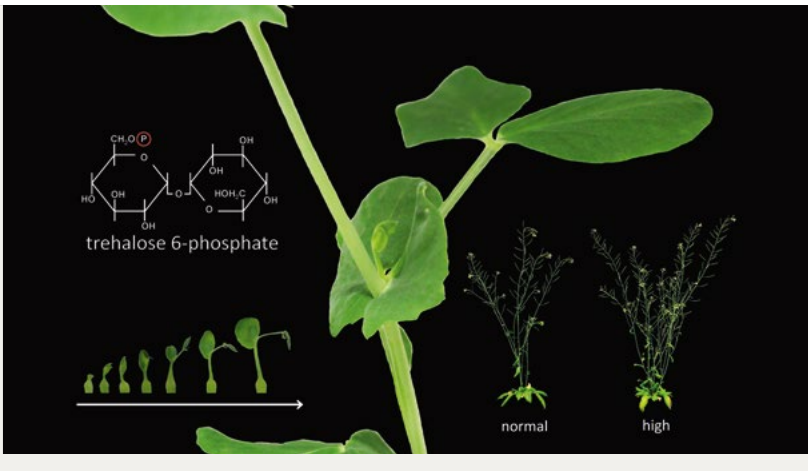
I will work as a postdoctoral researcher with Jiri Lukas (CPR, Copenhagen). I will stay in the field of genome stability.

Biology
& Medicine
Section

Dr. rer. nat. Franziska Fichtner

for studies of the role of TREHALOSE 6-PHOSPHATE SYNTHASE 1 and trehalose 6-phosphate in plant metabolism and development and especially in the regulation of shoot branching

Max Planck Institute of Molecular Plant Physiology, Potsdam
Research field: Molecular Plant Physiology
Current activity: Postdoctoral Fellow at the Max Planck Institute of Molecular Plant Physiology, Potsdam



My topic of interest

I am working with an important sugar in plants: trehalose 6-phosphate (Tre6P). Tre6P is similar to the human insulin and thus a signalling metabolite for the sugar availability in plants. Tre6P regulates how much sugars a plant can use and is in control over many developmental processes. The aim of my work is to understand how changes in Tre6P can modulate the plant's metabolism and to investigate the role of Tre6P in shoot branching using the model plants pea and Arabidopsis.

My motivation

Since my first semester at University, I have been fascinated by plants and their amazing ability to adapt to constantly changing environments. With my research, I would like to contribute to our knowledge about plants. I am driven by my curiosity to explore the unknown as well as my passion for science in general.

My next professional station

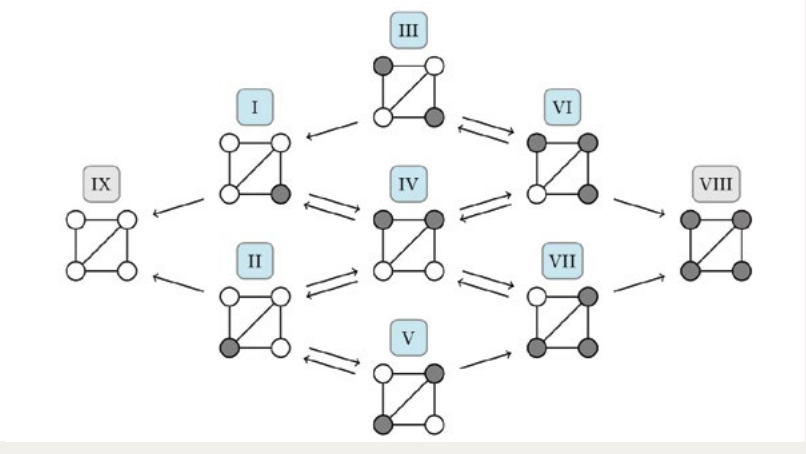
Currently, I am working in the group of Prof. Dr Mark Stitt at the Max Planck Institute of Molecular Plant Physiology. At the end of this year, I will relocate to Brisbane (Australia) to work with Prof. Dr Christine Beveridge at Queensland University. I will investigate how sugar and phytohormone signalling pathways interact to control plant development.

Biology
& Medicine
Section

Dr. rer. nat. Laura Hindersin

for the theoretical analysis of the amplification and suppression of selection by complex population structures

Max Planck Institute of Evolutionary Biology, Plön
Research field: Evolutionary Theory
Current activity: Statistician at the KOEHLER eClinical GmbH, Freiburg/Breisgau



My topic of interest

The question of my thesis was trying to improve the understanding of how spatial population structure shapes evolutionary processes. To this end, graphs represent an abstract model for studying the spread of novel mutations into a resident population. The details of the population structure can have unexpected effects on the time and the probability of this spread.

My motivation

Since my studies, I have been fascinated by using mathematical methods to understand biological and medical questions. Furthermore, I am very much motivated by the international and interdisciplinary environment that research at the MPI provides.

My next professional station

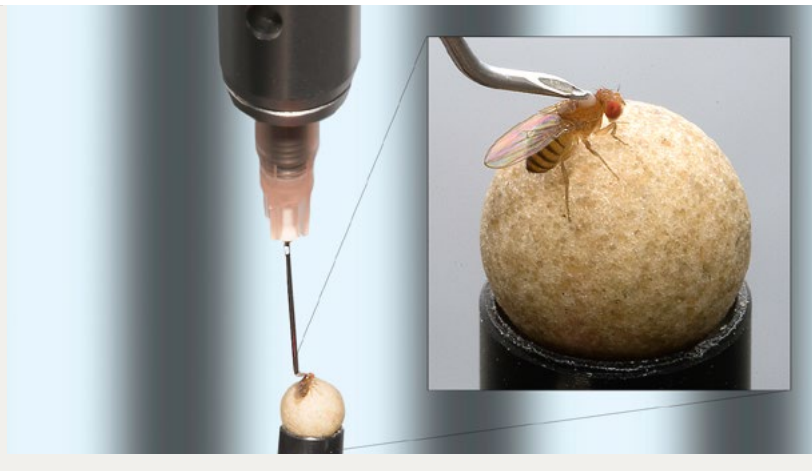
Since October 2018, I have been working as a statistician at KOEHLER eClinical GmbH in Freiburg/Breisgau.

Biology
& Medicine
Section

Aljoscha Leonhardt, PhD

for the understanding of the Drosophila motion vision circuits in the context of natural image processing

Max Planck Institute of Neurobiology, Martinsried
Research field: Neuroscience, Machine Vision
Current activity: Postdoctoral Fellow at the Max Planck Institute of Neurobiology, Martinsried



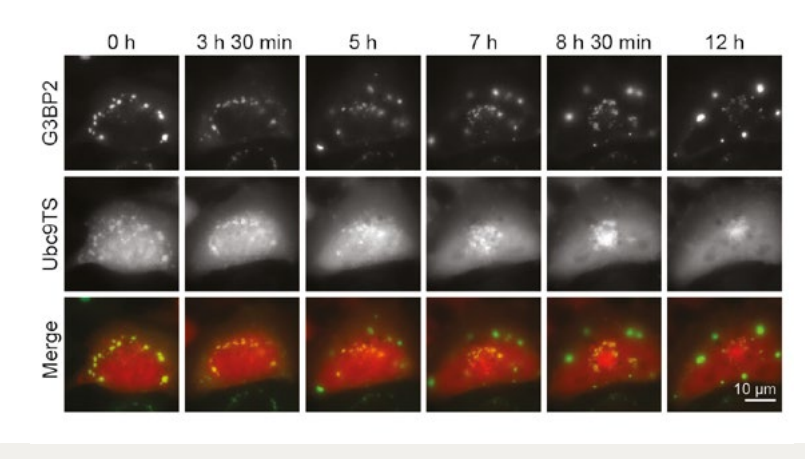
My topic of interest	Sensory organs solve difficult problems under adverse conditions. Our eyes, for instance, effortlessly recognize a buzzing fly in front of any background and under all light conditions. How do visual systems become so robust? During my graduate studies I used experiments and simulations to investigate how circuits and algorithms in the eye of the fruit fly have adapted to the characteristics of natural visual environments in order to reliably detect motion.
My motivation	Modern artificial intelligence is in the process of revolutionizing how machines perceive the world and thus fields ranging from transportation to medicine. I am driven by the hope that research into biological sensory systems will uncover fundamental principles that we can leverage to design ever more sophisticated artificial algorithms.
My next professional station	I am currently a postdoc in Munich. In the future, I plan to continue my research at the intersection between neuroscience and artificial intelligence.

Biology
& Medicine
Section

Daniel Matějů, PhD

for outstanding new insights into the molecular mechanisms underlying the formation and regulation of stress-inducible ribonucleoprotein granules using innovative imaging approaches

Max Planck Institute of Molecular Cell Biology and Genetics, Dresden
Research field: Cell Biology
Current activity: Postdoctoral Fellow at the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden



My topic of interest

I would like to contribute to our understanding of how our cells adapt to sub-optimal conditions and what role do these adaptive mechanisms play in diseases.

My motivation

I am motivated by the idea that my work might have a positive impact on lives of others, for example by facilitating the discovery of new treatments. Even if this impact is uncertain and would take decades to materialize, it's worth it.

