Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

List of Available Projects

Faculty of Humanities	

Translations of classical Chinese (Japanese, Korean, etc.) literature into Latin, 1550-1850: agents, functions and aims.
(Supervisor(s): Prof. Dr. Anja Wolkenhauer) *(required degree in Latin Philology)*   **4-5**

Faculty of Economics and Social Sciences	

A Qualitative study of a chosen field using a grounded theory and situational analysis approach
(Supervisor(s): Prof.Dr. Ursula Offenberger)   **6**

Innovative Technologies to Enhance Adaptivity in the classroom.
(Supervisor(s): Prof. Dr. Andreas Lachner)   **7**

Faculty of Science	

The contribution of cytosolic chaperones to the biogenesis of mitochondrial proteins
(Supervisor: Prof. Doron Rapaport) *(required degree in Biochemistry, Molecular Medicine, Biology, Biophysics)*   **8**

High-throughput studies of multi-component thin films
(Supervisor(s): Prof. Dr. Dr. h.c. Frank Schreiber) *(required degree in Physics or Chemistry)*   **9**

Atomic-scale structure and dynamics of lead-halide perovskites
(Supervisor(s): Prof. Dr. Frank Schreiber and Dr. Ivan Zaluzhnyy) *(required degree in Physics or Chemistry)*   **10**

Effect of root residue decomposition of winter cover crops on maize N nutrition
(Supervisor(s): Prof. Dr. Michaela Dippold) *(required degree in Resource and/or Environmental Sciences, Geoecology, Agriculture, Plant Biology, Plant Nutrition, or comparable)*   **11**

Explainable Natural Language Processing
(Supervisor(s): Prof. Dr. Carsten Eickhoff and Dr. Ali Bahreinian) *(required degree in Computer Science, Math, Electrical Engineering, Cognitive Science)*   **12**

Sub-patterned optical nano-antennas with ultra-high precision geometric control
(Supervisor(s): Prof. Dr. rer. nat. Monika Fleischer) *(required degree in Physics, Optics, Nanoscience, or comparable)*   **14**

Interaction of neurotransmitter-producing bacteria with neuronal receptors
(Supervisor(s): Prof. Dr. Friedrich Götz) *(required degree in Biology or Microbiology)*   **15**

Quantum reaction-diffusion systems   16
(Supervisor(s): Prof. Igor Lesanovsky) *(required degree in Physics)*

Production of glycerol from CO_2 using engineered *E. coli*   17
(Supervisor(s): Prof. Dr. Hannes Link) *(required degree in biotechnology, microbiology or a related field)*

Surfaces and interfaces of transition metal dichalcogenides   18
(Supervisor(s): Prof. Dr. Heiko Peisert) *(required degree in Physical Chemistry or Physics)*

Dealing with algorithms and AI in everyday life   19
(Supervisor(s): Prof. Dr. Sonja Utz) *(required degree in Psychology)*

Enhanced optical spectroscopy and microscopy of organic molecules   20
(Supervisor(s): Prof. Dr. Dai Zhang and Prof. Dr. Alfred J. Meixner) *(required degrees in Physical Chemistry, Solid State or Optical Physics)*

Experimental development for CTA and observational analysis of TeV celestial source.   21
(Supervisor(s): Prof. Andrea Santangelo Dr. Gerd Pühlhofer) *(required degrees in astrophysics)*

Understanding human vision by methods from computational vision and experimental   22
psychology
(Supervisor(s): Prof. Zhaoping Li)

Faculty of Medicine

Role of selective free fatty acid transport in insulin resistance and development of type-2   23
diabetes
(Supervisor(s): Prof. Dr. med. Andreas Birkenfeld, Dr Gencer Sancar) *(required degree in Biology or Biochemistry, Molecular Biology, Biomedical Engineering)*

Holographic optogenetic stimulation in the mouse retina   24
(Supervisor(s): Prof. Dr. Thomas Euler) *(required degree in Biomedical Engineering or a related discipline)*

Functional and metabolic signatures of psychedelics' effects in the brain   25
(Supervisor(s): Prof. Kristina Herfert) *(required degree in neuroscience, cognitive science, computer science, physics or a related natural science or engineering field)*

The neurobiology of learning in a virtual world   26
(Supervisor(s): Prof. Dr. Esther Kühn) *(required degree in Biology or (Cognitive) Neuroscience, Psychology, Medicine Technology)*

Actionable heterogeneity of SASP (senescence-associated secretory phenotype) and   27
surfaceome in hepatocellular carcinoma therapy-induced senescence
(Supervisor(s): Prof. Alexander N. R. Weber) *(required degree in biological sciences or*

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Faculty of Humanities
Institute / Section / Subject:	Classics Department
Supervising Professor(s):	Prof. Dr. Anja Wolkenhauer (Chair of Latin Philology with an additional focus on book history)
About the Supervisor(s):	After having worked as an antiquarian bookseller for many years, Anja Wolkenhauer (*1967) studied Latin, Greek, Art History and the History of Sciences and held academic research positions in Hamburg, Florence, Venice, and Bochum. Since 2010, she has been holding a Chair of Latin Philology at Tübingen University. Her research covers the history of Latin culture from antiquity to the modern era. She particularly focuses on the history and representation of knowledge, as well as on the aesthetics and interaction of the arts.
	The core issues of her works are the synergy of printing, the reception of antiquity, and modern Latin text production. She examined the impact history of the Laocoon figure, the early history of book advertisement, and the beginnings of emblematics. Her last book was about Horapollo and the tradition of Renaissance hieroglyphics as a kind of 'different antiquity' (with J. Helmrath et alii, published by the HAB Wolfenbüttel 2022). Current DFG-sponsored projects focus on early modern printed graphics (joint with A. Pawlak / Art History), as well as on translations of early modern vernacular works into Latin (Versio Latina).
	Further information:
	https://uni-tuebingen.de/de/7725
	https://uni-tuebingen.academia.edu/AnjaWolkenhauer
PhD Project Title:	Translations of classical Chinese (Japanese, Korean, etc.) literature into Latin, 1550-1850: agents, functions and aims
Project Description	For many centuries, Latin was the most important language in Early modern Europe. Religious, scientific, but also fictional literature was written in Latin or translated from other languages into Latin. This also applies to works from Asian literatures and travelogues about Asia, which were first received in Europe in Latin translation, e.g. the Confucian writings, which, after Matteo Ricci, were translated into Latin in the 17th century by the Jesuits Pr. Intorcetta and Ig. Acosta (often reprintend). Other translations include the letters of Emperor Kangxi (Nuremberg 1702), the history of Tamerlane (Prag 1711), historical and

