Outstanding!

Junior scientists
of the Max Planck Society
2021

Imprint

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Unless otherwise indicated,
the portraits and the photos representing
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June 2021

Contents

Outstanding!

Dear Members and Friends
of the MPG Community,

A strenuous year lies behind each one of the many thousands of junior scientists in the Max Planck Society. The pandemic has jeopardized career plans, rendered social gatherings virtually impossible, and it has made it especially difficult to settle into a new environment – and for many of these young researchers, also to settle into Germany as such. We have tried to alleviate the impact of the crisis for them through measures such as contract extensions, opportunities for working flexibly, improved supervision offers and possibilities for exchange via video meeting. I feel extremely thankful for the great individual commitment that has been demonstrated on the ground at the Institutes. Nonetheless, the Corona crisis has put our young talents to a tough stress test. Therefore, I do not want to miss this opportunity to express my deep appreciation to all of our junior scientists!

The vast majority of the award winners assembled in this brochure have completed their work in the midst of the pandemic. This fact makes their dedication, their determination and their creativity even more impressive. I extend my heartfelt congratulations to them, also on behalf of the Max Planck Society. Almost 60 nominations were submitted by our Institutes this year, which is an unusually high number. The originality of the research was out-

standing throughout, making it truly difficult for the committee to arrive at a small selection.

I sincerely hope you will enjoy getting to know this year's Awardees, and please allow me to make one last remark: Reinhard Genzel, Director at our MPI for Extraterrestrial Physics in Garching, was awarded the highest scientific honour of all last October: He was awarded the Nobel Prize in Physics for his observations of the supermassive black hole at the centre of our Milky Way. Listed on his CV as the first major research prize he won in his career is still the Otto Hahn Medal. He received it in 1980, during his doctorate at the MPI for Radio Astronomy in Bonn. This line in his CV should make us as the MPG – and this year's award winners in a very special way – particularly proud and motivate us!

Yours sincerely,
Martin Stratmann
President of the Max Planck Society


FÜR DEN WISSENSCHAFTLICHEN NACH
MAX-PLANCK-GESELLSCHAFT

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.

Usually, the award is presented during the General Meeting in the following year. Due to the ongoing Corona pandemic, the annual meeting with the award ceremony can only be held as an online event this year. Even more so, this brochure intends to underline the achievements of these young researchers.

Biology
& Medicine
Section

Dr. rer. nat. Franziska Eberl

for investigations on how poplar trees defend themselves against simultaneous attacks from an insect pest and a fungal disease

Max Planck Institute for Chemical Ecology, Jena
Research field: Chemical Ecology
Current activity: Scientific Coordinator at Friedrich Schiller University and Postdoctoral Fellow at the Max Planck Institute for Chemical Ecology

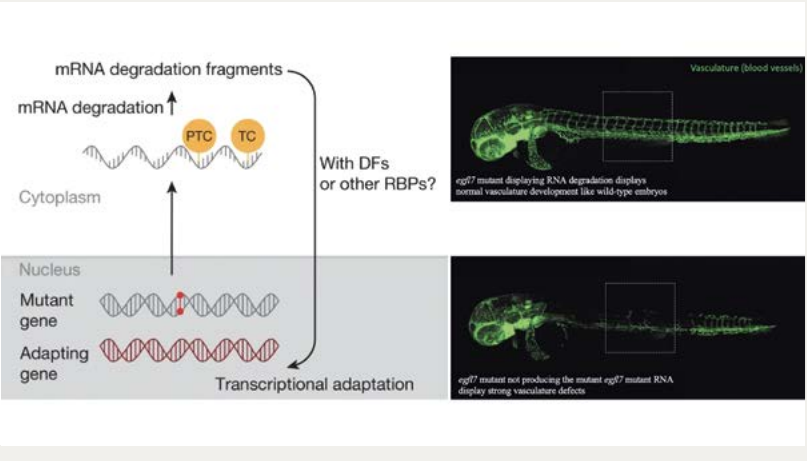
My topic of interest	I would like to understand the mechanisms of complex ecological interactions at a molecular and chemical level. So far, most studies on plant defense investigated one-by-one scenarios – with my work I want to find out how trees defend themselves against different antagonists at the same time.
My motivation	When we are outside in nature, for example during a walk in the forest, there are so many things to discover. To understand how all these many different organisms interact and communicate with each other is fascinating. What motivated me is to share this fascination with others inside and outside the scientific community, as well as the curiosity itself to understand such natural processes.
My next professional station	After my PhD I could complete another project about the chemical ecology of woody plants, and currently I am gaining insights into science management and science communication.

Biology
& Medicine
Section

Dr. rer. nat. Mohamed Ahmed El-Brolosy

for the ground-breaking discovery of molecular mechanisms underlying the phenomenon of transcriptional adaptation to mutations

Max Planck Institute for Heart and Lung Research, Bad Nauheim
Research field: Genetics
Current activity: Harvard Society of Fellows, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts, USA



My topic of interest

I am interested in understanding how to increase individuals' robustness to genetic mutations and how genetic variants influence gene expression levels and disease outcomes.

My motivation

Mutations can lead to a wide-variety of genetic diseases, most of which are rare and thereby do not receive much investment from the pharmaceutical industry. Approximately 6000 genetic diseases affecting 260-450 million individuals are known, with less than 10% of them being treatable. In my previous work, I identified a novel machinery through which cells compensate for mutations by increasing the expression levels of closely-related genes. Such observation may underlie the recent identification of healthy individuals harboring mutations within disease-relevant genes. Recent technological advances and the drop in sequencing costs provide us now with the ability to better understand how different genetic variants influence disease outcomes.
I am motivated by the desire to help patients of rare genetic diseases. I believe that further investigating the transcriptional adaptation machinery may lead to the development of more effective therapies that enhances an individual's robustness to a mutation rather than correct its effect.

My next professional station

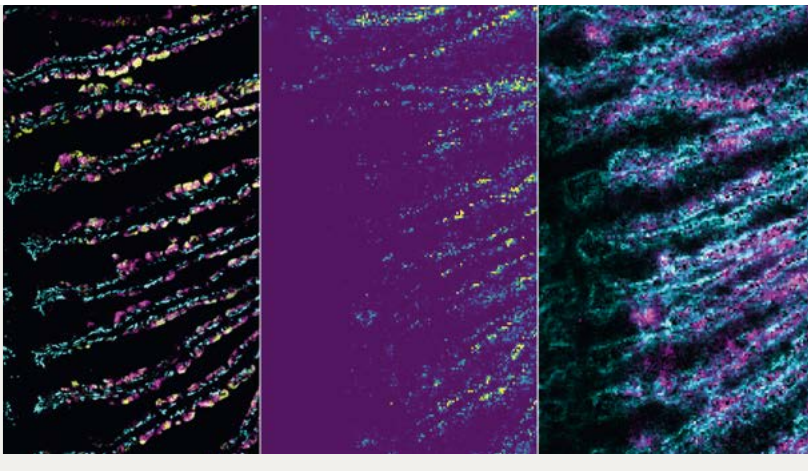
I am currently a junior fellow of the Harvard Society of Fellows, pursuing my research at the Whitehead Institute for Biomedical Research.

Biology
& Medicine
Section

Dr. rer. nat. Benedikt Geier

for the work on developing a method to image and study the chemical interactions in microbe-animal symbioses through the combination of mass spectrometry and microscopy

Max Planck Institute for Marine Microbiology, Bremen
Research field: Metabolic Interactions in Animal-Microbe Symbioses
Current activity: Postdoctoral Researcher at the Max Planck Institute for Marine Microbiology



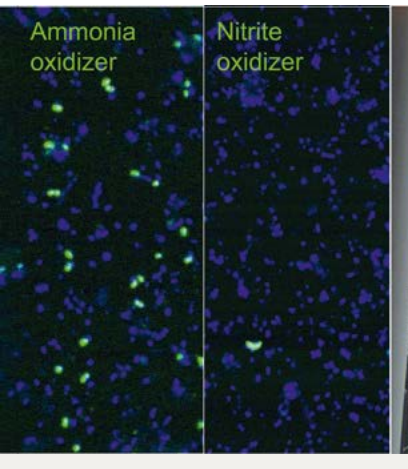
My topic of interest	I am fascinated by the interactions between microbes and tissues of animals and humans. My goal is to advance imaging approaches to better reveal how microbes colonize and persist in the tissues of animal hosts.
My motivation	The saying 'A picture is worth a thousand words' is the best way to describe the value of imaging techniques for understanding and communicating scientific data. My motivation is to capture images of biological processes that nobody has seen before.
My next professional station	I am currently finishing projects in my PhD lab and I am applying for fellowships to join a lab in the US as a Postdoc next year.

Biology
& Medicine
Section

Dr. rer. nat. Katharina Kitzinger

for work on the physiology of nitrifiers, which provided unprecedented insight into the factors controlling the abundance of these globally important microorganisms

Max Planck Institute for Marine Microbiology, Bremen
Research field: Marine Microbiology
Current activity: Postdoctoral Fellow at the Max Planck Institute for Marine Microbiology



My topic of interest

Ammonia and nitrite oxidation are balanced in the ocean. Despite this, ammonia oxidizing microorganisms outnumber nitrite oxidizers ten-fold. I study the factors that determine activity and abundances of ammonia and nitrite oxidizers in the ocean and in particular, the role of metabolic versatility.

My motivation

The nutrient cycles on Earth are driven by an invisible majority – the microorganisms. Yet we are only beginning to understand how the metabolic pathways of these microorganisms work, under which conditions they are active and how they interact with each other. Studying this is like working on an Earth-sized playground, with endless mysteries to uncover.

My next professional station

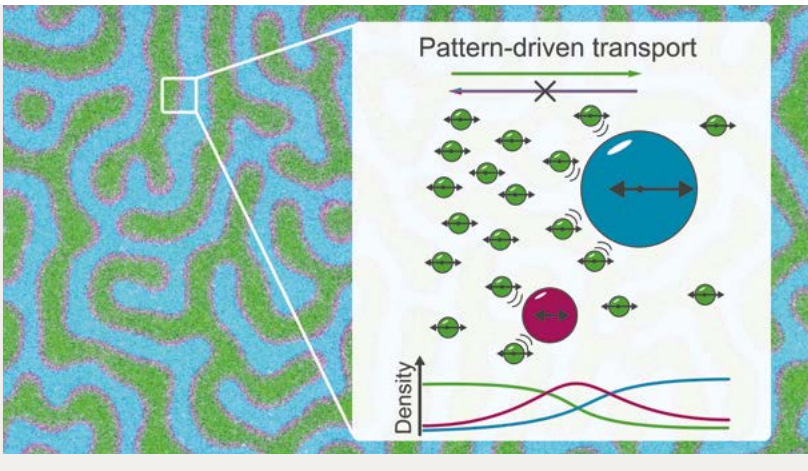
I am continuing my research on metabolic versatility of nitrogen cycling microorganisms as a Postdoctoral Fellow at the MPI for Marine Microbiology.