My next professional station

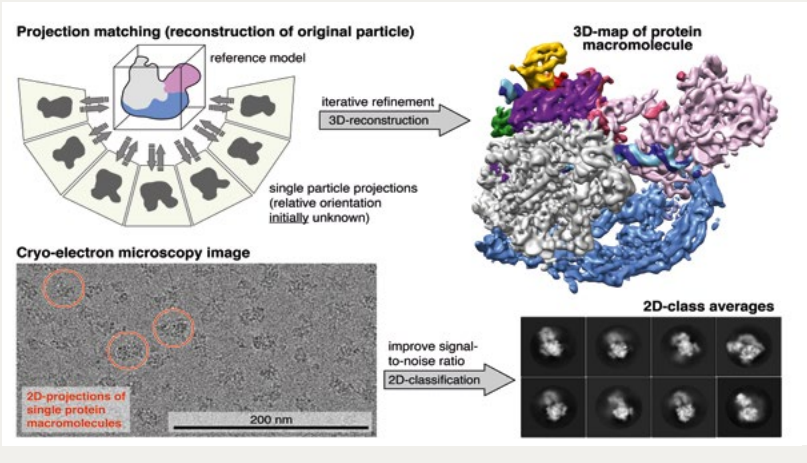
I have started a postdoctoral position at the Friedrich Miescher Institute in Basel, Switzerland. I am applying new tools for single-molecule imaging of mRNA to investigate the regulation of mRNA translation during the cellular stress response.

Biology
& Medicine
Section

Dr. rer. nat. Sandra Schilbach

for the determination of the three-dimensional molecular structure of the eukaryotic transcription pre-initation complex with the essential factors TFIIH and core Mediator

Max Planck Institute for Biophysical Chemistry, Göttingen
Research field: Molecular Biology, Biochemistry, Structural Biology
Current activity: Postdoctoral Fellow at the Max Planck Institute for Biophysical Chemistry, Göttingen



My topic of interest

The transcription of cellular DNA is pivotal to the decoding of genetic information and critical to the sustainability of any living organism. While the conceptual basis of this process is well understood, the exact function and regulation of many of its key enzymes remain elusive. My research aims to enhance our understanding of the events occurring at the onset of transcription. I primarily utilize methods from the fields of biochemistry and structural biology to analyze the molecular architecture of transcription-competent protein complexes and to reconstruct the structural rearrangements these assemblies undergo to launch gene expression.

My motivation

Despite major advances in many areas of research, our knowledge of fundamental events in our cells remains surprisingly incomplete, a discrepancy which always prompted my curiosity for life science. In addition to the vast possibilities for medical and technical applications arising from the precise description of cellular pathways on a molecular basis, I perceive my work as very intriguing in itself. The exploration of the evolutionarily shaped mechanisms at the center of biological processes frequently reveals underlying principles of an inspiring logic and simplicity. In my belief, integrative structural biology is a central tool to recapitulate the fascinating activities of macromolecules within a cell due to its intuitive descriptive power.

My next professional station

I am currently continuing my project on transcription in Göttingen. I would like to remain in academic science in the future.

Biology
& Medicine
Section

Dr. rer. nat. Helene Schmidt

for the discovery of a feed-forward inhibitory circuit motif with precise synaptic arrangements along dendrites and axons of medial entorhinal cortex neurons, revealing an unexpected level of precision in mammalian cortical microcircuits

Max Planck Institute for Brain Research, Frankfurt;
Humboldt University, Berlin
Research field: Brain Research
Current activity: Postdoctoral Fellow at the
Max Planck Institute for Brain Research, Frankfurt

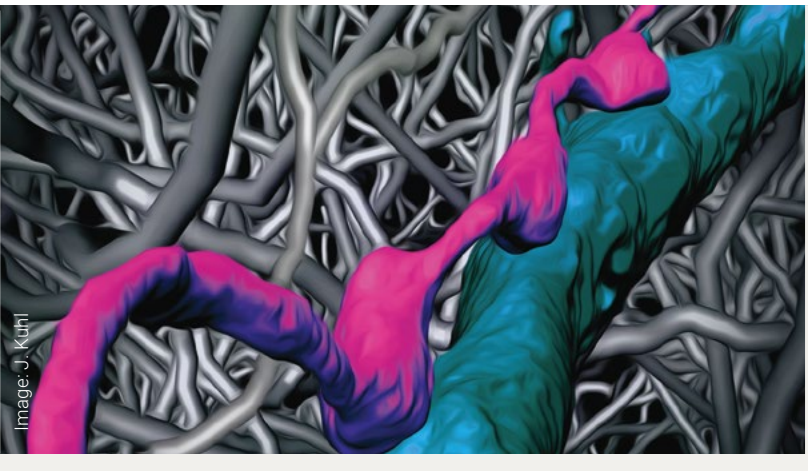


Image: J. Kuhl

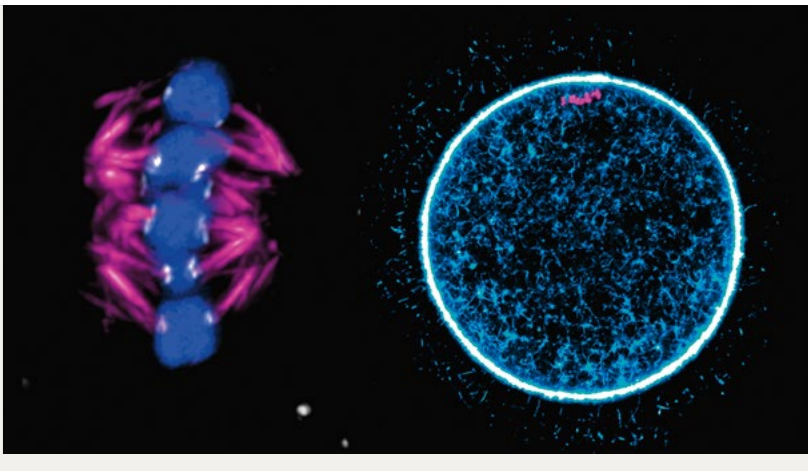
My topic of interest	The mechanisms by which the electrical activity of ensembles of neurons in the brain gives rise to an individual's behaviour are still largely unknown. I am interested in the detailed neuronal circuits of the mammalian brain computing complex tasks like navigation, predictions, ideas.
My motivation	I am fascinated by the highly complex neuronal networks in the brain that are essential for complex behaviour in animals and humans. To measure these neuronal configurations offers a unique scientific possibility to gain insights into the computational principles of biological intelligence – and can be perhaps even an inspiration for artificial intelligence.
My next professional station	I am currently planning my next career step, ideally at the interface between brain research and artificial intelligence.

Biology
& Medicine
Section

Agata Zielinska, PhD

for her ground-breaking work on the chromosome architecture in human oocytes and the molecular mechanisms underlying the maternal age effect

Max Planck Institute for Biophysical Chemistry, Göttingen
Research field: Cell Biology, Developmental Biology, Oocyte Meiosis
Current activity: medical student at the University of Cambridge, School of Clinical Medicine, UK



My topic of interest

All mammals rely on healthy eggs to produce viable offspring. Yet, the process of egg production is particularly inefficient. My research aims to understand why human eggs are exceptionally prone to chromosome segregation errors and how the molecular machinery of the egg changes with advancing female age.

My motivation

I have been enchanted by mammalian meiosis from the very moment I followed my first egg through its journey of partitioning chromosomes in the dark of a microscopy room. We are particularly lucky, as the egg has to actually divide twice to develop fully. I enjoy challenges, and studying mammalian eggs is an exciting field that constantly tests your imagination and asks for unorthodox solutions. Researching mammalian eggs allows me to continuously fulfil my passion for basic science, and also contribute to something that I believe is important - 1 in 7 couples struggle to conceive and the success rate of fertility treatments currently approaches just 40%. Gaining a more comprehensive understanding of the molecular mechanisms behind female meiosis holds a tangible promise to change this.

My next professional station

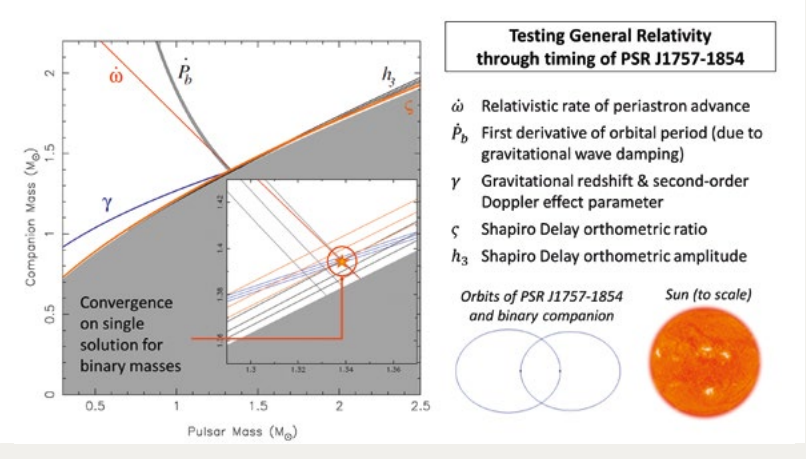
I am currently one year from qualifying as a medical doctor at the University of Cambridge, UK. I then plan to further develop my cell biology skills to implement new techniques into mammalian meiosis research, and in parallel work together with clinicians to improve the practical outcomes for infertile couples.