medical studies. The proposed work (doctorate or postdoc) would examine the actors, contents, procedures and publications of these translations; it would be carried out in close cooperation with the DFG project Versio latina, which deals with comparable questions within Europe. See in detail https://uni-tuebingen.de/de/231683

Degree to be awarded: Dr. phil.

Required Degrees: Master's degree (or equivalent) in Latin Philology

Language Requirements: Very good knowledge of Latin (ability to read preaviously unknown texts)

Knowledge of English, German or Italian at level C1 (https://www.europaeischer-referenzrahmen.de)

Notes:

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2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Economics and Social Science
Institute / Section / Subject:	Methods Center, Department for Qualitative Methods
Supervising Professor(s):	Prof. Dr. Ursula Offenberger
About the Supervisor(s):	Qualitative Methods, in particular Grounded Theory and Situational Analysis. Research Methodology, in particular US pragmatism. Topics: Science and Technology Studies, Gender Studies. More info: https://uni-tuebingen.de/en/faculties/faculty-of-economics-and-social-sciences/subjects/department-of-social-sciences/methods-center/institute/departments/qualitative-methods-and-interpretative-social-research/
PhD Project Title:	A Qualitative study of a chosen field using a grounded theory and situational analysis approach
Project Description	Situational analysis extends the qualitative research style of grounded theory by including poststructuralist theories into the theory methods package, in particular relational analysis. The PhD candidate will perform a qualitative study on a chosen empirical topic while using the situational analysis approach.
Degree to be awarded:	Which academic degree will be obtained: Dr. rer. soc.
Required Degrees:	Masters's degree
Language Requirements:	TOEFL iBT 95, IELTS 6.5
Notes:	The candidate needs substantial knowledge on qualitative research practices with a particular focus on grounded theory and situational analysis. Familiarity with theories from the interpretative paradigm is required as well, in particular symbolic interactionism and pragmatism or similar approaches.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Faculty of Economics and Social Sciences
Institute / Section / Subject:	Institute of Education
Supervising Professor(s):	Prof. Dr. Andreas Lachner
About the Supervisor(s):	Andreas Lachner is professor of educational research with a focus on teaching and learning with educational technology and Co-Director of the Tübingen Center for Digital Education. His research activities include the support of (meta-)cognitive and motivational learning processes while using educational technology (e.g., mixed realities, artificial intelligence), as well as the integration of technology in subject-specific teaching scenarios, for instance during adaptive teaching. Another focus concerns the professional competences of teachers for technology integration, as well as how (pre-service) teachers can be supported to develop these competencies. Personal website: https://uni-tuebingen.de/en/237441
PhD Project Title:	Innovative Technologies to Enhance Adaptivity in the classroom.
Project Description	Generative AI offers significant potential for providing adaptive support to students. However, available systems are not explicitly trained to provide adequate support during learning and at the same time foster students self-regulation, which is also known as the assistance dilemma. Goal of the current project is to empirically examine under which individual and instructional conditions (e.g., prior knowledge, motivation, learning task) what kind of support is needed to maximize learning. The project is embedded in a larger cooperation between the Tübingen Center for Digital Education and the Tübingen AI Center. Predominantly, experimental field studies will be employed by integrating process data (e.g., eye-tracking, log-files, physiological data).
Degree to be awarded:	Dr. rer. soc., Dr. rer. nat., or Dr. phil., depending on the focus of the dissertation
Required Degrees:	M.A., M.Sc., or M.Ed.
Language Requirements:	C1-Level in English would be required: iBT > 95, IELTS > 6.5
Notes:	Any other details or requirements for the applicant please here!