Biology
& Medicine
Section

Dr. rer. nat. Beatrice Ramm

for the discovery of a new generic mechanism for active directional transport on biological membranes

Max Planck Institute of Biochemistry, Munich
Research field: Biophysics
Current activity: Associate Research Scholar, Fellow at the Center for the Physics of Biological Function, Princeton University, New Jersey, USA



My topic of interest

I would like to understand how biological pattern formation arises from a mixture of biochemical and purely physical and mechanical factors. During my PhD, I studied a model for biological pattern formation, the *E. coli* MinDE system, using in vitro reconstitution approaches. I worked towards understanding the self-organization mechanism on the molecular level and thereby discovered an unexpected function: that MinDE dynamics are able to transport and even sort other molecules by size on the membrane based on a mechanism called diffusiophoresis.

My motivation

I am fascinated by the beauty and complexity of self-organization in biology. I love to zoom in and observe molecules and cells arranging in space and time using a microscope, often guided by my curiosity. I also immensely enjoy interdisciplinary approaches and the collaboration with other scientists to look at questions from different angles and understand fundamental processes in detail.

My next professional station

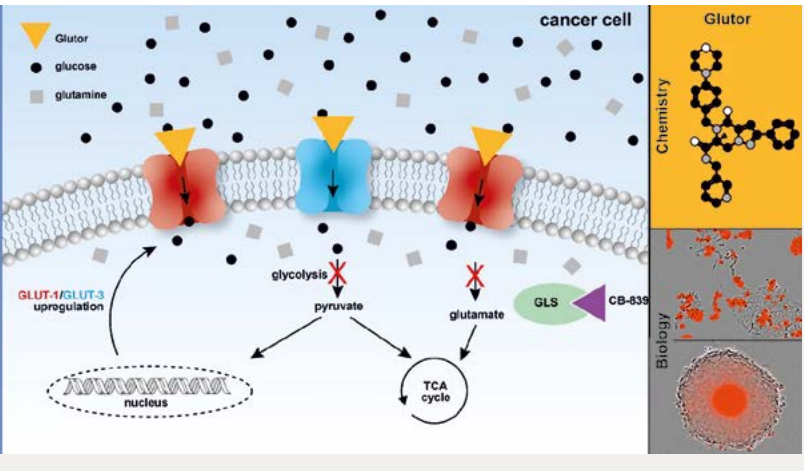
I recently started my position as fellow at the interdisciplinary Center for the Physics of Biological Function at Princeton University.

Biology
& Medicine
Section

Dr. rer. nat. Elena Sabrina Reckzeh

for the development of potent and selective inhibitors of the GLUT 1/3 glucose transporters as new principle for the treatment of cancer and inflammatory diseases

Max Planck Institute of Molecular Physiology, Dortmund
Research field: Chemical Biology
Current activity: Postdoctoral Fellow at the Hubrecht Institute for Developmental Biology and Stem Cell Research, Utrecht, The Netherlands



My topic of interest

The goal of my research is to investigate diseases with small molecules in order to find new treatment strategies. To increase the clinical relevance of my research I currently focus on the use of adult stem cell-derived organoids in drug research.

My motivation

I am extremely fascinated how the interplay between different disciplines creates new angles and full pictures of complex biological problems and observations. Diving into neighbouring disciplines and hence adapting my perspective on biological questions motivates me tremendously.

My next professional station

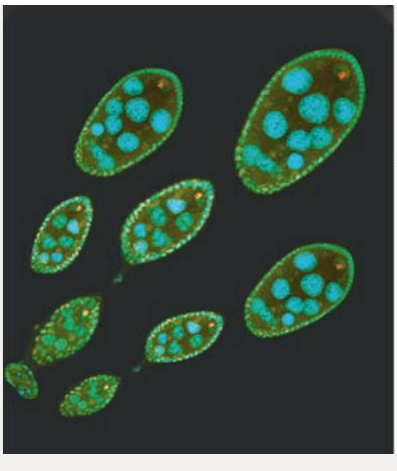
I am a Postdoc at the Hubrecht Institute in Utrecht in the group of Hans Clevers. I use adult stem cell-derived intestinal organoids to study genetic, metabolic diseases of the gut.

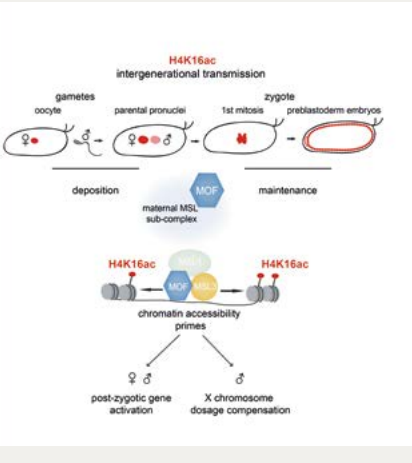
Biology
& Medicine
Section

Dr. rer. nat. Maria Samata

for investigations into maternal instruction of the active epigenome and X-chromosome regulation in the early embryo

Max Planck Institute for Immunobiology and Epigenetics, Freiburg im Breisgau
Research field: Molecular Biology & Epigenetics
Current activity: Postdoctoral Fellow at the Max Planck Institute for Immunobiology and Epigenetics





My topic of interest

The young embryo starts out transcriptionally silent. I am interested in understanding how the embryo initiates gene expression in the first hours of its life. Another fascinating aspect is how fluctuations of active chromatin modifications regulate embryonic development.

My motivation

I enjoy combining classical genetic experiments with modern genomic approaches to study the early developmental events. Whether the parents guide the transcriptional programs of their offspring is a fundamental question in the field of epigenetics. I was excited to discover that an active chromatin modification is maintained from the mother's oocyte to the zygote and works as a memory for future gene activation.

My next professional station

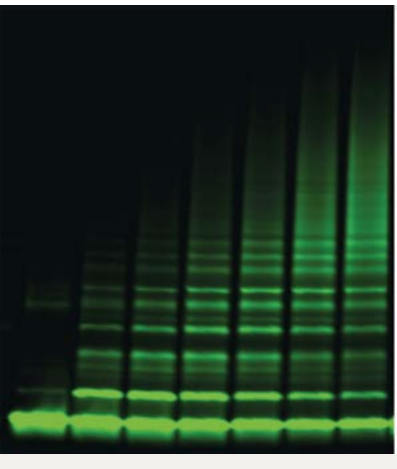
I am soon embarking on a new challenge by applying my research experience to the field of disease diagnostics.

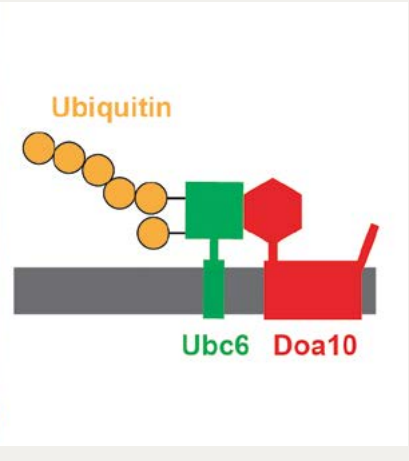
Biology
& Medicine
Section

Dr. rer. nat. Claudia Schmidt

for investigations into membrane protein quality control at the endoplasmic reticulum and the role of the ubiquitin ligase Doa10 in this process

Max Planck Institute for Biophysical Chemistry, Göttingen
Research field: Cell Biology and Biochemistry
Current activity: Postdoctoral Researcher at the Max Planck Institute for Biophysical Chemistry





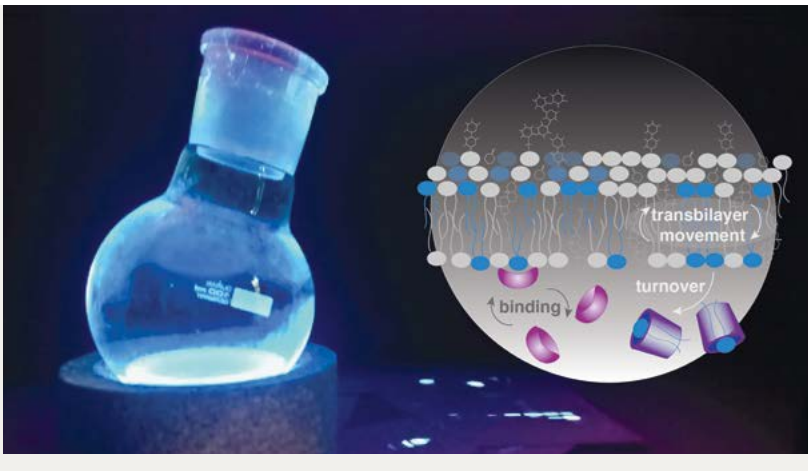
My topic of interest	Cells are dynamic systems that constantly synthesize and degrade proteins. I want to understand how the cell regulates protein levels to respond to environmental changes, and how it degrades misfolded proteins that cannot perform their function anymore.
My motivation	Whereas we know many components of cellular pathways, we often still do not know their molecular function. Mechanistically characterizing these proteins in order to be ultimately able to understand their role in the cell drives my research. I am especially inspired by reconstitution approaches that aim to answer these fundamental questions by reconstructing entire pathways.
My next professional station	I am currently continuing my research on protein degradation and planning my next step as a Postdoctoral Researcher.

Biology
& Medicine
Section

Dr. rer. nat. Milena Maria Schuhmacher

for work to develop experimental methods for performing quantitative lipid biochemistry in living cells

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



My topic of interest

Membrane lipids exhibit a remarkable structural diversity, but it is largely unknown what the biological function of lipid chemical diversity is. In my doctoral thesis, I used chemical biology to develop new tools for the light-dependent modulation of specific signaling lipid levels at the plasma membrane of living cells. Furthermore, I used these tools to develop a novel approach for the quantitative measurement of lipid turnover, lipid transbilayer movement and lipid protein affinities for specific lipid species.

My motivation

It fascinates me how many questions in the natural sciences are not yet entirely answered and thus remain elusive. Especially in the research area of membrane biology, we are only just beginning to understand a lot of processes and are constantly making new connections. This renders every project an adventure at the end of which, in addition to new findings, more questions await. Furthermore, I enjoy working in two disciplines, chemistry and biology, which makes my work incredibly varied.