Chemistry, Physics & Technology Section

Dr. rer. nat. Andrew David Cameron

for the successful search for new pulsars and the discovery of a new binary pulsar as a laboratory for testing the theory of general relativity

Max Planck Institute for Radio Astronomy, Bonn; University of Bonn
Research field: Astronomy, Astrophysics
Current activity: Postdoctoral Fellow at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Astronomy & Space Science, Sydney, Australia



My topic of interest

My research so far has focused on the discovery of new pulsars, especially pulsars in extreme binary systems. Some of the questions I am working to try and answer are just how to discover these new binary systems, what they can tell us about how gravity works in extreme environments, and whether those results agree with Einstein's theory of General Relativity.

My motivation

One of the things which motivates me the most is the chance to make new discoveries. There's a whole universe out there of new and unknown things that no-one else has ever found before, and to be able to make even a small contribution to that is very humbling. I also really love solving puzzles, and determining the behaviour of a brand-new pulsar once it has been discovered is one of the most satisfying puzzles I've ever experienced.

My next professional station

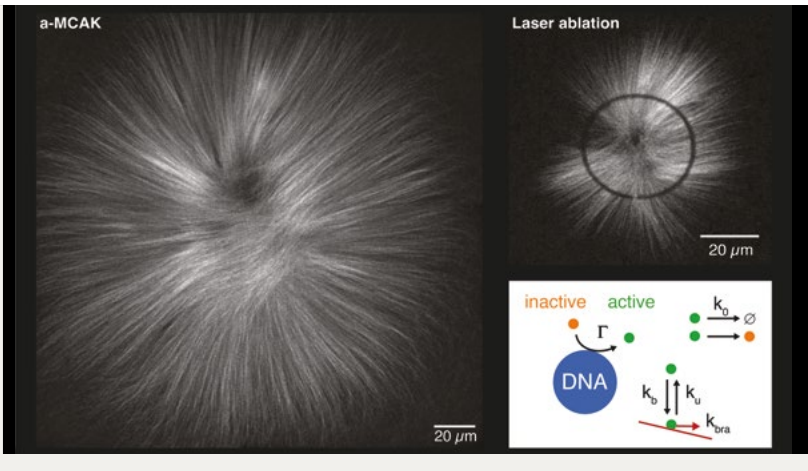
At the moment I have the chance to work with the largest telescope in the world in China (known as "FAST"), and to combine its data with telescopes like Effelsberg (in Germany) and Parkes (in Australia). These are very exciting research opportunities, and I am also keeping my eyes open for other new opportunities for my future career.

Chemistry, Physics & Technology Section

Dr. rer. nat. Franziska Decker

for the study of microtubule nucleation during cell division and its influence on the size of mitotic spindles

Max Planck Institute for the Physics of Complex Systems and Max Planck Institute of Molecular Cell Biology and Genetics, Dresden
Research field: Biophysics
Current activity: Postdoctoral Fellow at the Max Planck Institute for the Physics of Complex Systems and Max Planck Institute of Molecular Cell Biology and Genetics, Dresden



My topic of interest

I am fascinated by the self-organization capabilities of biological structures. During my PhD, I investigated the mitotic spindle, which mainly consists of microtubules, but also many other components. Interestingly, these building blocks have a lifetime of a few seconds while the entire structure remains for minutes up to hours. I studied where and how microtubules are made to maintain the steady state of the mitotic spindle and how this sets the overall size of the structure.

My motivation

I am mainly driven by my curiosity and I enjoy learning something new every day. I have always loved solving puzzles, and as a scientist I could make a profession out of it. In addition, I find it very exciting to be the first one to observe, measure, or understand a biological phenomenon.

My next professional station

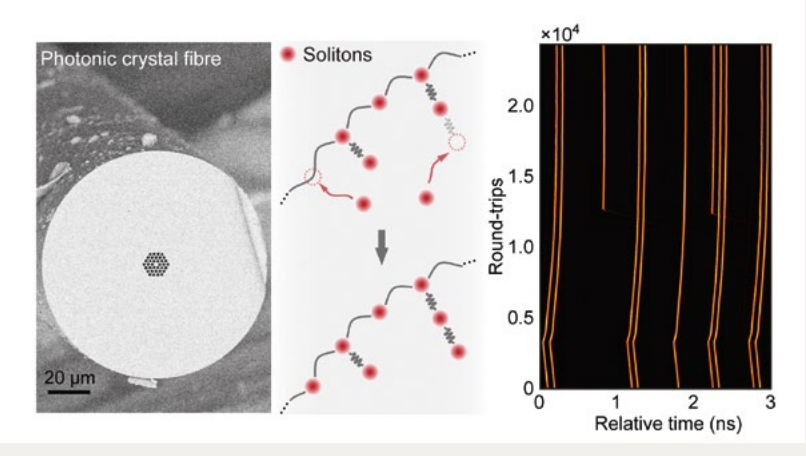
I am currently still at the MPI-PKS and MPI-CBG in Dresden where I am finishing up a continuation of my PhD project. During my postdoc, I would like to continue using biophysical measurements and theory to answer biological questions.

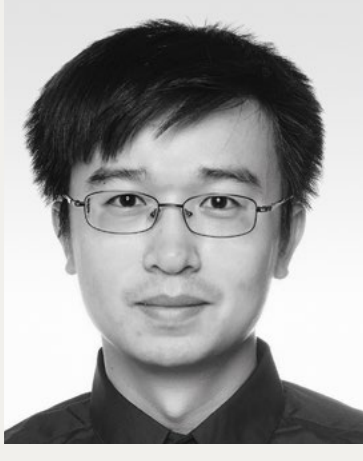
Chemistry, Physics & Technology Section

Dr. rer. nat. Wenbin He

for the ground-breaking work on optoacoustic mode-locking of fibre lasers, leading to the development of a unique range of GHz-rate, ultrafast fibre lasers in which long-range interactions between soliton pulses can be studied

Max Planck Institute for the Science of Light, Erlangen
Research field: Optoacoustic Effects in Photonic Crystal Fibres
Current activity: Postdoctoral Fellow at the Max Planck Institute for the Science of Light, Erlangen





My topic of interest

Can optical solitons, quasi-particles that arise from the interplay between nonlinearity and dispersion, interact like real particles and self-assemble into ordered structures? It is made possible in my research when a short piece of photonic crystal fibre (PCF) is added to the cavity of a mode-locked fibre laser. The enhanced optical nonlinearity in the PCF enables the precise control of the long-range interactions between optical solitons through which stable and highly-ordered 'soliton supramolecules' have emerged with unprecedented complexity and diversity.

My motivation

The research initiated with the aim to build an ultrafast fibre laser using the GHz acoustic vibrations in PCF. During the development, I was amazed by many unprecedented phenomena in this dissipative nonlinear system, which go far beyond a simple periodic pulse train. I started to realize that different long- and short-range interactions between solitons can cooperate under precise control and give rise to complex optical structures.

My next professional station

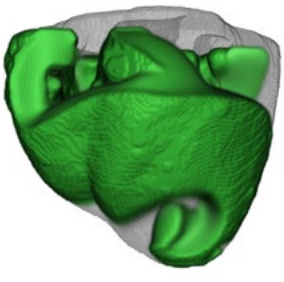
I am currently continuing my research in MPL on photonic crystal fibres.

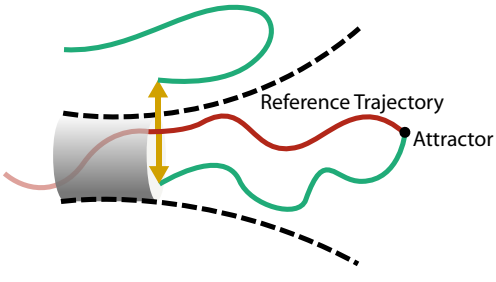
Chemistry, Physics & Technology Section

Dr. rer. nat. Thomas Lilienkamp

for investigations into the dynamics of cardiac arrhythmias and the discovery of a characteristic final phase of chaotic transients in excitable media and further nonlinear systems

Max Planck Institute for Dynamics and Self-Organization, Göttingen
Research field: Nonlinear Dynamics, Spatio-Temporal Chaos During Cardiac Arrhtyhmias
Current activity: Postdoctoral Fellow at the Max Planck Institute for Dynamics and Self-Organization, Göttingen





My topic of interest

I investigate the chaotic dynamics in spatially extended systems, for instance electrical excitation waves which can be observed in the heart during cardiac arrhythmias like ventricular fibrillation. In particular, I am interested in the underlying mechanisms of this highly complex and chaotic state, and new ways how to control and terminate the dynamics in an efficient way.

My motivation

Despite the broad knowledge we have about mechanisms on very small and very large scale systems (i.e. particle physics, or dynamics of galaxies) I find it astonishing that there are so many open questions related to the dynamics of complex (biological) systems. What motivates me is that we start to conceive governing mechanisms which play a role in these systems using interdisciplinary approaches, with the aim to improve current living conditions, like medical therapies. Furthermore, I am grateful for having as a scientist such an incredibly versatile and creative profession.