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Interfaculty Institute of Biochemistry
Supervising Professor(s):	Prof. Doron Rapaport, PhD
About the Supervisor(s):	Interest in protein transport, mitochondria, and chaperones
	PhD in 1995, Weizmann Inst. Of Science, Israel
	1996-2006 Post-doc and Group Leader in the University of Munich, Germany
	Since 2006 – Prof. of Biochemistry Tübingen, Germany
	Web: https://uni-tuebingen.de/de/46135
PhD Project Title:	The contribution of cytosolic chaperones to the biogenesis of mitochondrial proteins
Project Description	Most mitochondrial proteins are encoded by the nuclear genome and are imported into mitochondria after synthesis on cytosolic ribosomes. Accordingly, they face the challenge of maintaining an import-competent conformation in the cytosol. Despite recent progress, we are still missing a comprehensive picture of the repertoire of factors that associate with mitochondrial proteins during their passage through the cytosol and mechanistic insights into the roles of individual factors. The proposed doctoral project will close this gap and will reveal a complete picture of the chaperoning of preproteins on their way through the cytosol to the mitochondria.
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master degree in Biochemistry, Molecular Medicine, Biology, Biophysics, or similar topics.
Language Requirements:	Very good knowledge of English (for example TOEFL iBT 95). German is not required.
Notes:	The project is funded by the German Research Foundation (DFG) as part of a Priority Program.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Faculty of Science
Institute / Section / Subject:	Institute of Applied Physics
Supervising Professor(s):	Prof. Dr. Dr. h.c. Frank Schreiber
About the Supervisor(s):	Graduated from Bochum University (Dr. rer. nat., 1995), Post-doctoral Fellow at Princeton University (1996 – 1997), Research Assistant in Stuttgart (University and MPI-MF, 1998 – 2002), University Lecturer at the University of Oxford (2002 – 2004), Professor (Chair) at Tübingen University (since 2004), Dean of Studies in Nano-Science (since 2011).
	Research interests include organic and hybrid thin films (growth mechanisms, structure and properties), surface-sensitive X-ray and neutron scattering techniques and machine learning-based analysis of the scattering data.
	More information can be found on the group website: https://www.soft-matter.uni-tuebingen.de/schreiber.html
PhD Project Title:	High-throughput studies of multi-component thin films
Project Description	The compositional optimization of novel complex multi-component materials for their application requires high-throughput studies probing many different compositions. In this project, we aim for correlative structure-property studies of organic semiconductor thin films prospective for application in photovoltaics. The gradient thin films will be deposited by means of organic molecular beam deposition method using a dedicated chamber recently developed in the group. The spatial resolution of modern sample characterization techniques, such as X-ray scattering at synchrotron sources, atomic force microscopy and UV-Vis spectroscopy, will allow probing structure and optical properties of such gradient films effectively providing high compositional resolution using just single samples. More information on the subject and methods can be found on the group website: https://www.soft-matter.uni-tuebingen.de/
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master or equivalent degree in Physics or Chemistry
Language Requirements:	Good level of English is required
Notes:	Knowledge of programming languages such as Python or Matlab is a strong advantage

EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Faculty of Science
Institute / Section / Subject:	Institute of Applied Physics
Supervising Professor(s):	Dr. Ivan Zaluzhnyy (habilitand), co-supervision with Prof. Dr. Dr. h.c. Frank Schreiber
About the Supervisor(s):	Dr. Ivan Zaluzhnyy obtained his PhD in 2017 for work performed at DESY (Hamburg, Germany), spent his post-doc time at UCSD (San Diego, USA) and currently is doing his habilitation at the University of Tübingen.
	Research interests: X-ray scattering, coherence applications, nanofocused X-ray diffraction, soft matter, thin films, lead-halide perovskites
	Group web-page:
	https://www.soft-matter.uni-tuebingen.de/AGxrays.html
PhD Project Title:	Atomic-scale structure and dynamics of lead-halide perovskites
Project Description	The aim of this project is to apply novel X-ray scattering techniques at synchrotron sources to reveal the details of crystal structure and dynamics of lead-halide perovskites – prospective materials for photovoltaics, including solar cells and LEDs. We will study how various external conditions, such as temperature, moisture, and illumination, influence the atomic structure of perovskites. We will also study the effects of ion migration on the stability of perovskite-based solar cells and other devices. The experimental focus of the project will be on the application of novel X-ray scattering techniques, such as coherent X-ray scattering and X-ray nanodiffraction.
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master or equivalent degree in Physics or Chemistry
Language Requirements:	Good level of English is required
Notes:	Knowledge of programming languages such as Python or Matlab is an advantage. Practical lab skills and enjoying experimental work is also a plus..

Faculty:	Science
Institute / Section / Subject:	Department of Geosciences & Department of Biology, Group: Geo-Biosphere Interactions
Supervising Professor(s):	Prof. Dr. Michaela Dippold
About the Supervisor(s):	Prof. of Geo-Biosphere Interaction; main disciplines: soil biogeochemistry and molecular microbiology; work in natural and agro-ecosystems; emphasize on isotope applications at the root-soil-microbe continuum: https://uni-tuebingen.de/de/232301
PhD Project Title:	Effect of root residue decomposition of winter cover crops on maize N nutrition
Project Description	Cover crops are increasingly used to promote soil C sequestration, but serve also as "highways to the subsoil", promoting access to subsoil nutrient resources. Winter-hardy versus winter-killed cover crop species are thereby not yet studied regarding their implications for plant nutrition: i) Does the biomass of winter-killed cover crops lose significant amounts of its nutrients by early spring residue mineralization? ii) Do not-yet degraded root residues of winter-hardy cover crops block access to the root channels? The fellow will assess under which conditions these cover crop traits support maize N nutrition best and which potential lies in combination of winter-hardy and winter killed cover crops
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	M.Sc. in Resource and/or Environmental Sciences, Geoecology, Agriculture, Plant Biology, Plant Nutrition, or comparable. Expertise with biogeochemical transformations (preferably residue decomposition) and plant nutrition
Language Requirements:	English, C1 level
Notes:	

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Faculty of Medicine + Faculty of Science
Institute / Section / Subject:	Natural Language Processing
Supervising Professor(s):	Dr. Ali Bahreinian + Prof. Dr. Carsten Eickhoff
About the Supervisor(s):	Ali Bahreinian is a postdoctoral researcher at the University of Tübingen. He received a PhD from the University of Lugano, Switzerland in 2019 and held postdoctoral positions at EPFL, Switzerland and Brown University, USA. His research focus is on Natural Language Processing, and generative models in particular. More specifically, his current research focuses on integrating common-sense knowledge and semantic concepts into large language models and introducing controlability mechanisms to satisfy pre-defined requirements. He has served as a PC member at various international conferences such as ACL, SIGIR, and IJCAI.