My next professional station

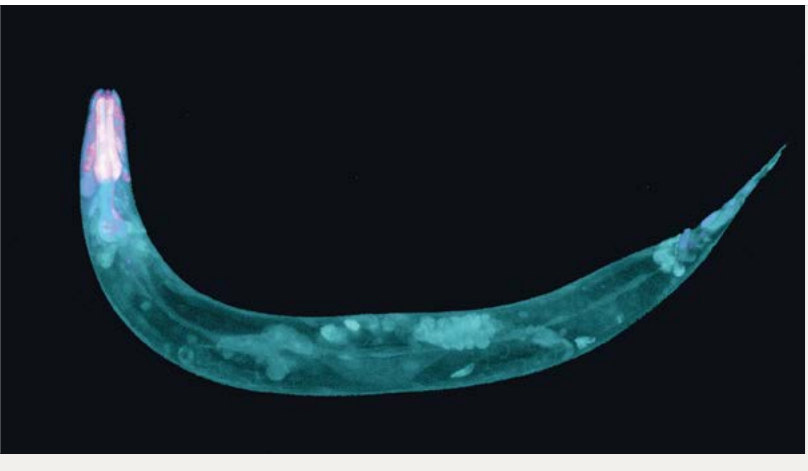
At the moment I am working on a thematic continuation of my doctoral thesis at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden.

Biology
& Medicine
Section

Dr. rer. nat. Bogdan Sieriebriennikov

for the first identification of the molecular logic and the evolutionary principles of a gene regulatory network controlling phenotypic plasticity

Max Planck Institute for Developmental Biology,Tübingen
Research field: Biology
Current activity: Postdoctoral Fellow at the New York University, New York, USA



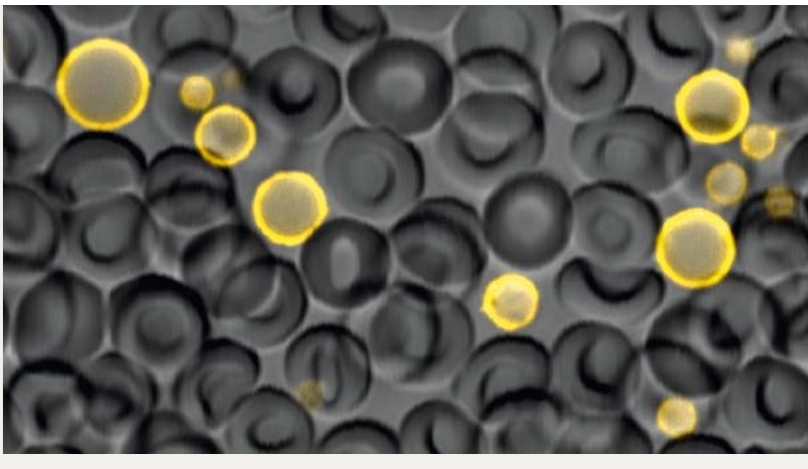
My topic of interest	How does the development of organisms change to make new body parts or to improve the existing ones during evolution?
My motivation	Nature is beautiful, and it only gets better once you start understanding how living organisms work and how they change over time.
My next professional station	I moved to New York University to study the development and evolution of insect brains.

Biology
& Medicine
Section

Dr. rer. nat. Oskar Staufer

for work on the development of synthetic exosomes and the investigation of their fundamental molecular signalling mechanism in cellular networks and tissue models

Max Planck Institute for Medical Research, Heidelberg
Research field: Synthetic Biology
Current activity: Postdoctoral Researcher at the Max Planck Institute for Medical Research



My topic of interest	Cells use diverse strategies to coordinate their collective behaviour, among them, so called extracellular vesicles. These vesicles are particularly important for the coordinated closure of skin wounds. My research is directed towards creating synthetic mimics of extracellular vesicles, in order to understand their function and open new routes for therapy of wound-healing disorders.
My motivation	Biology is all about complex interactions, which are often non-intuitive. I want to develop new experimental approaches to study molecular interactions in biological process in a systemic way. I´m fascinated how life-like materials can be applied to study molecular processes in cells under fully-synthetic conditions.
My next professional station	For my Postdoc, I will transfer to the University of Oxford, where I want to apply my know-how in synthetic biology towards questions in tumor immunology.

Biology
& Medicine
Section

Dr. phil. Yunmin Wu

for the study of an optical illusion, which led to the discovery of a motion-processing neural circuit in the zebrafish brain

Max Planck Institute of Neurobiology, Martinsried
Research field: Neurobiology
Current activity: Consultant in Life Sciences at Charles River Associates, Munich

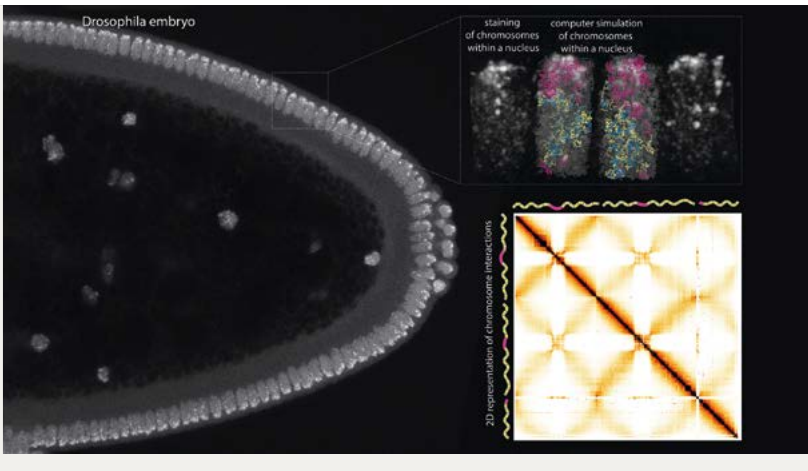
My topic of interest	Inside the brain, there are myriads of neurons that process motion and its direction. Given the abundance of these neurons, I am interested to find out if all of them are required to recognize motion.
My motivation	My research was inspired by illusions. Instead of being merely mistakes of the sensory systems, illusions can serve as a window into how the brain operates. Leveraging an optical illusion named motion aftereffect, we narrowed down from a large number of neurons in larval zebrafish and homed in on just a handful of them that are not only required, but also sufficient to drive motion perception.
My next professional station	Since 2021, I am a strategy consultant specialized in life sciences at Charles River Associates in Munich.

Biology
& Medicine
Section

Dr. rer. nat. Fides Zenk

for work on the epigenetic regulation of *Drosophila* early embryonic development

Max Planck Institute of Immunobiology and Epigenetics, Freiburg im Breisgau
Research field: Chromatin Regulation
Current activity: Postdoctoral Researcher at the Department of Biosystems Science and Engineering Basel, ETH Zurich, Switzerland



My topic of interest

How can the 30 trillion cells in our body arise from only one fertilized egg? I am trying to understand how cell types acquire their identity during development, how they keep it and how they inherit it after cell division.

My motivation

I am fascinated by the pace and coordination of molecular processes that govern early embryonic development. Molecularly dissecting the role of chromatin in these processes will give us the unique opportunity to better understand the formation of a multicellular organism.

My next professional station

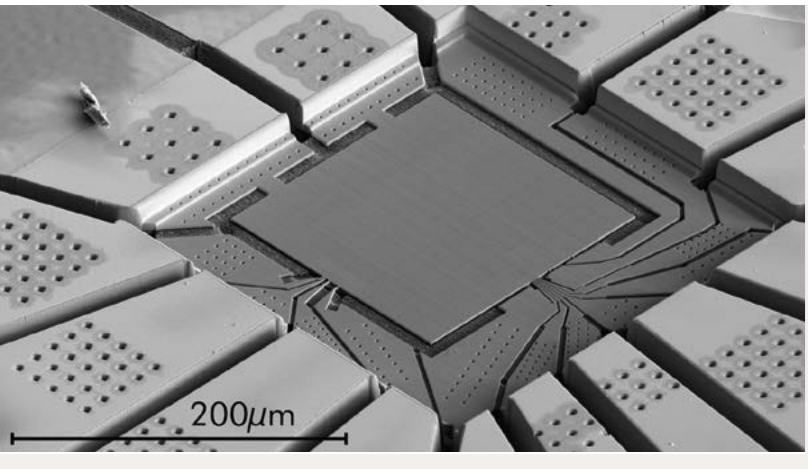
For the future, I would like to understand developmental processes at single cell resolution. For that reason, I am currently a Postdoc in the lab of Barbara Treutlein at the ETH Zurich.

Chemistry, Physics & Technology Section

Dr. Maja Deborah Bachmann

for electrical transport studies of microstructures of oxide and correlated electron metals and superconductors

Max Planck Institute for Chemical Physics of Solids, Dresden
Research field: Physics of Quantum Materials
Current activity: Postdoctoral Researcher at the Stanford University in California, USA



My topic of interest

My main research interest lies in understanding quantum materials, where quantum effects give rise to unusual electronic properties such as superconductivity, exotic forms of magnetism or topological states. In particular, I am curious about how purposefully tailoring the shape and size of such materials can influence their electronic behaviour and help us address specific questions about the underlying physics.

My motivation

Discovering and investigating novel quantum phenomena realized in materials is incredibly exciting! Typically, when experiments push the boundaries of our current understanding, there are various conceptual and engineering challenges, which I find stimulating and gratifying. Moreover, I am also motivated by the prospect of uncovering a new material or effect that may become technologically relevant in the future.

My next professional station

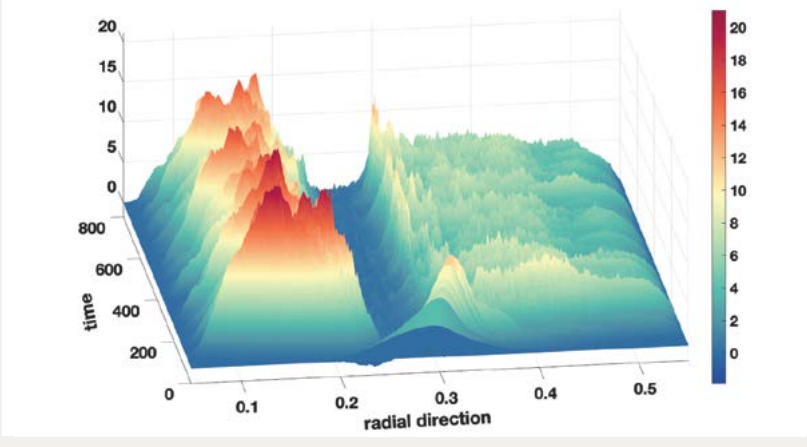
Currently, I am working as a Postdoctoral Researcher at Stanford University in the group of Prof. Ian Fisher. Here, I am combining my microstructuring expertise with novel strain tuning techniques to further investigate quantum materials.