My next professional station

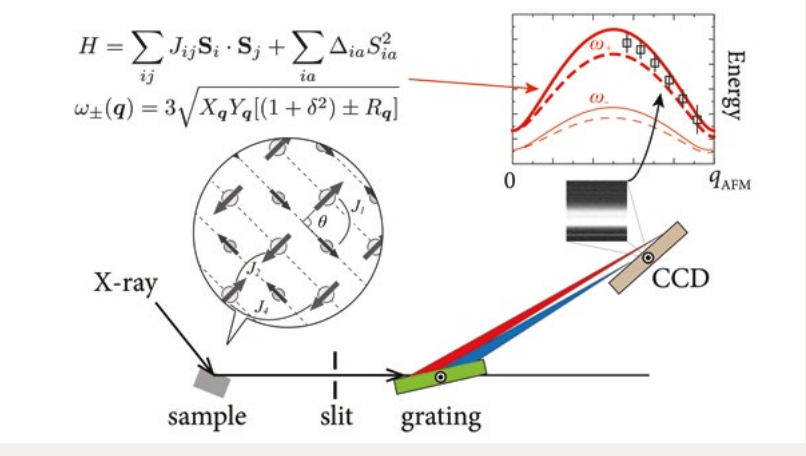
Currently, I continue my research as a Postdoc in the Bio-medical Physics Group, in order to incorporate the insights obtained from theoretical considerations and numerical simulations into experimental studies which aim at developing an improved control of cardiac arrhythmias.

Chemistry, Physics & Technology Section

Dr. rer. nat. Yi Lu

for experimental and theoretical investigations of the electronic structure and dynamics of quantum materials using novel spectroscopic, analytic, and numerical methods

Max Planck Institute for Solid State Research, Stuttgart
Research field: Strongly Correlated Electron Systems
Current activity: Postdoctoral Fellow at the Institute for Theoretical Physics, Heidelberg University



My topic of interest

My research is mostly focused on so-called strongly correlated materials, which exhibit a vast variety of complex and fascinating properties that emerge from the nontrivial collective interplay among the electronic charges and spins within. In my work, I try to decode the behaviour of these internal degrees of freedom by measuring, both in experiments and in theory, their response to external stimuli such as x-ray photons.

My motivation

I like puzzles, and physics is full of them. The field of strongly correlated electron systems poses some of the most intriguing challenges in physics. The solution to these puzzles not only allows us to peek into nature's design book, but also promises immense potential for future technological applications. The desire to know the unknown motivates me to develop theoretical tools for modelling and simulating these systems, with the aim to understand and predict the results of laboratory experiments.

My next professional station

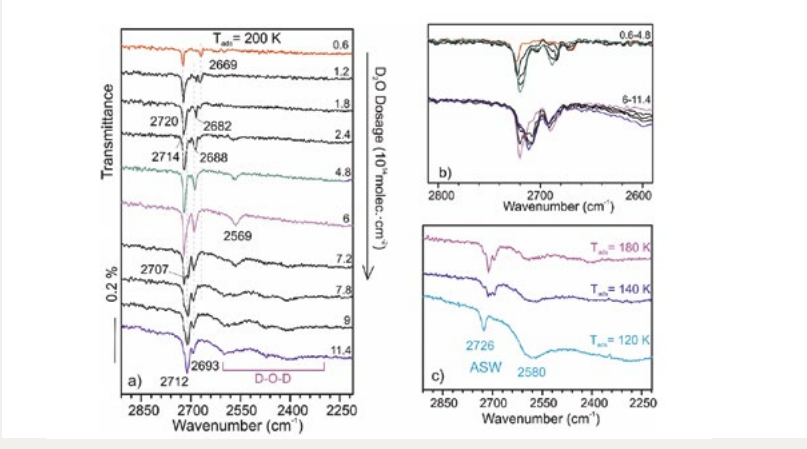
I am currently working as a postdoctoral researcher at the Institute for Theoretical Physics at Heidelberg University. I focus on employing and developing new theoretical and numerical methods to further my understanding of strongly correlated systems.

Chemistry, Physics & Technology Section

Dr. rer. nat. Francesca Mirabella

for discovering the structure and dynamics of water and carbon dioxide adsorption on transition metal oxide surfaces using magnetite as an example

Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin
Research field: Physical Chemistry
Current activity: Postdoctoral Fellow at the Technical University of Vienna, Institute for Advanced Physics, Austria



My topic of interest

To investigate modern materials at the atomic scale and understand their interaction with the environment is fascinating for me. The interaction of water with metal oxide surfaces is central to a variety of research areas, ranging from geochemistry and corrosion to catalysis and energy storage. During my research, I characterized the initial stages of the water adsorption on well-defined magnetite surfaces to understand the atomic structure of the water/oxide interface in UHV conditions. A delicate balance between water–surface and water–water interaction is found, which stabilizes the formation of particular structures. With the understanding of water adsorption under UHV conditions falling into place, the next step will be to investigate whether similar phenomena occur under more realistic pressure conditions.

My motivation

A deep curiosity and thirst for knowledge. Moreover, it is a great motivation to research on the fundamental aspects of the conversion of water and CO2 into chemical energy because this is becoming one of the key technologies enabling a sustainable future. In this way, I may contribute to find solutions to a crucial challenge our society faces today.

My next professional station

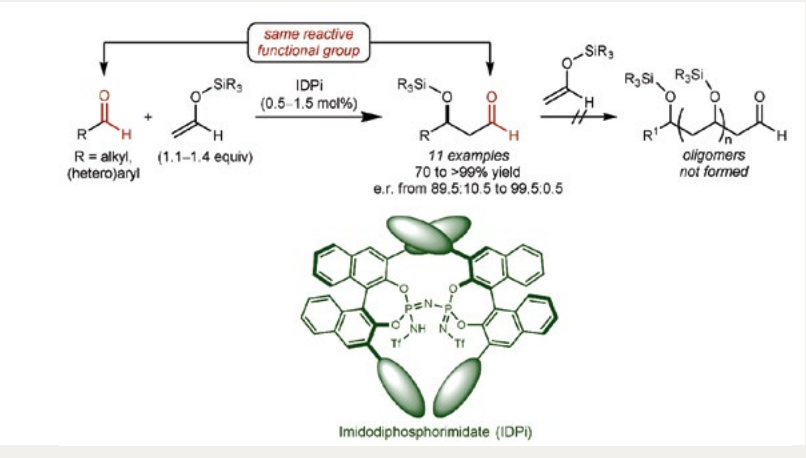
Last September I started working at the TU Vienna as a Postdoctoral Fellow. My further career course is still open.

Chemistry, Physics & Technology Section

Dr. rer. nat. Lucas Schreyer

for the development of a general Mukaiyama-aldol reaction of acetaldehyde enolsilanes with aldehydes

Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr
Research field: Homogeneous Catalysis
Current activity: Postdoctoral Fellow at the Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr



My topic of interest

Aldol reactions of acetaldehyde enolsilanes are extremely challenging due to their proneness to oligomerize under acid catalysis. The recently introduced imidodiphosphorimidates (IDPi), a highly active, structurally confined class of chiral Brønsted acids, were found to exhibit a promising selectivity towards the single addition of those molecules to aldehydes. My colleagues and I sought to tune the catalyst structure for optimal selectivity towards this highly desired single addition, as well as control of the stereochemical outcome of the reaction.

My motivation

Catalysts are among the most powerful tools in synthetic chemistry, as they facilitate access to useful synthetic intermediates, often through transformations which otherwise would be impossible. I find it fascinating to develop a catalytic system for a specific application and am always curious to explore and captivated by the effect that even subtle changes in the catalyst structure have on their activity and selectivity.

My next professional station

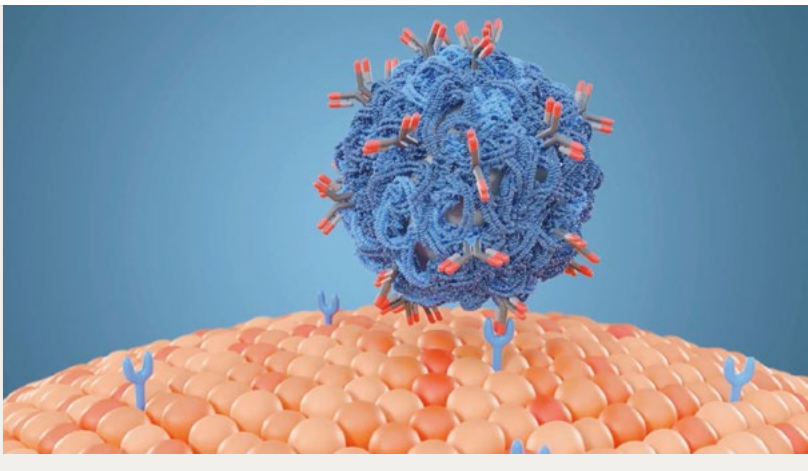
I recently started my postdoctoral research in the group of Prof. Dr. Alois Fürstner at the Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr. In the long term, I would like to continue to work in synthetic organic chemistry.