Carsten Eickhoff is a Full Professor of Medical Data Science and Computer Science at the University of Tübingen, where his lab specializes in the development of machine learning and natural language processing techniques with the goal of improving patient safety, individual health and quality of medical care. Prior to joining Tübingen, he was the Manning Assistant Professor of Medical and Computer Science at Brown University. He received degrees from the University of Edinburgh and TU Delft, and was a postdoctoral fellow at ETH Zurich and Harvard University. Carsten has authored more than 100 articles in computer science conferences (e.g., ICLR, ACL, SIGIR, WWW, KDD) and clinical journals (e.g., Nature Digital Medicine, The Lancet - Respiratory Medicine, Radiology, European Heart Journal). His research has been supported by the NSF, NIH, DARPA, IARPA, Swiss National Science Foundation, Google, Amazon, Microsoft and others.

PhD Project Title:	Explainable Natural Language Processing
Project Description	Explainability is a critical aspect of Artificial Intelligence (AI) systems, particularly in the context of Large Language Models (LLMs). As these models grow in complexity and scale, understanding their inner workings becomes increasingly challenging. The need for explainability arises from the desire to interpret and trust the decisions made by these models and ensure the factual correctness of the outputs. In this research, we focus on developing methods and techniques to enhance the explainability of LLMs.
Degree to be awarded:	PhD (Computer Science)
Required Degrees:	M.Sc. (Computer Science, Math, Electrical Engineering, Cognitive Science)
Language Requirements:	Fluency in spoken and written English (IELTS 6,5 or TOEFL equivalent).
Notes:	

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Institute for Applied Physics / Plasmonic Nanostructures Group
Supervising Professor(s):	Prof. Dr. rer. nat. Monika Fleischer
About the Supervisor(s):	Prof. Fleischer's research focuses on the lithographic fabrication and spectroscopic analysis of metallic nanostructures for nano-optics, plasmonics, near-field microscopy and sensing. The metal nanostructures are combined with e.g. bioassays, quantum dots or organic films to investigate the emerging properties of the hybrid systems. The optical properties are modelled by numerical simulations. For information, see: http://www.uni-tuebingen.de/plasmonics/
PhD Project Title:	Sub-patterned optical nano-antennas with ultra-high precision geometric control
Project Description	When noble metal nanostructures are excited by light, the free electron density in the metal performs collective oscillations that are called plasmons. Such particles act like antennas for visible light. By further fine-tuning the shape of such nanostructures through sub-patterning with single-digit precision, e.g. using focused helium ion beam milling, local coupling of the electric fields at edges of the structure can lead to extremely high electric near-fields, and/or the emission direction of the antennas can be modified. These options are attractive e.g. for sensing applications, and coupling can be used to fine-tune the resonances of the system. Techniques with ultra-high control down to the atomic level are required to engineer high-quality antennas. To optimize geometric control, single crystalline gold flakes will be combined with the advanced methods of atomic layer deposition of ultra-thin oxide layers and focused helium ion beam milling for lateral outline control. The resulting antennas will be imaged by scanning electron microscopy, and their optical properties and emission patterns will be investigated by micro-spectroscopic analyses supported by numerical simulations.
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master degree in Physics, Optics, Nanoscience, or comparable
Language Requirements:	Fluency in spoken and written English) is immensely important in academia, since projects are developed in discussion, and results need to be correctly expressed in the thesis and in journal papers. English at the proficiency level of C1-C2 (high/good scores in all categories of the TOEFL test, i.e. a minimum of 94 points, better of 100 points) are required. Basic knowledge of German will facilitate everyday life, but is not mandatory.
Notes:	Applicants should have good practical & analytical skills. Previous experience in nanofabrication, microscopy and/or spectroscopy is welcome. Participation in tutoring lab courses will be expected.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Interfaculty Institute for Microbiology and Infection Medicine Tübingen (IMIT) - Microbial Genetics
Supervising Professor(s):	Prof. Dr. Friedrich Götz
About the Supervisor(s):	Has studied Biology and Chemistry at Munich University with a main focus in microbiology, received several awards and calls, was president of the association of general and applied microbiology, is member of the European Academy Microbiology (EAM), received 1987 the Chair in Microbial Genetics at the University Tübingen, holds a Seniorprofessorship with about 7 coworkers. Ranks in Germany top 8 Scientists in the field of Microbiology (https://research.com/scientists-rankings/microbiology), home page: www.imit.uni-tuebingen.de/beteiligte-einheiten/mikrobielle-genetik.html
PhD Project Title:	Interaction of neurotransmitter-producing bacteria with neuronal receptors
Project Description	Leading scientist in microbiology and infection biology. The objectives of his research are: The physiology of staphylococci, carbondioxide metabolism, lipoproteins and immune response, microbiota controlling peripheral and central nervous system

Microbiota-derived neurotransmitters and their impact on neurological disorders. Neurotransmitter-producing and -metabolizing bacteria are widely distributed in the human microbiota. The influence of these bacteria on the peripheral and central nervous system is poorly understood. The Götz group has been intensively studying neurotransmitter-producing bacteria in humans and their influence on the peripheral nervous system. |
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Biology or Microbiology
Language Requirements:	Fluency in spoken and written English (IELTS 6,5 or TOEFL equivalent).
Notes:	