Chemistry, Physics & Technology Section

Dr. rer. nat. Alessandro Di Siena

for pioneering work on the interaction between suprathermal particles and turbulence in fusion plasmas

Max Planck Institute for Plasma Physics, Garching
Research field: Plasma Physics
Current activity: Postdoctoral Fellow at the University of Texas, Austin, USA



My topic of interest

The goal of fusion research is to recreate the physical conditions of the center of a Star in a reactor as an alternative energy source. During my doctoral thesis, I have worked towards identifying ways of suppressing turbulent transport – one of the main obstacles to overcome – in future fusion devices, thus possibly improving their energy production output. In particular, I focused on understanding the role that highly energetic ions, generated by external heating systems, have in reducing particle and energy losses, thus improving reactor performances.

My motivation

Understanding the physics behind the interaction between energetic ions and turbulence, and how it can bring fusion forward, is like solving a puzzle. Which I love. I get to piece together years of experimental and numerical research and shine light on mechanisms that may be key to the achievement of fusion power. I enjoy developing models and computational tools to predict experimental results and possibly optimise new scenarios.

My next professional station

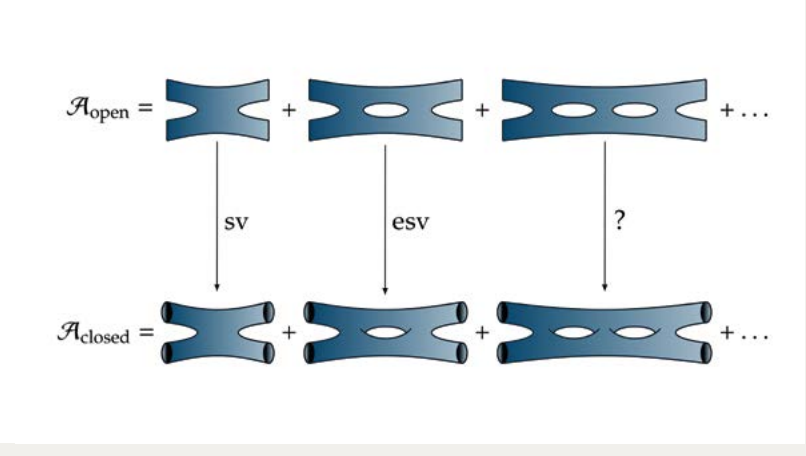
I have started a Postdoctoral position at the University of Texas at Austin where I joined the Exascale Computing Project WDMApp, aiming to develop a fully comprehensive numerical tool to model the entire fusion reactor. At the same time, I am further extending the studies on energetic particles and turbulence, with the ultimate goal of designing new and improved scenarios to be exploited in the first prototype fusion reactor ITER, currently under construction in France.

Chemistry, Physics & Technology Section

Dr. rer. nat. Jan Erik Gerken

for outstanding results in the study of the mathematical structure of string theory scattering amplitudes, in particular in connection with modular graph forms

Max Planck Institute for Gravitational Physics, Potsdam
Research field: Scattering Amplitudes in String Theory
Current activity: Postdoctoral Fellow at the Chalmers University of Technology, Gothenburg, Sweden



My topic of interest

During my PhD, I was interested in the mathematical structures that appear in the calculation of scattering amplitudes in string theory. In particular, I studied the fascinating interplay of number theory and physics that emerges in this field.

My motivation

I am motivated by a desire to understand the world at it's most fundamental level. An example of what our universe might look like at currently inaccessible energy scales is provided by string theory. At the same time, I am fascinated by the mathematical structures which we find in string theory and which lead to fruitful interdisciplinary research.

My next professional station

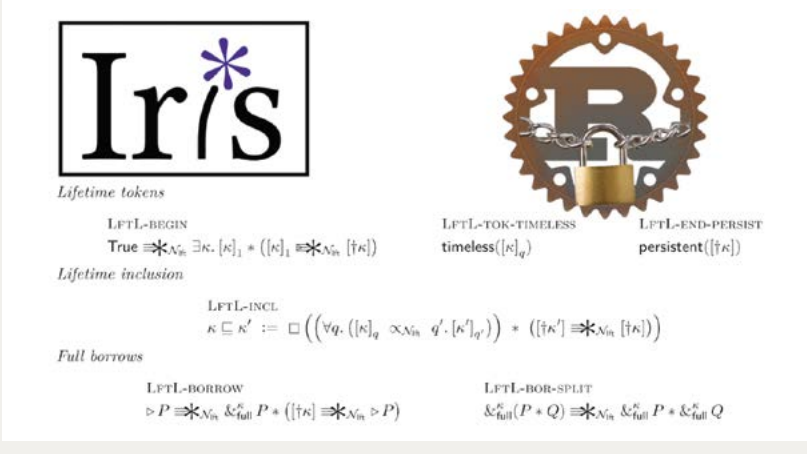
I am currently doing a Postdoc in Sweden in the field of deep learning. We apply techniques used in string theory to construct more efficient neural networks.

Chemistry, Physics & Technology Section

Dr.-Ing. Ralf Jung

for work on the first formal foundations for the cutting-edge 'systems programming' language Rust

Max Planck Institute for Software Systems, Saarbrücken
Research field: Programming Languages
Current activity: Postdoctoral Fellow at the Max Planck Institute for Software Systems



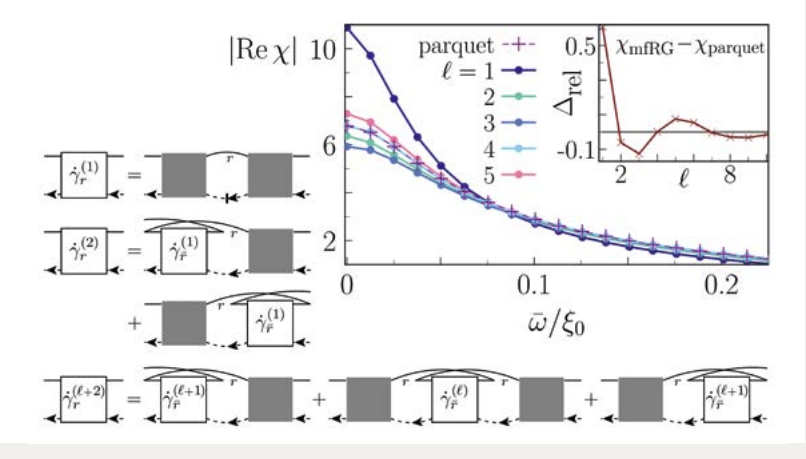
My topic of interest	How can we show that software does what it is supposed to do? How can we avoid drowning in a sea of bugs?
My motivation	Computer programs enjoy the fascinating property that in principle, it is possible to describe precisely what they do – and to prove mathematically that they indeed do what they are supposed to do. In practice, however, we are often far from being able to deliver on this promise. I enjoy bringing together deep mathematical theory and practical software engineering to close this gap and improve the reliability and security of real-world software systems.
My next professional station	I will do a Postdoc at the Massachusetts Institute of Technology.

Chemistry, Physics & Technology Section

Dr. rer. nat. Fabian Kugler

for work on the extension and application of renormalization group methods for the description of strongly correlated electron systems

Max Planck Institute of Quantum Optics, Garching
Research field: Theoretical Condensed Matter Physics
Current activity: Postdoctoral Fellow at Rutgers University, New Jersey, USA



My topic of interest

Strongly correlated electron systems are paradigmatic for emergent behaviour, where simple microscopic mechanisms lead to complex macroscopic phenomena. The renormalization group theory is an important tool to describe this process. During my PhD, I worked on the extension of certain renormalization group methods and applied them to model as well as material systems.

My motivation

From the outside, an area of research like physics sometimes seems concluded and molded by a few geniuses. During a PhD, you notice that it instead consists of countless open ends and that, according to my impression, it is often patience and meticulousness that eventually yield new insight. I find it exciting to narrow down the unknown through systematic investigation and fulfilling to participate in extending humankind's pool of knowledge by a little bit.

My next professional station

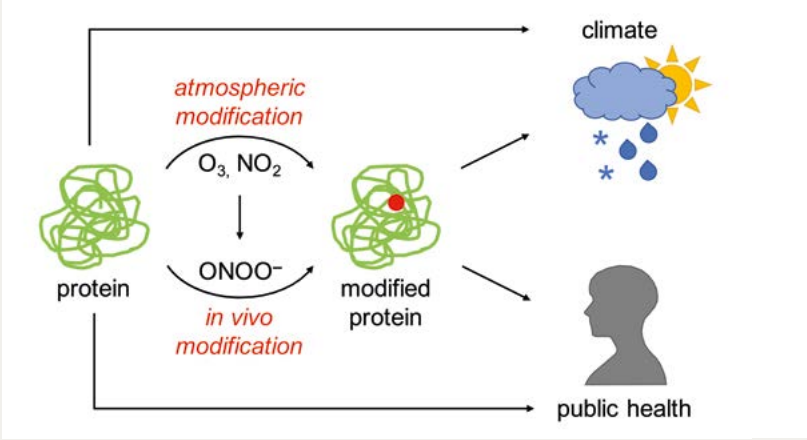
Currently, I am a Postdoc with Prof. Gabriel Kotliar at Rutgers University. Here, I work on the characterization of strongly correlated materials, and I aim to gain deeper insight into correlation physics by using real-frequency methods.

Chemistry, Physics & Technology Section

Dr. rer. nat. Anna Theresa Kunert

for research on protein interactions of particular importance for climate and public health

Max Planck Institute for Chemistry, Mainz
Research field: Atmospheric Science, Protein Chemistry, Biomedicine
Current activity: Postdoctoral Fellow at the Max Planck Institute for Chemistry



My topic of interest

Proteins are involved in many environmental and physiological processes that are relevant for climate and public health. Upon interactions with air pollutants, proteins can undergo chemical modifications influencing their physical, chemical and biological properties. The underlying mechanisms and the effects of modified proteins on climate and public health are not yet fully understood. My work aims to enhance our understanding of protein interactions and their effects to assess the consequences of the steeply increasing human influence on air quality, climate and public health.

My motivation

Man-made environmental changes, in particular a reduction in air quality, are becoming more and more threatening and already have substantial consequences for climate and public health. Thus, basic research is essential to elucidate the underlying mechanisms and effects to contain this process and to preserve a healthier environment for future generations.