Chemistry, Physics & Technology Section

Dr. rer. nat. Johanna Simon

for pioneering work on the influence of adsorption of biomolecules on nanocarriers for translation into medicine

Max Planck Institute for Polymer Research, Mainz
Research field: Nanoparticle Protein Interactions
Current activity: Postdoctoral Fellow at the Max Planck Institute for Polymer Research, Mainz



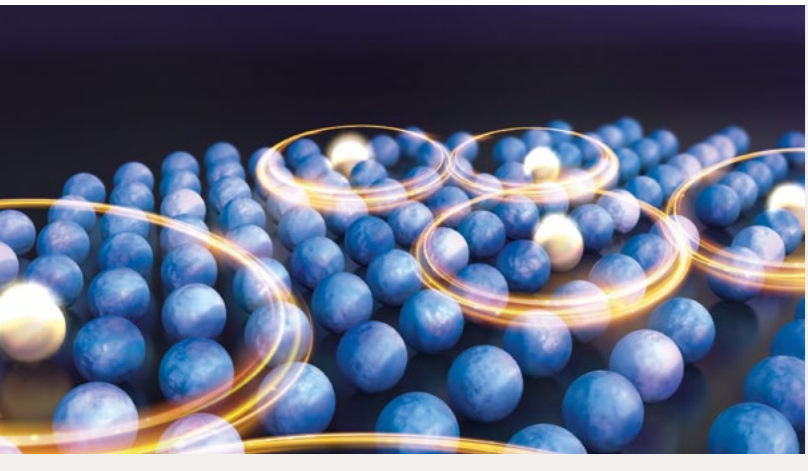
My topic of interest	Multifunctional nanocarriers should enable a targeted transport of drugs to a specific body region, hereby reducing undesired site effects and improving the therapeutic efficiency. Before clinical application, it is crucial to thoroughly study the biological interaction of nanocarriers in a physiological environment. Therefore, my work aimed to characterize the interactions of nanocarriers and blood components, thereby enabling a successful application of nanocarriers in vivo.
My motivation	Despite the recent progress in the field of nanomedicine, there is up to now a limited number of nanocarriers, which have actually reached clinical practice. This implies that there is still a huge gap between the development of novel nanomaterials and their biological application. Understanding and controlling the interaction of nanocarriers with blood components is my goal to overcome current challenges in nanomedicine.
My next professional station	Currently, I am working as Postdoctoral Fellow at the Max Planck Institute for Polymer Research in Mainz continuing my research work on the translation of nanocarriers into clinical application.

Chemistry, Physics & Technology Section

Dr. rer. nat. Johannes Zeiher

for the first single-particle resolved observation of coherent quantum dynamics in a long-range interacting Rydberg quantum simulator

Max Planck Institute of Quantum Optics, Garching
Research field: Ultracold Quantum Gases, Quantum Simulation
Current activity: Postdoctoral Fellow at the University of California, Berkeley, USA



My topic of interest

My goal is to understand how complex quantum systems can be composed atom by atom in a controlled way and which novel effects arise due to the interaction of the constituents in the resulting quantum many-body systems. This knowledge is fundamental for a variety of different quantum technologies, which rely on the interplay of many quantum particles.

My motivation

I am fascinated by how easily one reaches the limit of our understanding of nature already in the simplest composite quantum systems. Building intuition for a physical problem in this realm by means of extremely controlled experiments and creativity is very appealing to me. Beyond that, I am motivated to utilize the developed understanding in practice to improve the control over quantum systems.

My next professional station

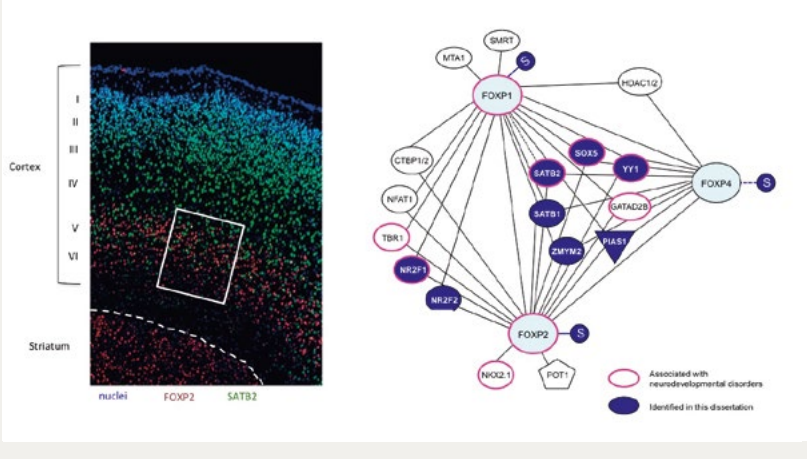
Currently, I work as a postdoc at UC Berkeley in the group of Prof Dan Stamper-Kurn. My work is focused on the interface between atomic quantum systems and individual light quanta stored in optical resonators. Coupling these two systems provides on the one hand a novel measurement toolbox for cold atoms, but on the other hand the atomic systems can also be used to manipulate light at the fundamental level of single light quanta.

Human Sciences Section

Dr. rer. nat. Sara Busquets Estruch

for work that has uncovered novel molecular pathways implicated in severe developmental speech and language disorders

Max Planck Institute for Psycholinguistics, Njimegen, Nederlands
Research field: Molecular Genetics of Neurodevelopment
Current activity: Clinical Geneticist at qGenomics S.L., Barcelona, Spain



My topic of interest

In my PhD, I aimed at discovering novel genetic and molecular pathways that underlie speech and language function and development. I studied how mutations in certain genes can alter the molecular activity of the protein to lead to speech impairment. I wanted to give my little contribution to uncover the complex molecular puzzle that drives the development of the brain.

My motivation

My curious spirit is what motivates my research. I've always been fascinated by how all the things in nature work. To me, the biggest mystery yet to be resolved in biology is how the brain works, and specially, how our genes can make our brain orchestrate every single thing we do, how can a tiny molecule called DNA in our microscopic cells make us speak, laugh or walk?

My next professional station

After finishing my PhD, I decided to shift my career towards a more clinical setting because I wanted my work to have a more immediate impact to society. I took a position as a clinical geneticist in Barcelona and I spend my days analyzing the genomes of hundreds of patients to help them in anyway a geneticist can.

Human Sciences Section

Dr. iur. Linn Katharina Döring

for the comparative analysis of the emergence and limits of criminal liability of social workers for (their) failures in fatal child protection cases in the family context

Max Planck Institute for Foreign and International Criminal Law, Freiburg/Breisgau
Research field: Criminology, Comparative Criminal Law, Child Protection
Current activity: Legal Advisor in the youth welfare office of the Breisgau-Hochschwarzwald district administration, Freiburg/Breisgau.

My topic of interest

Since the 1990s, social workers in Germany have been held criminally liable for negligent manslaughter by omission if children who have been abused and neglected by their families die while under their care. I sought to analyze the development, its criminal policy functions and implications of this new criminal offence of negligent manslaughter by omission and compared it to the non-criminal approach typically chosen for such cases in England.

My motivation

I saw it as a challenge to empirically prove the impact of criminal policy on criminal law doctrine and to conduct a study of a specific issue in an interdisciplinary manner. My motivation was driven by the interviews I conducted with social workers impacted by this punitive development. They raised my awareness of the effects of 'quality control' in this context by means of criminal law and measures equivalent to criminal law. In the end, I was in a position to critically assess the German jurisprudence which is at times inclined to focus too much on questions of doctrine as well as to critically assess the German criminal justice authorities who tend to be motivated by criminal policy.

My next professional station

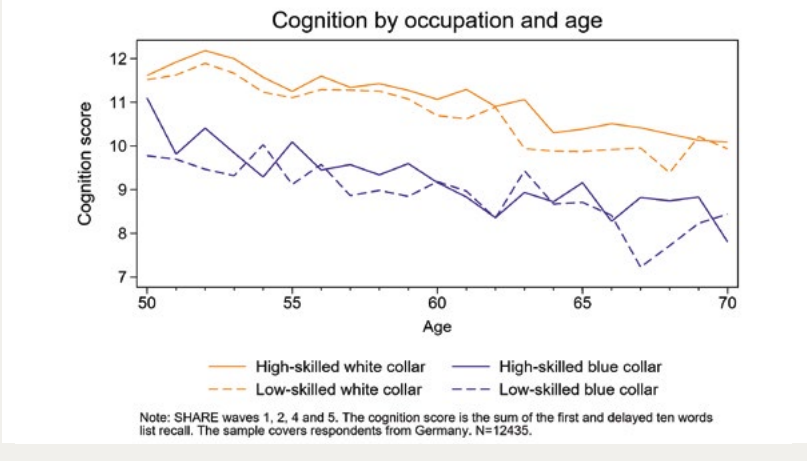
After my Second State Exam in April 2019, I wanted to put the skills acquired during my doctorate to good practice, which is why I'm now working as a legal advisor in the youth welfare office.

Human Sciences Section

Dr. rer. pol. Felizia Hanemann

for investigations on the relationship between labour market inactivity and health for individuals aged 50 and older

Max Planck Institute for Social Law and Social Policy, Munich
Research field: Labour and Health Economics
Current activity: Postdoctoral Fellow at the Max Planck Institute for Social Law and Social Policy, Munich



My topic of interest

How does the transition process from the labour market into retirement differ between European countries? How does labour market inactivity affect mental and physical health? Do working conditions and personal circumstances impact the health effect of retirement? Can an active lifestyle and social networks after retirement buffer the negative effects of retirement on health?