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Institute for Theoretical Physics
Supervising Professor(s):	Prof. Igor Lesanovsky
About the Supervisor(s):	The group "Theoretical Atomic Physics and Synthetic Quantum Matter" was established in 2019 and conducts research on the quantum physics of systems formed of many constituents interacting with light. The research goal is to uncover emergent complex behavior such as phase transitions and to find ways for utilizing those in applications. See www.open-quantum-systems.com.
PhD Project Title:	Quantum reaction-diffusion systems
Project Description	Reaction-diffusion systems are simple systems which show emergent behavior that manifests at large distances and over long times. They can be modelled by a lattice system in which particles undergo (diffusive) hopping dynamics and react when meeting. Upon reacting particles are expelled from the system, which ultimately leads to an empty lattice. This final state is, however, reached in a highly correlated fashion, which manifest in a power-law decay of the particle density. The power-law exponent of this decay law may change depending on dimensionality and nature of the reaction process. The goal of this PhD project is to study quantum generalizations of such reaction diffusion dynamics using numerical and analytical methods. Recent work by our group has shown that quantum effects can lead to novel manifestations of collective behavior.
Degree to be awarded:	PhD in Physics
Required Degrees:	MSc in Physics
Language Requirements:	Proficiency in English on a C1-level (certificates TOEFL or IELTS).
Notes:	The applicant must have a high level of independence, the ability to work in a team and excellent knowledge of analytical methods of theoretical physics. Programming skills (e.g., Python or Matlab) are also advantageous.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Interfaculty Institute of Microbiology and Infection Medicine Tübingen/Bacterial Metabolomics/ Synthetic Biology
Supervising Professor(s):	Prof. Dr. Hannes Link
About the Supervisor(s):	Prof. Link's research aims to advance knowledge and innovation in synthetic microbiology, addressing global challenges like sustainable production of chemicals and combating antibiotic resistance. More information at www.linkmetabolism.com
PhD Project Title:	Production of glycerol from CO_2 using engineered *E. coli*
Project Description	Glycerol, a sustainable feedstock for many bio-based products, is currently a byproduct of biodiesel production—a source that's expected to deplete in the future. This research aims to engineer *E. coli* bacteria to fixate CO_2 and introduce a synthetic pathway for enhanced glycerol production. The glycerol pathway, originally developed by the Link group in *E. coli* (Wang et al, Nature Comm.) is being refined using a synthetic autotrophic *E. coli* as a production host. We will employ cutting-edge genome engineering to create superior production strains and utilize metabolomics for in-depth examination.
Degree to be awarded:	Dr. rer. nat. in Biology
Required Degrees:	M.Sc. in biotechnology, microbiology or a related field
Language Requirements:	Fluent English, verbally and in writing (IELTS 6,5 or TOEFL equivalent)
Notes:	See our papers on www.linkmetabolism.com, e.g. Wang et al. in Nature Communications (2021) for the glycerol production strain.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Institute of Physical and Theoretical Chemistry
Supervising Professor(s):	apl. Prof. Dr. Heiko Peisert
About the Supervisor(s):	Apl. Prof. Dr. Heiko Peisert is the leader of the research group "Interfaces of organic semiconductors". For many years he studied the electronic structure of organic materials and their interfaces (organic/ inorganic and organic/organic) using various surface-analytical methods, including photoelectron spectroscopy (PES), scanning microscope methods (STM, AFM), x-ray absorption spectroscopy (XAS) in the lab and at synchrotron radiation sources. He. He published more than 160 papers in peer-revied journals and is referee for more than 20 scientific journals. For further information, see: http://www.uni-tuebingen.de/de/43390
PhD Project Title:	Surfaces and interfaces of transition metal dichalcogenides
Project Description	The recently increasing research efforts devoted to layered transition metal dichalcogenides (TMDCs) derives from their fascinating electronic and magnetic properties. Nowadays they are promising alternatives to conventional semiconductor materials enabling novel future applications. Although interfaces play a crucial role for applications in devices, the nature of interactions is often poorly understood. Further, electronic properties of TDMCs can be tuned by the adsorption of molecules. The investigation the interaction mechanism of mechanism between organic or inorganic materials will be the focus of this project. For the characterization of the electronic structure of TMDC surfaces and interfaces mainly photoemission spectroscopy (PES) and ultraviolet photoemission spectroscopy (UPS) in the home-lab and at synchrotron radiation sources will be applied. The geometrical structure of adsorbates will be studied by scanning tunneling microscopy (STM) in ultrahigh vacuum.
Degree to be awarded:	Dr. rer. nat
Required Degrees:	Master degree in Physical Chemistry or Physics
Language Requirements:	IELTS- 6.0, TOEFL - 90 Points
Notes:	

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Science
Institute / Section / Subject:	Leibniz-Institut für Wissensmedien (Knowledge Media Research Center), Media Psychology
Supervising Professor(s):	Prof. Dr. Sonja Utz
About the Supervisor(s):	Sonja Utz is a full professor for Communication via Social Media at University of Tübingen. She is head of the Everyday Media Lab at Leibniz-Institut für Wissensmedien in Tübingen. Sonja Utz holds a PhD in psychology from Catholic University of Eichstätt (1999; Social identification with virtual communities). Before moving to Tübingen, she held positions in Chemnitz, Amsterdam and Leeuwarden. Her research focuses on the effects of social and mobile media use, especially in knowledge related contexts, as well as on human-machine communication. More information on https://www.iwm-tuebingen.de/www/en/sonjautz
PhD Project Title:	Dealing with algorithms and AI in everyday life
Project Description	Algorithms are involved in many applications and decisions, often without the awareness of the users. This project explores how dealing with algorithms in everyday life is related to algorithm awareness, algorithm literacy, and algorithm acceptance and how these concepts evolve over time. Examples for everyday life algorithm use are engaging with the TikTok algorithm or playing around with ChatGPT. The project could focus on the question whether such everyday interactions effect understanding of algorithms and self-efficacy, and whether effects spill over to algorithm acceptance in other domains. This could be tested across different cultures
Degree to be awarded:	Dr. rer. nat. (Psychology)
Required Degrees:	Master or equivalent in Psychology
Language Requirements:	Fluency in spoken and written English (IELTS 6,5 or TOEFL equivalent).
Notes:	