My next professional station

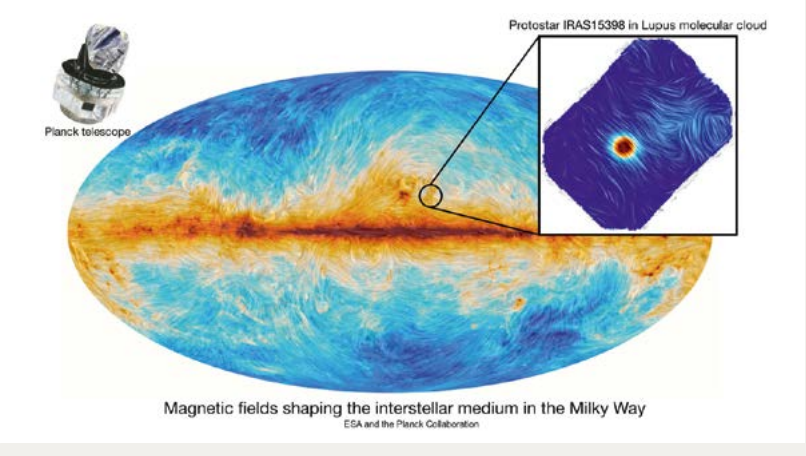
Currently, I continue my research as a Postdoctoral Fellow at the Max Planck Institute for Chemistry in Mainz.

Chemistry, Physics & Technology Section

Dr. rer. nat. Elena Redaelli

for work on regions of our Galaxy where stars like our Sun are currently formed, being able to unveil the physical and chemical structure of interstellar molecular clouds

Max Planck Institute for Extraterrestrial Physics, Garching
Research field: Astrochemistry
Current activity: Minerva Fast Track Group Leader at the Max Planck Institute for Extraterrestrial Physik



My topic of interest

My research focuses on studying how Sun-like stars form. I investigate the chemistry and the role of magnetic fields in star forming regions within the Milky Way. In particular, I want to understand when and how planetary systems like ours developed or inherited their chemical complexity.

My motivation

I have two main sources of motivation. One is my profound passion for the beauty and immensity of the night sky, which led me in the first place to study astrophysics. Secondly, I am driven by my innate curiosity, which motivates me always to expand my research topics and to examine them in depth.

My next professional station

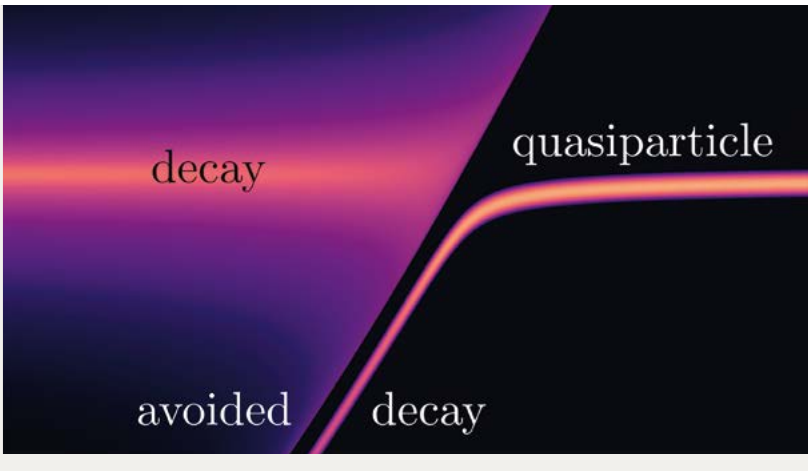
Right after my PhD, I started my new position as Minerva Fast Track Group Leader. This gives me the chance to continue my research at Max Planck for Extraterrestrial Physics while supervising two PhD students.

Chemistry,
Physics &
Technology
Section

Dr. rer. nat. Ruben Verresen

for fundamental advances of our understanding of topological quantum phases of matter and the discovery of a general physical mechanism that prevents quasiparticle decay

Max Planck Institute for the Physics
of Complex Systems, Dresden
Research field: Theoretical Condensed Matter Physics
Current activity: Postdoctoral Fellow at the
Harvard University, Cambridge, Massachusetts, USA



My topic of interest

Quantum entanglement – the instantaneous connection between particles – is one of the strangest non-classical phenomena in our universe. I would like to better understand its consequences for emergent phenomena on the macroscopic scale, in objects visible to the naked eye.

My motivation

I am driven by a childlike curiosity to try and understand the universe we find ourselves in. It is a great surprise that simplistic models of elementary particles with idealized physical laws can explain and predict reality. It is an even greater surprise that new and richer laws spontaneously emerge from the collective behaviour of such elementary constituents. It is these mysteries that motivate me.

My next professional station

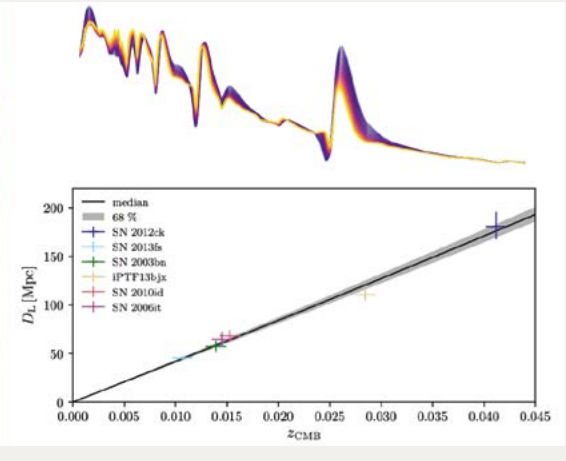
I am currently a Postdoctoral Researcher at Harvard University in the group of Ashvin Vishwanath.

Chemistry,
Physics &
Technology
Section

Dr. rer. nat. Christian Vogl

for investigations of measuring
today's expansion rate of the Universe
with supernovae

Max Planck Institute for Astrophysics, Garching
Research field: Astrophysik
Current activity: Postdoctoral Fellow at the
Max Planck Institute for Astrophysics



My topic of interest

How fast is our universe expanding? This is one of the most important questions since the beginning of modern cosmology. Today, we need a precise answer more than ever to unravel the mysteries of the cosmos such as the nature of the elusive dark energy. In my research, I address this question through observations and simulations of the light emitted by exploding stars.

My motivation

The wonders of the night sky inspire me since my youth. Exploring the dynamics of the cosmos with the brightest explosions allows me to experience this fascination every day anew. I particularly enjoy the diversity of this research. My work combines observations at the world's largest telescopes, complex computer simulations and statistical analyses.

My next professional station

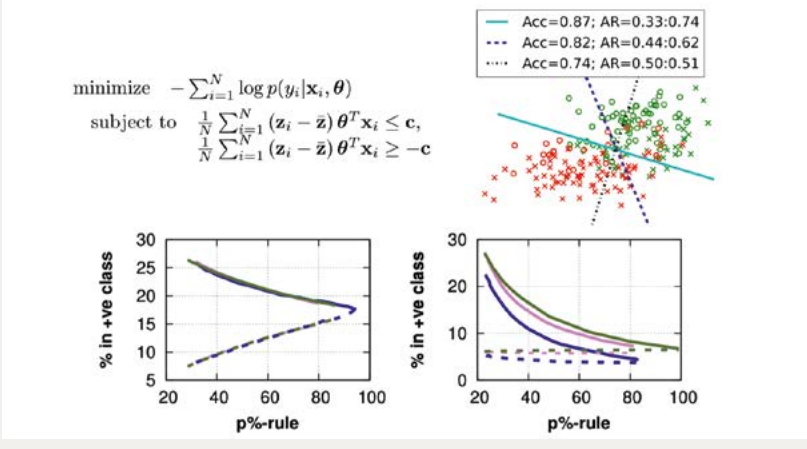
As a Postdoctoral Researcher at the Max Planck Institute for Astrophysics, I am working on an ambitious observational program at the Very Large Telescope that will enable an even more precise measurement of the cosmic expansion. Also, I am investigating current questions in supernova physics using a combination of simulations and machine learning.

Chemistry, Physics & Technology Section

Dr.-Ing. Muhammad Bilal Zafar

for investigations into developing responsible and trustworthy artificial intelligence systems that can help reduce discrimination and polarization in society

Max Planck Institute for Software Systems, Saarbrücken
Research field: Computer Science
Current activity: Applied Scientist at Amazon Web Services, Berlin



My topic of interest	How can we design Artificial Intelligence algorithms to encode our moral and ethical values? How can we make sure that these algorithms do not lead to unintended harms?
My motivation	I am interested in algorithmic decision making as it promises to significantly improve our lives. While algorithms can help increase the efficiency and accuracy of decision making, they may also result in unintended biases, unfairness and inequality. Through my research, I strive to understand, measure and mitigate such risks.
My next professional station	I am currently working as an Applied Scientist at Amazon Web Services, with a focus on helping create AI systems that are fair, transparent and robust.

Human Sciences Section

Dr. iur. Daniel Burke

for the analysis of coherence deficits regarding the protection of antitrust leniency applicants from criminal prosecution and the development of a corresponding reform proposal

Max Planck Institute for the Study of Crime, Security and Law, Freiburg im Breisgau
Research field: Criminal Law, Antitrust Law
Current activity: Public Prosecutor in Offenburg

My topic of interest

To uncover secret cartels, antitrust authorities use an ingenious and indispensible investigative tool: leniency programs. However, in Germany, the antitrust authorities' leniency programs apply only to administrative offences. There exists no leniency provision granting automatic immunity to cooperating individuals facing criminal prosecution for bid rigging. In my dissertation, I examine how fear of criminal sanctions deters potential leniency applicants from coming forward and develop a constitutional legislative reform proposal to remedy the existing incoherence.

My motivation

I am fascinated by the use of law as a tool for directing human behaviour in society. In my work, I sought to use behavioural science findings as a basis for eliminating the inefficiencies that resulted from an approach that failed to look at the legal system as a whole.