My motivation

For most countries, population ageing is a challenge and at the same time an opportunity. I'm convinced that we can all benefit from comparing different countries to learn from each other and to turn the challenges into opportunities. With the help of data from "SHARE -Survey of Health, Ageing and Retirement in Europe" I want to understand how we age in Europe and how we can improve the conditions for the individuals and the society.

My next professional station

After my parental leave, I will continue researching at the Max Planck Institute for Social Law and Social Policy in Munich.

Human Sciences Section

Dr. Carolyn Moser

for revealing the accountability arrangements of EU security and defence activities by using an innovative interdisciplinary approach

Max Planck Institute for Comparative Public Law and International Law, Heidelberg
Research field: European and Public International Law, Public Governance, Security
Current activity: Senior Research Fellow at the Max Planck Institute for Comparative Public Law and International Law, Heidelberg

My topic of interest

Since 2003, the EU has launched more than 30 peace operations, primarily of civilian nature. Currently, some 2,500 experts – including policemen, judges and customs officers – work in EU missions in Africa, Asia and Europe. Yet, the accountability scheme of these activities has so far been largely obscure. My doctoral thesis hence explores the political, legal and administrative accountability arrangements of EU civilian crisis management at both the national and European level. My inquiry shows that, despite an unfavourable legal framework, an effective accountability practice regarding EU civilian missions has developed at EU level.

My motivation

My interdisciplinary research on European security issues rests on several pillars. Curiosity is the main driver of my work. What is more, I believe that sound insights into law and politics are key for politically active citizens.
The secrecy and lack of transparency regarding security and defence render the study of these matters thus particularly intriguing and relevant. Finally, I am fond of the EU not least because of my Franco-German roots.

My next professional station

Under the Minerva Fast Track scheme of the Max Planck Society, I will lead a research group on novel security policy trends in Europe at the Max Planck Institute for Comparative Public Law and International Law.

Human Sciences Section

Dr. iur. Nicolas von zur Mühlen

for the analysis of fundamental questions regarding access to electronic communications in criminal investigations and for the development of a corresponding reform concept

Max Planck Institute for Foreign and International Criminal Law, Freiburg/Breisgau
Research field: Criminal Procedural Law, Constitutional Law, Data Protection Law
Current activity: attorney at Deloitte Legal, Berlin

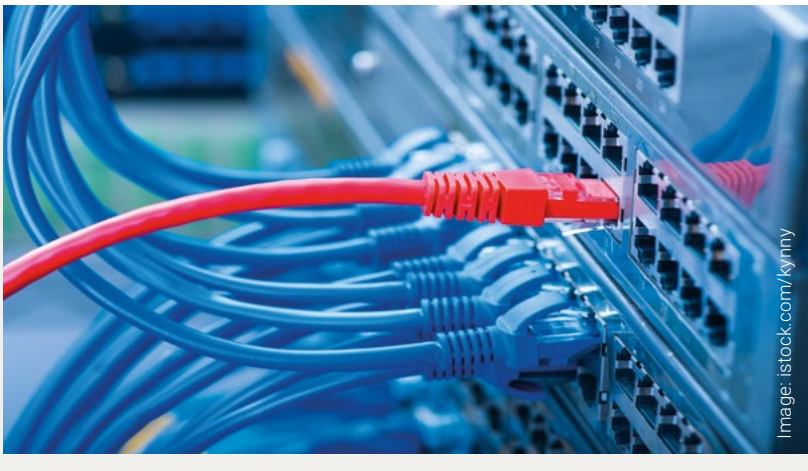


Image: istock.com/kynny

My topic of interest

Modern information and communication technologies have become pervasive in almost all areas of life. As a result, the access of law enforcement authorities to data that allow deep insight into the personality of each individual is a key issue. At the same time, the complexity of such investigations is growing in both technical and legal terms due to the rapid developments in the underlying technologies. In my research, I examine how to address these questions through a reform of criminal procedural law. The aim is to develop a sustainable approach, one that is effective in covering future technical developments and compliant with fundamental rights.

My motivation

It fascinates me to link fundamental questions evolving from the (seeming) antagonism of technology and law by means of interdisciplinary research with practical issues in order to deliver solutions for complex problems.

My next professional station

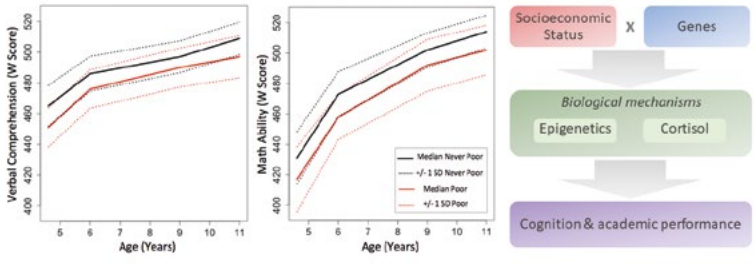
I recently started working as a lawyer at the interface of criminal law, data protection law, and IT law.

Human Sciences Section

Dr. rer. nat. Laurel Raffington

for studies on socio-economic disparities in children's cognitive development with a focus on stress mechanisms

Max Planck Institute for Human Development, Berlin
Research field: Developmental Psychology
Current activity: Postdoctoral Fellow at the University of Texas at Austin, USA



My topic of interest

Children from socioeconomically disadvantaged family backgrounds tend to perform lower on many measures of cognitive and academic achievement. Early childhood adversity, including poverty and chronic stress, may contribute to these disparities. Yet, we know fairly little about the biological mechanisms that explain how adversity "gets under the skin". My current primary research explores how genetic and environmental interactions contribute to individual differences in children's and adolescent's stress-sensitive hormone secretion and behaviours often found to correlate with socioeconomic status. To this end, I utilize behaviour genetic models applied to data from twins and molecular (epi-)genetic methods, such as DNA methylation profiles of poverty at birth.

My motivation

I believe that every child has an equal right to live in a nurturing and stimulating environment. I hope that this research may inform intervention studies and social policies that alleviate the burden of early childhood adversity, social inequality, and discrimination.

My next professional station

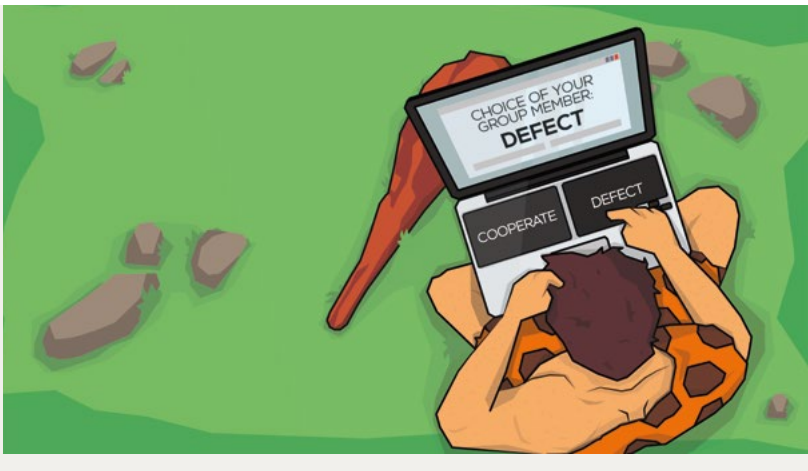
After completing my postdoctoral training, funded by the German Research Foundation (DFG), at the University of Texas at Austin with Prof. Elliot Tucker-Drob and Prof. Paige Harden, I hope to start a research group in Germany.

Human Sciences Section

Dr. Angelo Romano

for outstanding new insights into the origins of human cooperation and tools to combat parochial altruism across societies

Max Planck Institute for Research on Collective Goods, Bonn
Research field: Cooperation and Parochial Altruism
Current activity: Senior Research Fellow at the Max Planck Institute for Research on Collective Goods, Bonn



My topic of interest	I am interested in understanding how to promote human cooperation in situations where there is a conflict between personal and collective interest. I address this issue by studying and conducting experimental research on the evolution and cross-societal variation of cooperative behaviour and discrimination in humans.
My motivation	I have always been fascinated by the scientific study of human behaviour. In particular, I find exciting that certain behaviours (e.g. cooperation) are widespread across societies that differ from their cultural and ecological background.
My next professional station	I am currently a Senior Research Fellow at the Max Planck Institute for Research in Collective Goods in Bonn. Here I will continue studying human cooperation and its supporting mechanisms in very young children, and its variation across 42 societies around the globe.

Human Sciences Section

Dr. rer. nat. Viviane Slon

for the study of archaic hominins by recovering their DNA from sediment, which opens the possibility to investigate ancient populations at archaeological sites where no skeletal remains are found

Max Planck Institute for Evolutionary Anthropology, Leipzig
Research field: Evolutionary Genetics
Current activity: Postdoctoral Fellow at the Max Planck Institute for Evolutionary Anthropology, Leipzig

Image: Alex Cagan

My topic of interest

The study of DNA from prehistoric humans has often been restricted by the scarcity of the fossil record. The ability to recover ancient DNA from sediments deposited in prehistoric caves now allows us to carry out genetic studies even in the absence of human remains. I apply this methodology to a large array of prehistoric sites, striving to trace changes in human populations through time.