Faculty:	Science
Institute / Section / Subject:	Institute of Physical and Theoretical Chemistry / Spectroscopy
Supervising Professor(s):	apl. Professor Dr. Dai Zhang and Prof. Dr. Alfred J. Meixner
About the Supervisor(s):	The expertise of Prof. Dr. Alfred J. Meixner: 1) optical single molecule spectroscopy (fluorescence, Raman scattering), including also quantum dots and gold nanoparticles and 2) multimodal tip/Plasmon enhanced near-field optical microscopy and spectroscopy in the spectral and time domain, respectively. Homepage: www.uni-tuebingen.de/nanospectroscopy
	The expertise of apl. Professor Dr. Dai Zhang: 1) Local Raman and photoluminescence microscopy in the linear optical regime, 2) second harmonic generation and two photon photoluminescence microscopy and 3) Local optical properties of novel optoelectronic materials, such as organic semiconductors, perovskites and two-dimensional materials. Homepage: https://uni-tuebingen.de/de/40809
PhD Project Title:	Enhanced optical spectroscopy and microscopy of organic molecules
Project Description	It has been shown that the electronic structures of self-assembled monolayers or two-dimensional transition metal dichalcogenide monolayers can be influenced by their morphologies. In this fundamental science-oriented project, polarized Raman and fluorescence spectroscopy will be applied to derive the molecular orientation, and local structure order of the thin films. Second harmonic generation microscopy and two photon fluorescence will be used to study the defects, and grain boundaries. By imaging the above signals in the Fourier plane, one will further correlate the intensity and energy of the signal with its angular information. In the case of very weak optical signals, different enhancement strategies will be explored making use of the electromagnetic enhancement and chemical enhancement mechanisms. The PhD candidate will get insight into the relationship between the film morphology and their electronic structures. The candidate will also obtain experiences of working with optics and different types of optical microscopes.
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master degree in Physical Chemistry, Solid State or Optical Physics
Language Requirements:	IELTS, TOEFL (C1-level)
Notes:	

Faculty:	Science
Institute / Section / Subject:	Institute of Astronomy and Astrophysics (IAAT)
Supervising Professor(s):	Prof. Andrea Santangelo Dr. Gerd Pühlhofer
About the Supervisor(s):	Prof. Santangelo is the head of the High energy astrophysics Abteilung of IAAT, whereas Dr. Pühlhofer has a permanent staff position and is coordinating the very high energy gamma-rays activities of the Institute.
PhD Project Title:	Experimental development for CTA and observational analysis of TeV celestial source.
Project Description	The last ten years have been characterized by the unveiling of the Universe at very High Energies (VHE) thanks to the observations of the HESS, MAGIC, VERITAS and LHAASO observatories. Currently the new large observatories at VHE the Cherenkov Telescope Array is being developed and has finally entered the construction phase in both the southern and the northern hemisphere. The High Energy astrophysics section of the Institute of Astronomy and Astrophysics is actively involved in VHE astronomy, both in the observational analysis of extreme sources and in developing hardware for the CTA observatory. The successful candidate will be involved in the observational analysis of Supernova Remnants and Gamma binaries emitting at VHE using a multi-wavelength approach. In addition the candidate will work on the development of the PMT based focal plane cameras for the Medium Size Telescope array of CTA, that has entered the construction phase in the two sites in Chile and La Palma. In the context of the study we expect to establish a collaboration with the LHAASO telescope which is revolutionising the view of the Universe at the even higher energies.
Degree to be awarded:	PhD
Required Degrees:	Master's degree in astrophysics
Language Requirements:	English at B2-C1 level
Notes:	

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Sciences
Institute / Section / Subject:	Computer Science/Cognitive Science/Computational and Experimental Vision
Supervising Professor(s):	Zhaoping Li, Professor in Cognitive Science, Head of department of Sensory and Sensorimotor Systems in Max Planck Institute for Biological Cybernetics
About the Supervisor(s):	*Understanding vision: theory, models, and data. Ph.D. 1990 California Institute of Technology, Professor in University College London since 2007, and in* University of Tübingen since 2018. More information please see https://www.lizhaoping.org/
PhD Project Title:	Understanding human vision by methods from computational vision and experimental psychology
Project Description	The desired project should be along the line stated in the project title above. Generally, it should have one sub-project in visual psychophysics and one sub-project on computational vision related to this psychophysics project. The actual projects can be adapted based on the skills, interests, and training needs of the student. Interested students should read some of publications by Zhaoping Li from https://www.lizhaoping.org/zhaoping/papers.html and/or try out the free online courses at https://zhaoping.thinkific.com/ to find whether some topics are of interests, and even email Zhaoping li to ask for any additional information.
Degree to be awarded:	*Dr. rer. nat.*
Required Degrees:	*Master's degree in some natural science or engineering discipline, must have sufficient skills in programming and mathematics (e.g., in linear algebra and statistics)*
Language Requirements:	*the language level of at least: TOEFL iBT 95, IELTS 6.5.*
Notes:	recommendation letters are additionally required