My next professional station

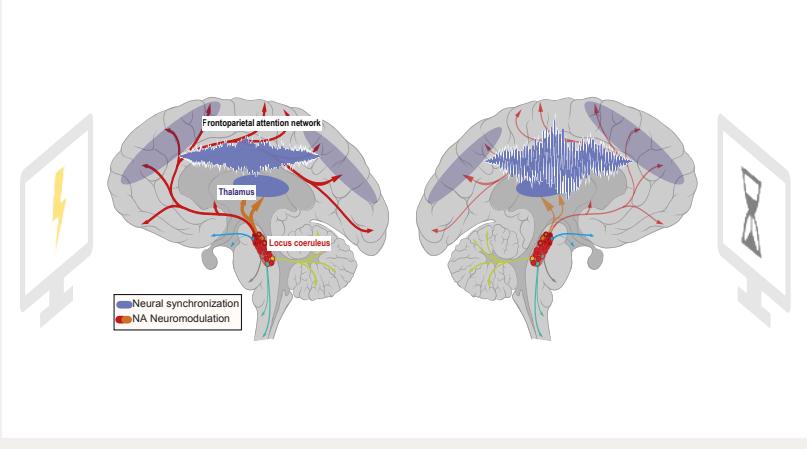
I recently began working as a public prosecutor in the justice system of Baden-Württemberg.

Human Sciences Section

Dr. rer. nat. Martin J. Dahl

for fundamental breakthroughs in identifying neurophysiological correlates of human cognitive ageing

Max Planck Institute for Human Development, Berlin
Research field: Developmental Cognitive Neuroscience
Current activity: Postdoctoral Fellow at the Max Planck Institute for Human Development and at the University of Southern California, Los Angeles, USA



My topic of interest

I seek to understand the neural underpinning of attention and memory as well as their age-related decline.

My motivation

I am fascinated by the complexity of the brain and how it gives rise to cognition. A better knowledge of how neurodegeneration in ageing and disease leads to cognitive decline can pave the way for interventions.

My next professional station

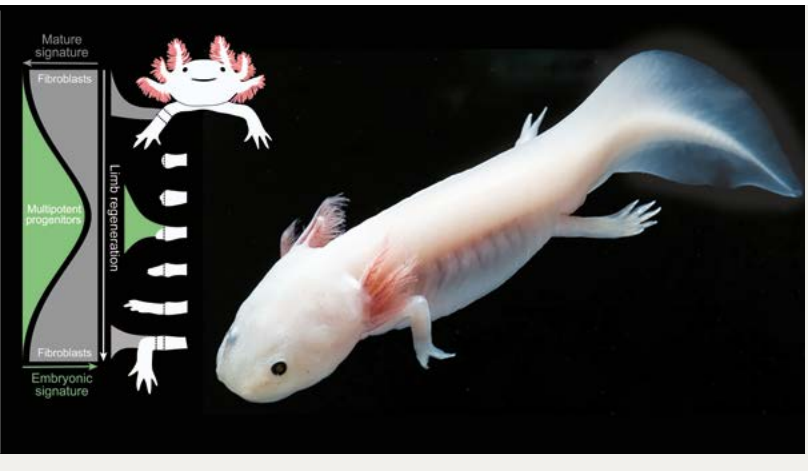
I complete a shared Postdoc between the Max Planck Institute for Human Development and the University of Southern California in which I continue my work on age-related memory decline.

Human Sciences Section

Dr. rer. nat. Tobias Gerber

for the study of the molecular processes underlying the regeneration of limbs in the axolotl, which has implications for human regenerative medicine

Max Planck Institute for Evolutionary Anthropology, Leipzig
Research field: Developmental and Regenerative Biology, Molecular Biology
Current activity: Postoctoral Researcher at the European Molecular Biology Laboratory EMBL, Heidelberg



My topic of interest

Mammalian fibroblasts respond to injury by differentiating into myofibroblasts, eventually leading to the formation of scars. In contrast, salamanders like axolotls can even grow back whole limbs after loss. I investigate which cells allow this enormous regeneration potential and search for possible key regulators that turn mature fibroblasts not into myofibroblasts, but instead into progenitor cells capable of regrowing a limb.

My motivation

Since childhood I have been fascinated by the diversity of life and the outstanding abilities of some living beings. With my research, I would like to help understanding the molecular biological processes underlying these phenomena in order to derive improvements for us humans and our everyday life. The example of the axolotl shows how much we can still learn from nature and I hope that my research will one day help to improve wound healing in humans.

My next professional station

I am currently a Postdoc in the Developmental Biology Unit at EMBL Heidelberg where I use sophisticated molecular biological tools to investigate cell type adaptations to different environmental factors.

Human Sciences Section

Docteur en Droit Ana Harvey

for her PhD thesis on ‘Public Hearings in Investor-State Arbitration: Revisiting the Principle’

Max Planck Institute Luxembourg for International, European and Regulatory Procedural Law, Luxembourg
Research field: Comparative Procedural Law, Arbitration, International Dispute Resolution
Current activity: Lecturer in Law at the University of Bedfordshire, United Kingdom

My topic of interest

From open air trials in ancient Athens to secrecy during the Inquisition, from cabinet justice to cameras and Twitter in courtrooms, public hearings have travelled a long road over the centuries. Their journey does not end there: public hearings have recently also entered the traditionally confidential world of investment arbitration. What do we understand by a ‘public’ hearing today? How has the traditional idea that ‘justice must be seen to be done’ been transformed by modern technologies and the media? In light of recent developments, the system of international dispute resolution between investors and States provides a test case for examining these issues in my research.

My motivation

I have always been fascinated by the ways in which societal, political, and technological changes have had an impact upon our understanding and application of traditional legal principles across different areas of law. The transformation of the principle of public hearings has been a particular source of inspiration in this context.

My next professional station

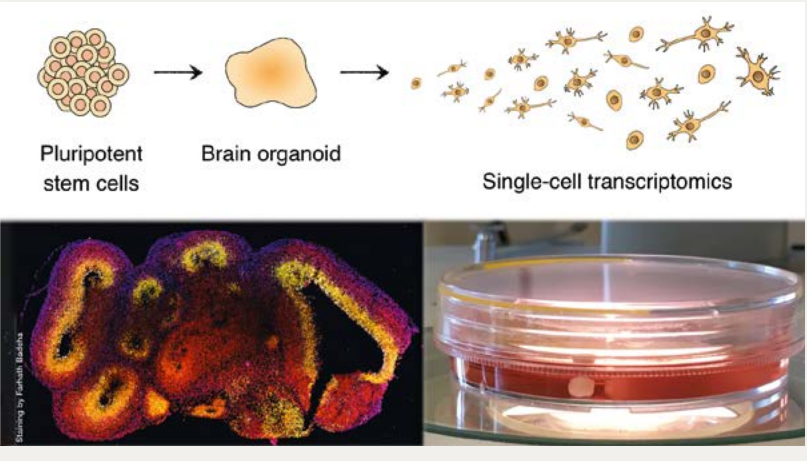
As of recently, I have been appointed a lecturer in law in the United Kingdom, where I am planning to further pursue my academic career.

Human Sciences Section

Dr. rer. nat. Sabina Kanton

for the investigation of cortical development in evolution and disease using organoids, which opens the door to understand human- specific features of brain development

Max Planck Institute for Evolutionary Anthropology, Leipzig
Research field: Comparative Brain Development
Current activity: Postdoctoral Scholar at the Stanford University, California, USA



My topic of interest

I would like to understand what distinguishes the human brain at the cellular and molecular level compared to its closest evolutionary relatives, the great apes. In addition, I am interested in investigating how deviations in brain development could lead to malformations of the brain and ultimately to neurological diseases.

My motivation

I have long been fascinated by the capabilities of the brain and want to better understand its functioning, especially with regard to brain evolution and potentially related neurological diseases. Brain organoids combined with high-resolution single-cell transcriptomics represent promising methods to explore previously inaccessible questions in this field. Moreover, working scientifically allows me to constantly learn, explore new complexities and satisfy my curiosity.

My next professional station

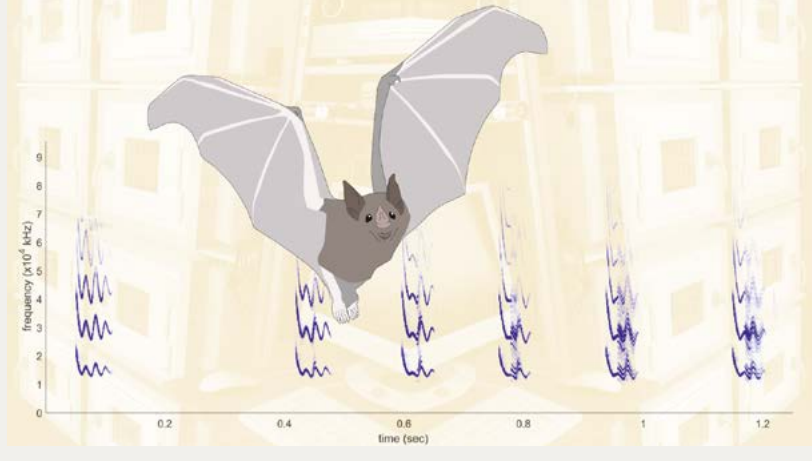
I recently started as a Postdoc in the group of Sergiu Pasca at Stanford University. There, I would also like to further develop brain organoids as a model system myself and study neurological diseases related to early brain development.

Human Sciences Section

Ella Zoe Lattenkamp, PhD

for work that has established a novel mammalian model for the study of vocal learning and contributed to the investigation of the evolutionary origins of speech

Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands
Research field: Behavioural Biology and Bioacoustics
Current activity: Managing Director of the Moving Child Foundation, Munich



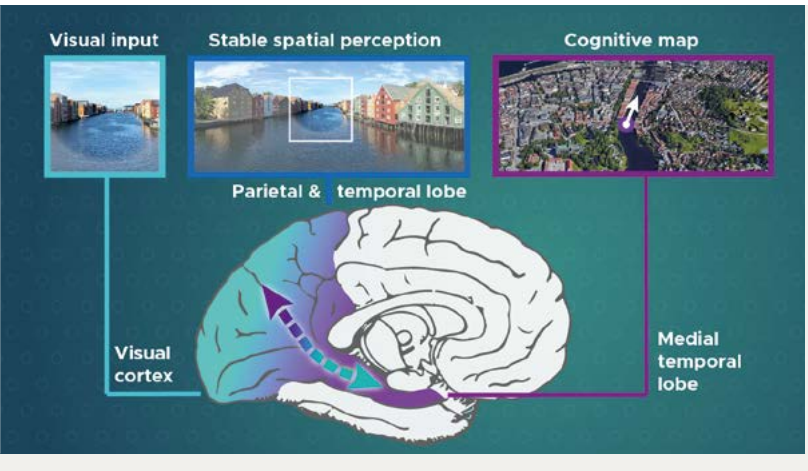
My topic of interest	How do animals, especially bats, learn their calls? Which evolutionary pre-requisites were required for humans to develop speech?
My motivation	I am fascinated by the evolutionary and social drivers of animal behaviours. Specifically, I am interested in the differentiation and interactions between innate and learned behaviours.
My next professional station	In my free time, I am finishing up several projects from my PhD, but my current professional position is Managing Director for a non-profit organization in Munich.