My motivation

I have always been interested in prehistoric times, when no written records exist to help us understand how people lived, thought and behaved. To decipher the past, we must rely on what people left behind, making research in this field akin to solving a riddle. I find the technical challenges of recovering DNA from ancient individuals to be a great motivation, and I am often amazed by how much one can learn about past populations from ancient DNA.

My next professional station

I plan to establish an ancient DNA research facility and start my own research group at Tel-Aviv University next year.

Human Sciences Section

Dr. rer. nat. Maria Spyrou

for the reconstruction of the genetic history of *Yersinia pestis*, one of the most infamous pathogens in human history and for tracing its origin back to the European Bronze Age

Max Planck Institute for the Science of Human History, Jena
Research field: Archaeogenetics
Current activity: Postdoctoral Fellow at the Max Planck Institute for the Science of Human History, Jena

My topic of interest

How far back in history can we trace microbial pathogens? What has influenced their evolution and geographic distribution over time? Starting with my PhD work that focused on the history of the plague pathogen, *Yersinia pestis*, my research aims on tracing infectious disease evolution and on understanding the complex relationship between humans and pathogens through time.

My motivation

A unique aspect of my work that I find appealing and motivating is its interdisciplinary nature that encourages collaboration between scientists from diverse disciplines, including geneticists, archaeologists, anthropologists and historians. We live in a fascinating time for genetics research, where advancements in molecular biology facilitate high-throughput analysis of DNA from archaeological specimens and allow us to address key questions about human evolution that are of relevance to multiple research disciplines. From a breadth of resulting topics, my own personal interest entails the tracing of infectious disease epidemics during our recent and more distant past.

My next professional station

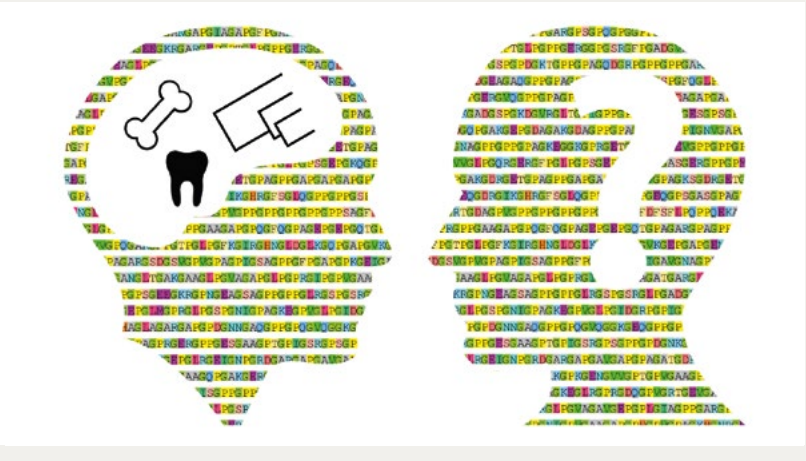
In October 2018, I transitioned into a postdoctoral position at the Max Planck Institute for the Science of Human History in Jena, Germany.

Human Sciences Section

Dr. Frido Welker

for work in paleoproteomics showing how ancient proteins can be used to establish molecular phylogenies of extinct species beyond the range of ancient DNA

Max Planck Institute for Evolutionary Anthropology, Leipzig
Research field: Human Evolution, Archaeology, Anthropology
Current activity: Postdoctoral Fellow at the Max Planck Institute for Evolutionary Anthropology, Leipzig



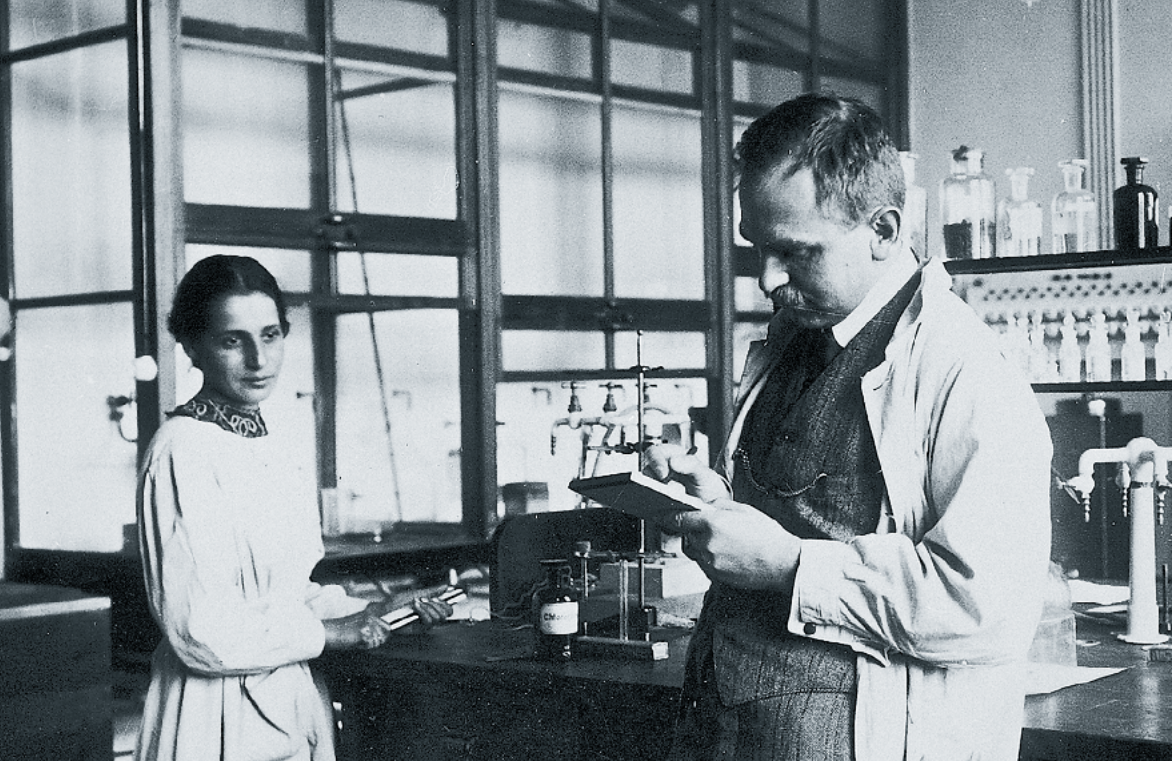
My topic of interest	I am interested in how the recovery and analysis of ancient proteins can inform us about human evolution and hominin behaviour. How do past human fossils relate to each other, and us, evolutionary? What was their behaviour, and how can ancient proteins preserved in their skeletal tissues inform us about molecular processes happening inside extinct hominins when they were alive?
My motivation	Proteins are a major constituent of our skeleton, the organic artefacts hominins surround themselves with, and a central part of our diets. They are also informative on the evolutionary relationships between species and modified in vivo. Our discovery that ancient proteins survive for at least 2 million years across the globe has initiated a series of developments in protein extraction methods, protein mass spectrometry, and analytical tools, and being part of this process is tremendously exciting.
My next professional station	I am currently continuing my research on ancient hominin proteomes at the University of Copenhagen, particularly focused on the Middle and Early Pleistocene.

Otto Hahn Award

The Otto Hahn Award is bestowed by the Max Planck Society every year to particularly worthy recipients of the Otto Hahn Medal.

The award provides for a long-term research residency abroad, followed by leadership of a research group on the scientist's own research topic at one of the Max Planck Institutes. The award is intended to pave the way for a long-term scientific career in Germany.

Lise Meitner and
Otto Hahn in the laboratory,
Kaiser Wilhelm Institute
for Chemistry, 1913



This year three scientists will be honoured with the Otto Hahn Award of the Max Planck Society.

Biology
& Medicine
Section

Helene Schmidt

see page 15

Chemistry,
Physics &
Technology
Section

Johanna Simon

see page 24

Human Sciences
Section

Viviane Slon

see page 33

The Reimar Lüst Fellowship

The Reimar Lüst Fellowship is financed by a foundation that was created in 1983 to mark the 60th birthday of Reimar Lüst, a former President of the Max Planck Society.

The foundation‘s endowment consists of donations from German companies. The foundation fosters junior scientists via the two-year Reimar Lüst Fellowship, which is awarded annually.

The Reimar Lüst Fellowship used to be a scholarship. Since the reorganization of the support for junior scientists, winners of the award have received a doctoral funding contract, i.e. an employment contract, which is subject to the TVöD, for two years.

The former and the current president: Reimar Lüst and Martin Stratmann at the Annual General Meeting of the Max Planck Society in 2014

Dr. iur. Laura Hering

for her dissertation on the consequences of procedural irregularities in European Administrative Law

Max Planck Institute for Comparative and International Private Law, Hamburg; Max Planck Institute for Comparative Public Law and International Law, Heidelberg; University of Hamburg
Research field: European Administrative Law
Current Activity: Senior Research Fellow at the Max Planck Institute for Comparative Public Law and International Law, Heidelberg

My topic of interest	Under which circumstances can it be justified to refrain from strictly enforcing procedural law – especially in view of the fact that errors cannot be completely avoided when the administration adopts complex decisions?
My motivation	A progressive, efficient and forward-looking European administration needs appropriate mechanisms for dealing with procedural and formal errors. However, EU law has not yet fully and systematically addressed the issue of the consequences of procedural errors in general, nor the rectification and irrelevance of procedural and formal errors in particular. The main driving force for my research, however, lies elsewhere: I am German-Italian, attended a European School and clerked at the European Commission and the CJEU. Thanks to these experiences I have become a dedicated and passionate European. Especially at a time when support for the EU seems to be fading, I am particularly motivated to conduct research in the field of European law.
My next professional station	My next goal is the 'Habilitation'. Therefore, I will spend the next years as a postdoc at the Max Planck Institute for Comparative Public Law and International Law in Heidelberg in the research group of Professor von Bogdandy.