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Medicine
Institute / Section / Subject:	Internal Med IV/ Institute of Diabetes Research and Metabolic Diseases
Supervising Professor(s):	Prof. Dr. med. Andreas Birkenfeld, Dr Gencer Sancar
About the Supervisor(s):	Prof. Dr. med. Andreas Birkenfeld is the director of Clinic for Diabetology, Endocrinology and Nephrology at University Clinic Tübingen and Dr. Gencer Sancar is the Junior Group Leader focusing on the role of adipose tissue in insulin resistance and type-2 diabetes. Our research group is interested in molecular and physiological pathways involved in insulin resistance and type-2 diabetes. We study different plasma membrane transporters as targets for therapeutic interventions in type-2 diabetes, obesity, and associated metabolic comorbidities. We are particularly curious how liver and adipose tissue communicate in the context of metabolic disease processes. Further information on the lab can be found at: https://www.helmholtz-munich.de/en/idm; https://www.medizin.uni-tuebingen.de/de/das-klinikum/mitarbeiter/1979
PhD Project Title:	Role of selective free fatty acid transport in insulin resistance and development of type-2 diabetes
Project Description	Exposure to increased saturated free fatty acid (FFA) levels *in vivo* or *in vitro* is associated with endoplasmic reticulum stress, inflammation and oxidative stress which lead to insulin resistance. Unsaturated FFAs have beneficial effects and even prevent the insulin resistance induced by saturated FFAs. In this study, we will investigate the molecular players that enhance unsaturated FFA uptake. Moreover, we aim to differentiate FFA processing in insulin sensitive and insulin resistant human adipocytes using stable isotope labelling, followed by lipidomics analysis. Complementary transcriptomics experiments will be performed to assess gene expression changes upon FFA treatment. These experiments will establish novel pathways that selectively uptake/utilize unsaturated FFAs and identify lipidomic/transcriptomic signature that is responsible for insulin resistance in adipocytes.
Degree to be awarded:	PhD
Required Degrees:	MSc in Biology or related discipline (e.g. Biochemistry, Molecular Biology, Biomedical Engineering)
Language Requirements:	Proof of proficiency in English on at least C1 level
Notes:	Looking for highly motivated candidates interested in metabolism and type-2 diabetes. The candidate could expect a highly supportive environment for his/her scientific development.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Medicine
Institute / Section / Subject:	Institute for Ophthalmic Research / Center for Integrative Neuroscience / Ophthalmic Research
Supervising Professor(s):	Prof. Dr. Thomas Euler
About the Supervisor(s):	Our lab investigates how neural circuits in the retina process information and, specifically, what feature representations are extracted from the incoming visual scene and forwarded to higher visual areas in the brain. To this end, the lab pioneered two-photon imaging techniques that allow us to present visual stimuli while optically recording neural activity in all layers of the isolated retina with subcellular resolution. Yielding data from thousands of neurons, our experimental approach is complemented by large-scale data analysis and computational modelling. Dr. Euler received his PhD at the University of Mainz / MPI for Brain Research, Frankfurt/M. After postdoc positions at Harvard Medical School / MGH (Boston), and the MPI for Medical Research (Heidelberg), he started his lab in 2009 at the University of Tübingen.
	For more information, see https://eulerlab.de/; for our publications, see https://tinyurl.com/eulerlab.
PhD Project Title:	Holographic optogenetic stimulation in the mouse retina.
Project Description	The retina is not just a simple light sensor; it also performs a first analysis of the image stream falling into our eye. The retina extracts not only infor-mation about, for instance, contrast, brightness, and color but also more complex visual features, such as object borders and motion directions. Hence, the retina is an excellent model system to study neural (visual) information processing at the circuit level. Our lab has established 2-pho-ton imaging of visual stimulus-evoked neural activity in all retinal layers. To be able to manipulate retinal signal processing in a highly selective and dynamic manner, we now plan to add optogenetic manipulations to our repertoire. The aim of this project is to establish holographic stimulation of selected retinal neurons via the targeted expression of light-sensitive channels and to use this approach to test current concepts of signal integration in retinal output neurons.
Degree to be awarded:	Dr. rer. nat. in Neuroscience (international Graduate Training Centre, GTC) https://www.neuroschool-tuebingen.de/phd/
Required Degrees:	Master of Science in Biomedical Engineering or a related discipline, ideally with a background in Optics.
Language Requirements:	Fluent English, verbally and in writing (IELTS 6,5 or TOEFL equivalent); German is a benefit, but not required.
Notes:	Programming skills (i.e., Python, Jupyter lab).