Human Sciences Section

Matthias Nau, PhD

for experimental investigations on the neural mechanisms of spatial perception and cognitive mapping in humans

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig
Research field: Cognitive Neuroscience
Current activity: Postdoctoral Researcher at the National Institutes of Health (NIH), Bethesda, Maryland, USA



My topic of interest

Our memories are the building blocks of our imagination. Each time we recall our past, plan our future or imagine fictitious events, our brain recombines existing memories anew. But how are memories formed in the first place, and how are they retrieved when needed? How does the brain even link the many sensory inputs that together define our visual experience? What role does our behaviour play in these processes? These are the questions I address with a focus on spatial perception and eye movements using state-of-the-art functional neuroimaging of the human brain.

My motivation

As a cognitive neuroscientist, I work at the fascinating intersection between biology, psychology, computer science, medicine, physics and philosophy. I have the huge privilege of learning something new about all these fields on a daily basis and to gain in-depth insights into human brain function. Not only does this type of research generate new knowledge and the basis for medical applications, but it actively shapes the very understanding of ourselves as humans in this world. Motivation comes naturally.

My next professional station

I am continuing my research as a Postdoc at the National Institutes of Health (NIH) in Bethesda with the support of a fellowship from the Alexander von Humboldt foundation.

Human Sciences Section

Limor Raviv, PhD

for an experimental study of social pressures on the evolution of grammatical structure

Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands
Research field: Language Evolution
Current activity: Postdoctoral Researcher at the Vrije Universiteit Brussel, Belgium

My topic of interest

I investigate whether the structure of languages is shaped by the environment in which they evolved. I ask questions like: What are the social, ecological, and cognitive pressures that shape the evolution of language in our species? Why are there so many different languages in the world? And how did this astonishing diversity evolve?

My motivation

Language is at the heart of human culture and cognition. We use it every day for a variety of tasks, from expressing our feelings to doing science. But the origins of language are poorly understood, and we know very little about how and why are languages so different. I think these are fascinating questions, and that studying the origin of language diversity is important for understanding our societies and human's uniqueness.

My next professional station

In the fall I will start my own Minerva Fast Track Research Group at the MPI in Nijmegen, called 'Language Evolution and Adaptation in Diverse Situations' (LEADS). My group will use novel behavioural paradigms and computational models to uncover the communicative pressures, cognitive constraints, and cross-cultural demographic features that shape social interaction and language use in our species and lead to linguistic variation.

Human Sciences Section

Dr. iur. Alexander Ruckteschler

for his study on 'The Transfer of Objects subject to Litigation: A re-evaluation on the basis of a historical and comparative analysis'

Max Planck Institute for Comparative and International Private Law, Hamburg
Research field: Comparative Law, Civil Procedure Law, Legal History
Current activity: Attorney in Frankfurt am Main

My topic of interest

By analyzing historical backgrounds and comparing the approaches in different jurisdictions, I would like to find solutions for the complex issues that seemingly minor transactions oftentimes create for procedural law. Assigning a claim that is subject to litigation, for example, leads to complicated questions on who is the correct party to the proceedings and who is bound how far by a judgment.

My motivation

Procedural Law has an immense impact on the possibilities to actually enforce existing legal rights. Nevertheless, different procedural laws oftentimes follow path-dependencies that are based on historical coincidences. I am fascinated by uncovering and analyzing them and to develop both fair and efficient solutions on this basis.

My next professional station

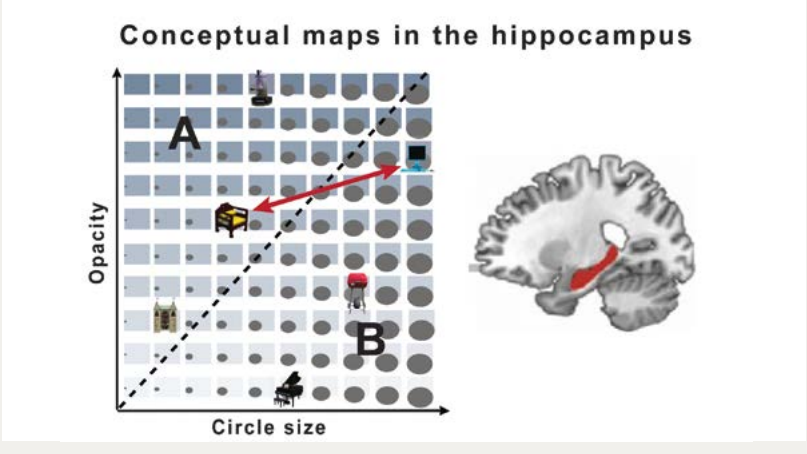
Currently, I am using my knowledge in practice and am helping to solve cross-border disputes as an attorney.

Human Sciences Section

Stephanie Theves, PhD

for experimental investigations on the neural mechanisms of knowledge acquisition and cognitive mapping in humans

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig
Research field: Cognitive Neuroscience
Current activity: Postdoctoral Fellow at the Max Planck Institute for Human Cognitive and Brain Sciences



My topic of interest

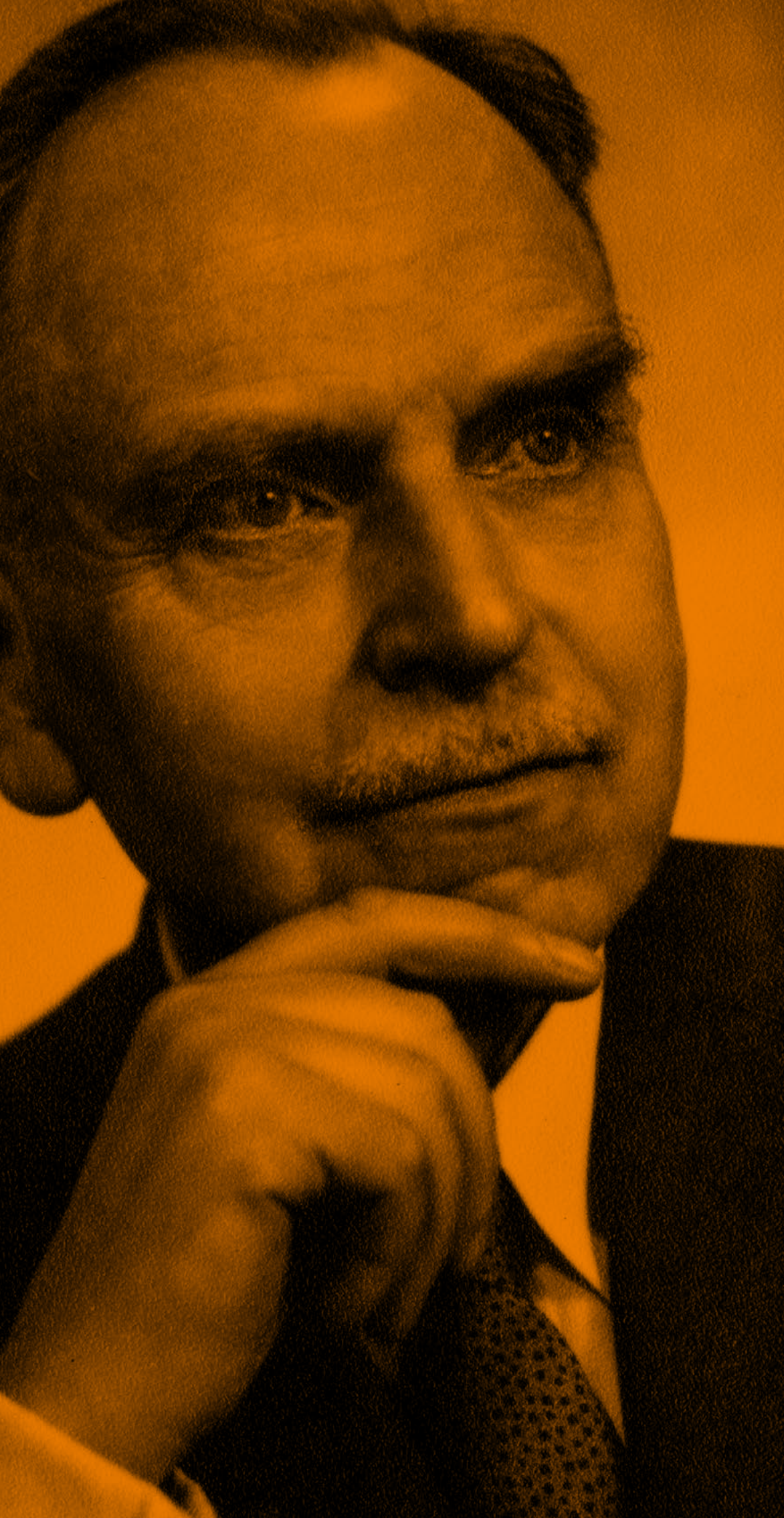
My doctoral work was motivated by the question of how conceptual knowledge is acquired and represented in the brain to allow for its flexible use. I discovered that hippocampal coding principles, originally considered to underlie the brain's navigational system, support the formation of conceptual knowledge by organizing relevant information into map-like representations, suited to allow inference and generalization. I now aim to investigate how these spatial coding principles, and the geometry of neural representations more broadly, relate to interindividual differences in intelligence.

My motivation

I have always been intrigued to understand key principles governing human thinking and interindividual differences therein. Moreover, I am fascinated by the dynamic with which research areas develop and the challenge to creatively contribute to this progress.

My next professional station

Currently I'm continuing my research as a Postdoc at the MPI for Human Cognitive and Brain Sciences in Leipzig.