The Dieter Rampacher Prize

As a motivation for students to complete a PhD when young, the Dieter Rampacher Prize has been awarded to the youngest PhD student of the Max Planck Society every year since 1985. The prize usually goes to a young researcher aged 25 to 27. The prize also includes a monetary award.

The prize was endowed by Dr. Hermann Rampacher, a Supporting Member of the Max Planck Society, in memory of his brother, Dieter Rampacher, a physics student at the TH Stuttgart, who died in battle in 1945 at the age of 20.

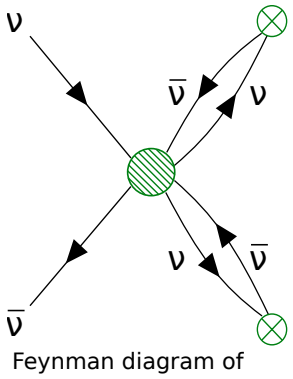
Carsten A. Rampacher, son of the benefactor and also a Supporting Member of the Max Planck Society, has assumed funding of the prize since 2011.

Herrmann Rampacher talking with Chaitanya Giri, winner of the Dieter Rampacher Prize 2015

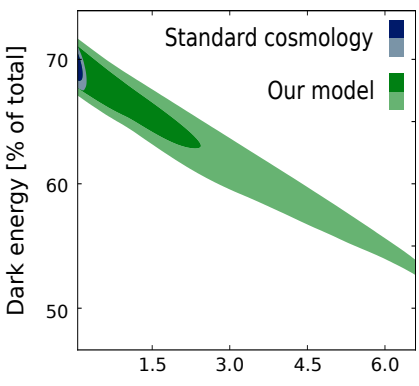
Dr. rer. nat. Lena Funcke

Dissertation: 'How Gravity Shapes the Low-Energy Frontier of Particle Physics: Neutrino Masses and the Domestic Axion'

Max Planck Institute for Physics
(Werner Heisenberg Institute), Munich
Research field: Particle Physics
Current activity: Postdoctoral Fellow at the Perimeter Institute for Theoretical Physics, Waterloo, Canada



Feynman diagram of our neutrino mass model



My topic of interest

The fundamental building blocks of our universe are described by the Standard Model of Particle Physics, which leaves several important questions unanswered: What is the origin of neutrino masses? Why does the strong interaction treat matter and antimatter on an almost equal footing? To answer them, I develop models beyond the Standard Model, which have far-reaching implications for our understanding of cosmological structure formation.

My motivation

My motivation for physics has always been the quest to explore the fundamental structures underlying our observable world. It is truly fascinating that such an abstract and human-made construct as mathematics describes our universe. In my research, I combine knowledge from particle physics, gravitation, cosmology, and astrophysics. It deeply intrigues me that the physical theories describing the smallest building blocks of our universe also describe phenomena on the largest scales, such as galaxy formation.

My next professional station

Since September 2018, I have been working as a Postdoctoral Fellow at the Perimeter Institute in Canada on how to experimentally confirm my models using cosmological and astrophysical data.

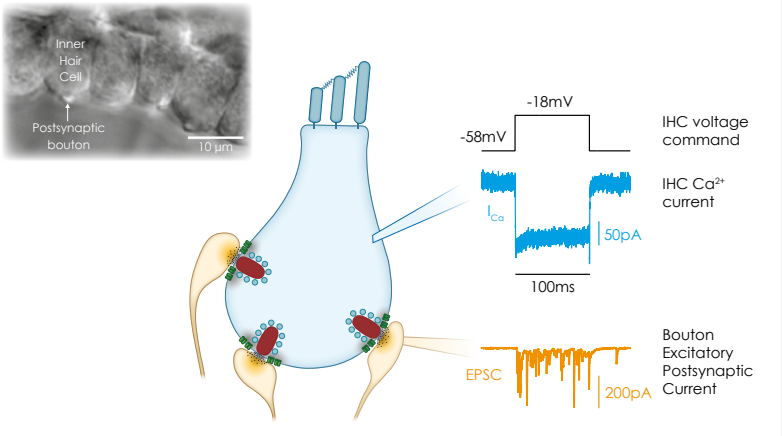
The Nobel Laureate Fellowship

The Nobel Laureates of the Max Planck Society can each nominate an outstanding postdoc for a Nobel Laureate Fellowship in recognition of their achievements. The fellows receive an employment contract at a Max Planck Institute as well as resources for research. This instrument for promoting junior scientists of the Max Planck Society provides postdocs with a unique insight into the research activities of the Nobel Laureates. They also benefit from excellent national and international networks for their future career.

Lina María Jaime Tobón, M.Sc.

Nobel Laureate:
Prof. Erwin Neher

Max Planck Institute for Biophysical Chemistry, Göttingen
Research field: Synaptic Nanophysiology
Current activity: PhD student at the Max Planck Institute for Biophysical Chemistry, Göttingen



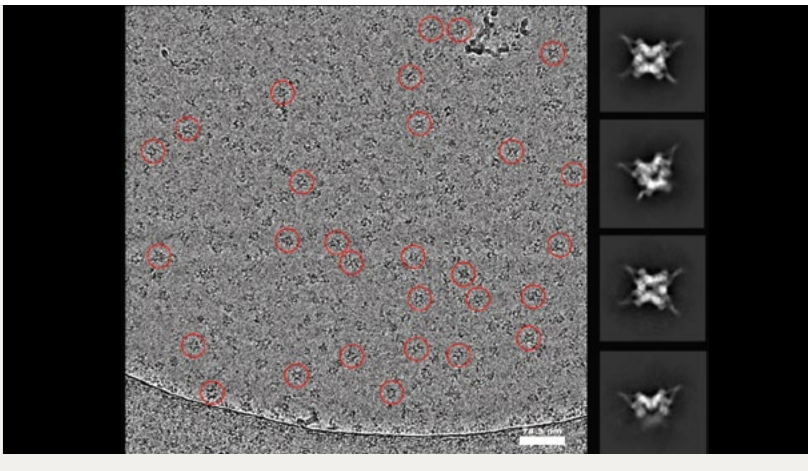
My topic of interest	Sound encoding relies on the ribbon synapses between cochlear inner hair cells and the spiral ganglion neurons. How do these specialized synapses accomplish their characteristic fast and precise synaptic transmission? Which mechanisms underlie their remarkable functional diversity?
My motivation	I am fascinated by synapses. And the ribbon synapses of inner hair cells are for sure among the most fascinating ones. They are unconventional and specialized at a molecular, anatomical and functional level. I study the role of these specializations on synaptic transmission by performing simultaneous pre- and post-synaptic patch-clamp recordings. By gathering information at the single active zone level, I hope to contribute to our understanding of synaptic vesicle release and sound encoding in general.
My next professional station	After completion of my PhD, I would like to continue my research as a Postdoctoral Fellow at the Max Planck Institute for Biophysical Chemistry.

Nobel
Laureate
Fellowship

Dr. rer. nat. Jung-Hoon Lee

Nobel Laureate:
Prof. Dr. Robert Huber

Max Planck Institute of Biochemistry, Martinsried
Research field: X-ray crystallography,
cryo-electron microscopy
Current activity: Research Group Leader at the Max Planck Institute of Biochemistry, Martinsried



My topic of interest	Cryo-EM studies on nucleosome-containing assembly will help to describe how a chromatin-regulating protein complex recognizes nucleosome and modifies histones to repress gene expression at a molecular level.
My motivation	Recent 'resolution revolution' in cryo-EM has drastically changed the research strategy for structural biology. Structural characterization of therapeutic target clearly changes the way we design drugs. I am motivated by the desire to better understand molecular mechanisms of therapeutic target proteins by looking at atomic level details and particularly translate my existing expertise and skills in practical applications for innovative drug discovery.
My next professional station	I am continuing cryo-EM studies of biomolecular macromolecules at the Max Planck Institute of Biochemistry in Martinsried.

Imprint

Publisher	Max Planck Society for the Advancement of Science e.V. Hofgartenstraße 8, D-80539 Munich Phone +49 (0)89 2108-0
Editor responsible for the content	Kerstin Dübner-Gee, Dr. Christiane Haupt Department Human Resources Development & Opportunities
Layout, Project Management	Vogt, Sedlmeir, Pfeiffer. GmbH, Munich Dieckmann PR, Munich
Photos	Unless otherwise indicated, the portraits and the photos representing the research projects have been provided by the junior scientists.
Copyright notice	All pictures and texts are subject to copyright protection. Pictures on page 4–6: © Peter Vogel and Amac Garbe
Printing	Joh. Walch, Augsburg
	June 2019