Faculty:	Medicine
Institute / Section / Subject:	Department of Preclinical Imaging and Radiopharmacy
Supervising Professor(s):	Prof. Kristina Herfert
About the Supervisor(s):	Prof. Herfert is Associate Professor for Functional and Metabolic Brain Imaging. Our research group investigates brain function using hybrid fPET/fMRI systems. For more information, please visit: http://www.isct.uni-tuebingen.de/wsic/research/research-groups/neurology/functional-and-metabolic-brain-imaging
PhD Project Title:	Functional and metabolic signatures of psychedelics' effects in the brain
Project Description	Psychedelics are likely to become mainstream in our society, under the pressure of both, their therapeutic potential in psychiatric disorders (e.g., treatment-resistant depression and PTSD) and the force of capital. Despite the surge in scientific interest, very few studies have focused on potential harms associated with abuse of these substances. In this project we will employ simultaneous fPET-fMRI to study concurrent changes in blood oxygenation and glucose metabolism during administration of psychedelic drugs, such as MDMA, LSD and Ketamine. We aim to advance the identification of functional and neurochemical brain signatures that are related to the negative effects of psychedelics, including perceptual distortions, hallucinations and dissociative symptoms. Introducing the use of psychedelics in a scientifically informed and ethically rigorous way could minimize risks and support their potential usefulness in tackling the mental health crisis.
Degree to be awarded:	Dr. rer. nat.
Required Degrees:	Master's degree in neuroscience, cognitive science, computer science, physics or a related natural science or engineering field
Language Requirements:	Strong command of English (C1-level ELTS, TOEFL)
Notes:	We are looking for students who are interested and have a good background knowledge in brain science. Students should have good programming skills (e.g., in MATLAB, Python), they should be motivated, responsible and have good teamwork skills. Projects can be adapted according to interests, skills and needs of the student.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Medicine
Institute / Section / Subject:	Hertie Institute for Clinical Brain Research
Supervising Professor(s):	Prof. Dr. Esther Kühn
About the Supervisor(s):	The Research Group „Translational Imaging of Cortical Microstructure" uses translational MR imaging to understand how cortical microstructure links to human brain function in health and disease. We study healthy younger and older adults, people with neurodegenerative diseases and people with mental disorders to understand the neuronal mechanisms that underlie healthy and pathological brain states and their modification.
	http://www.estherkuehn-science.org
PhD Project Title:	The neurobiology of learning in a virtual world
Project Description	In everyday life, we are exposed to a multitude of sensory modalities during learning, whereas in a laboratory setting, learning is mostly studied by investigating one or maximally two channels only, for example visual and auditory learning. In this project, we will investigate body memories by making use of a novel setup where people are exposed to visual immersion combined with full-body haptic feedback via haptic suits. By combining this experimental setup with fMRI during retrieval, this project allows to gain a deeper understanding about the neuronal mechanisms that allow us to remember everyday life bodily experiences, both pleasant and unpleasant. This is an important prerequisite to understand the mechanisms of maladaptive memory formation and their modification.
Degree to be awarded:	Dr.rer.nat.
Required Degrees:	Master of Science (Biology, (Cognitive) Neuroscience, Psychology, Medicine Technology)
Language Requirements:	Fluent command of English, C1-level
Notes:	Prior experience with f/MRI data analyses and/or VR programming is/are a strong plus.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Medicine
Institute / Section / Subject:	Interfaculty Institute of Cell Biology, Department of Innate Immunity
Supervising Professor(s):	Prof. Alexander N. R. Weber
About the Supervisor(s):	Trained biochemist (training in Tübingen, Cambridge UK and Heidelberg) and expert in innate immunity with a focus on the recognition of microbes and endogenous threats by so-called pattern recognition receptors.
PhD Project Title:	We offer the following PhD project (depending on the interest, background and preferences of the candidate) • Actionable heterogeneity of SASP (senescence-associated secretory phenotype) and surfaceome in hepatocellular carcinoma therapy-induced senescence • Induction of senescence in AML (acute myeloid leukemia) augments NK cell cytotoxicity via inflammasome priming
Project Description	Innate immunity plays a critical part in the host defense against infection but also in cardiovascular, neurodegenerative, metabolic and malignant diseases. Primary regulators of innate immunity are the so-called pattern recognition receptor (PRRs) which sense internal or external danger and trigger molecular and cellular responses that lead to immunological effector responses. Our lab has a strong track record in PRR signaling pathways and has been contributing insightful results in the areas of microbial recognition, initiation of inflammation and oncogenesis. Recently, we have focused on the effect of cellular senescence induced by therapeutic agents (therapy-induced senescence, TIS) on innate signaling pathways and immune cells in either hepatocellular carcinoma (HCC) or acute myeloid leukemia (AML). Our focus is to investigate how senescence affects well-known PRR pathways, the cellular surfaceome and the way in which senescent tumor cells can be targeted by immunotherapies (e.g. targeting antibodies or NK cells).
Degree to be awarded:	PhD
Required Degrees:	Masters degree (or equivalent) in biological sciences or medicine
Language Requirements:	Certified very good command of the English language (both written and spoken, e.g. IELTS of 6.5 or higher)
Notes:	Some research experience in molecular/cellular biology, microbiology/virology, protein biochemistry and/or immunology; high motivation to work independently and as part of a team. We are a dynamic research group with a solid track record, and located in an excellent scientific environment, the Department of Immunology located on the campus of the University of Tübingen, one of Germany's Excellence Universities. In our well-funded laboratory you would find a friendly, well-connected and international (English-speaking) environment, and a firm commitment to good supervision and professional development.

Tübingen - Korea PhD Program

2024 application round for prospective PhD positions at University of Tübingen

Faculty:	Medical Faculty
Institute / Section / Subject:	Institute for Medical Virology and Epidemiology of Viral Diseases
Supervising Professor(s):	Prof. Dr. Daniel Sauter
About the Supervisor(s):	Research in our laboratory focuses on the interplay of innate immune responses with different viral pathogens (e.g., retroviruses, coronaviruses). The supervisor has a strong interest in elucidating the co-evolution of (zoonotic) viruses with their host species, and the mechanisms that viruses have evolved to overcome or evade immune responses. More information on the supervisor and the host lab can be found here.
PhD Project Title:	"HIV latency and glucocorticoid receptor modulation"
Project Description	Current drug regimens are unable to eradicate the Human Immunodeficiency Virus (HIV) from infected individuals due to the establishment of latent viral reservoirs. To overcome this hurdle, shock-and-kill approaches aim to reactivate latent HIV. Interestingly, the HIV genome harbors several binding sites for glucocorticoid receptors (GR), suggesting that glucocorticoids may influence HIV latency and reactivation. The proposed project aims to decipher the effects of natural glucocorticoid hormones, as well as GR-modulating drugs on HIV latency and reactivation. The PhD candidate will investigate whether some of these compounds may be used to improve current shock-and-kill approaches in HIV treatment.
Degree to be awarded:	PhD Exp. Med. / Dr. rer. nat.; possible integration into 'The Interfaculty Graduate School of Infection Biology and Microbiology (*IGIM*)'
Required Degrees:	Master degree in Biology, Biochemistry, Infection Biology, Molecular Medicine, Biotechnology, or related degrees; expertise in infection biology, immunobiology and/or steroid hormones is a plus.
Language Requirements:	Excellent oral and written communication skills in English are mandatory (minimum: TOEFL iBT 95, IELTS 6.5)
Notes:	The project involves research under biosafety levels (BSL) 2 and 3.