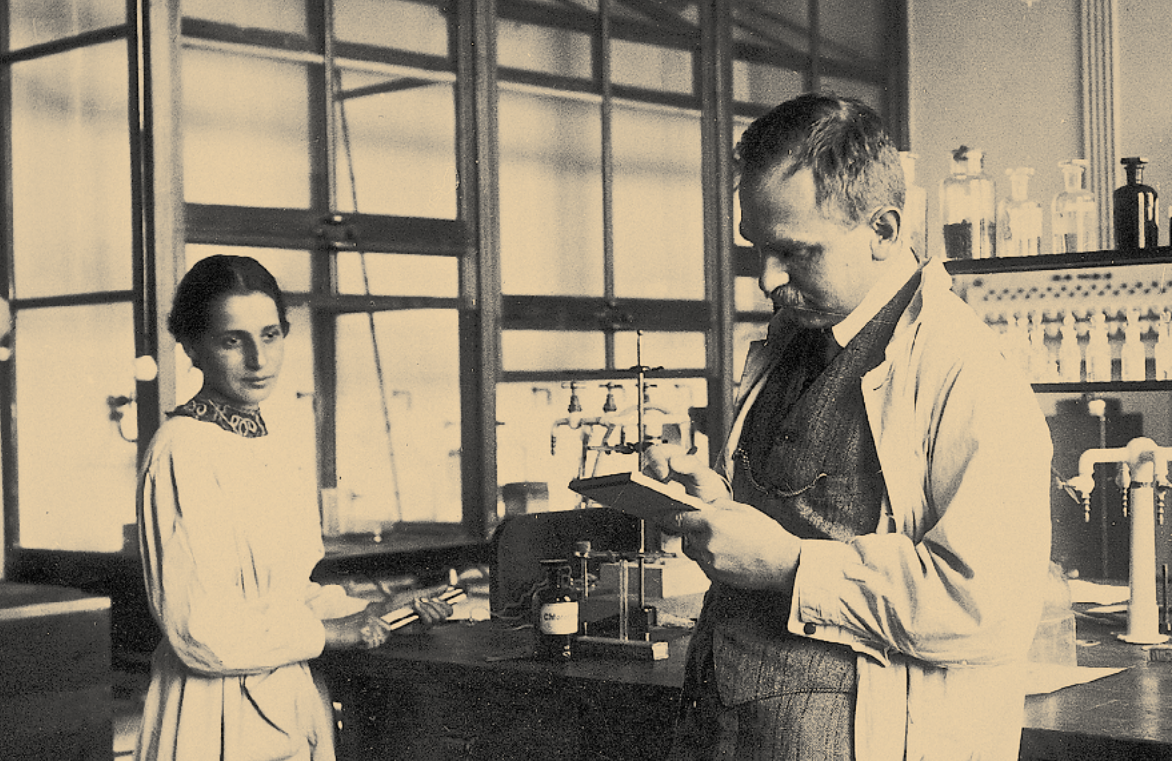


The Otto Hahn Award

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 two scientists will be honoured with the Otto Hahn Award of the Max Planck Society.

Dr. rer. nat. Maria Samata

Biology & Medicine Section

see page 12

Dr. rer. nat. Sabina Kanton

Human Sciences Section

see page 33

Hermann Neuhaus Prize

Hermann Neuhaus (1931– 2007) was a successful entrepreneur. Like many excellent scientists, he used his untiring creativity and critical mind to strive constantly for the best. His aim was to sustainably shape the future for generations to come. He is the most generous benefactor of the Max Planck Society and posthumously received the Harnack Medal, its highest accolade.

Since 2018, the Max Planck Foundation and the Hermann Neuhaus Foundation have awarded the Hermann Neuhaus Prize in his memory.
The prize recognizes outstanding postdoctoral achievements with reference to applied research, particularly in the Biology & Medicine Section and the Chemistry, Physics & Technology Section.

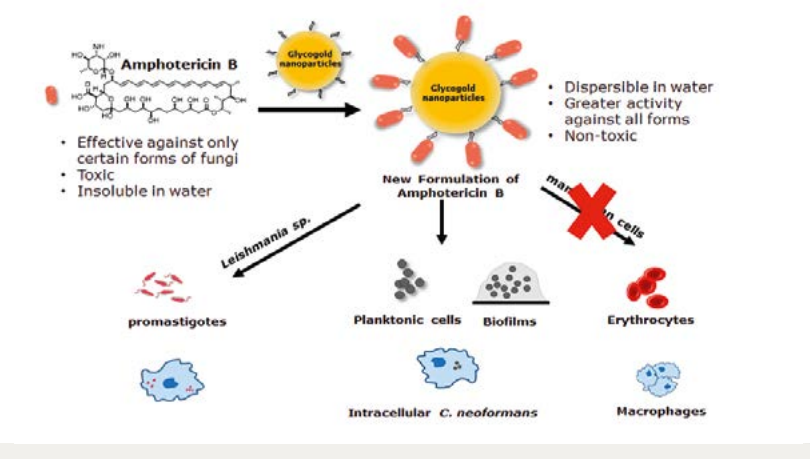
In accordance with the benefactor's last will, the prize money enables the winners to further advance their research's potential for application.

Chemistry, Physics & Technology Section

Dr. Chandradhish Ghosh

for the development of water-dispersible, non-toxic amphotericin B-glyconanoparticles that ameliorate the properties of the parent drug

Max-Planck-Institute of Colloids and Interfaces, Potsdam
Research field: Glyconanomaterials
Current activity: Researcher at IMIB – Institute for Molecular Infection Biology, Julius-Maximilians-Universität Würzburg



My topic of interest

Infectious diseases claim many lives across the globe. My research strives to develop interventions that might help in humanity's fight against infectious diseases. The questions that I seek to answer involve how to design completely new drugs against infections and how to alter properties of existing drugs to make them more effective and less toxic.

My motivation

The threat of antimicrobial resistance requires urgent and innovative strategies both in terms of therapy and vaccines. My research efforts in this direction might have a direct impact on human health. This feeling of being able to contribute to society and make a real impact through my research motivates me to go to the lab every day.

My next professional station

My goal is to see the drug formulations that I have designed in the market. While I am trying to start a company that can take them close to the market, presently I am engaged in developing antisense oligonucleotides as alternatives to conventional antibiotics at the Institute of Molecular and Infection Biology in Würzburg.

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.

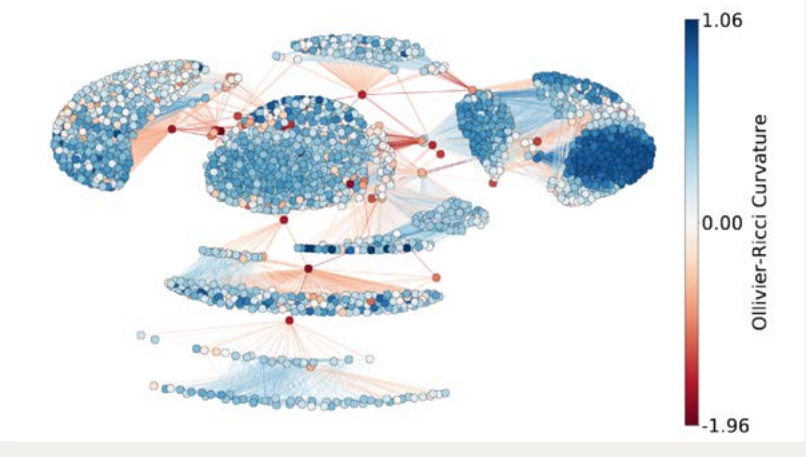
Herrmann Rampacher talking with Chaitanya Giri, winner of the Dieter Rampacher Prize 2015

Chemistry, Physics & Technology Section

Gary Becigneul, PhD

for his dissertation ›On the Geometry of Data Representations‹

Max Planck Institute for Intelligent Systems, Tübingen
Research field: Machine Learning, Computer Science
Current activity: Gematria Technologies CEO, London, United Kingdom



My topic of interest	To what extent can non-Euclidean geometries be leveraged to build better data representations?
My motivation	The competitive aspect of getting scientific papers published at the most prestigious venues.
My next professional station	I co-founded Gematria Technologies which uses Natural Language Processing (NLP) to help hedge funds make safer and more responsible investments. We allow users to build customized indices aggregating various types of information from news and forums, such as controversy indices quantifying disagreement about chosen subjects.

Peter Hans Hofschneider Prize

The Peter Hans Hofschneider Prize has been awarded by the Max Planck Society every two years since 2005. The award honours ground-breaking research in the area of molecular medicine.

Peter Hans Hofschneider, for whom the award is named, is regarded as a pioneer in the field of molecular biology and one of the key figures in interferon research. From 1966 onwards, he was director at the Max Planck Institute of Biochemistry in Martinsried.

Dr. rer. nat. Mohamed Ahmed El-Brolosy

Biology & Medicine Section

see page 12

The Nobel Laureate Fellowship

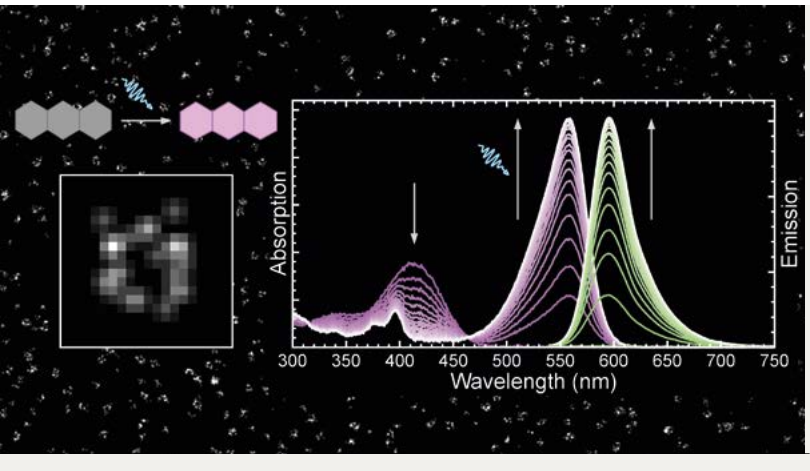
The Nobel Laureates of the Max Planck Society can each nominate an outstanding postdoc for a Nobel Laureate Fellowship in recognition of their achievements. The fellows receive an employment contract at a Max Planck Institute as well as resources for research. This instrument for promoting junior scientists 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.

Biology
& Medicine
Section

Richard Lincoln, PhD

Nobel Laureate:
Prof. Stefan W. Hell

Max Planck Institute for Medical Research, Heidelberg
Research field: Physical Chemistry, Organic Chemistry
Current activity: Postdoctoral Fellow at the Max Planck Institute for Medical Research



My topic of interest	I seek to push the limits of what we can image inside living systems with fluorescence nanoscopy, through the design of new photoactivatable fluorophores with improved properties and labelling strategies with greater molecular specificity. By combining state of the art microscopy techniques, with the rational design of new dye molecules, I am confident to visualize the chemistry of the cell in yet unexplored dimensions.
My motivation	I am fascinated by the complex machinery of life that can be seen through the lens of a microscope, and the intricate details that can be visualized with fluorescence nanoscopy. By expanding the molecular toolbox of fluorophores and labels at our disposal, we reveal new secrets, and I am excited to see what is discovered next.
My next professional station	I will continue working in Heidelberg, addressing the challenges of the dyes and labelling strategies needed for the next generation of optical nanoscopy techniques.