

New Scientific Director: Frauke Gräter

As of 1 January 2021, **Frauke Gräter** is the new Scientific Director of HITS. The position of Scientific Director rotates among the group leaders, and the change had thus been planned by the HITS management. **Wolfgang Müller**, who had been Scientific Director for the previous two years, stepped down from this position at the end of the year. The new deputy Scientific Director will be **Tilman Gneiting**.

Frauke Gräter has been leader of the Molecular Biomechanics group at HITS since 2009 and Professor of Molecular Biomechanics at Heidelberg University since 2014. She intends to decipher how proteins have been designed to specifically respond to mechanical forces, be it in the cellular environment or as a biomaterial, and will tackle medical topics, such as blood clotting, as well as

topics in materials science, such as spider silk. Gräter received several awards and grants for her research, among them an ERC Consolidator Grant of ca. two million euros. As of 2021, she is now a member of the Editorial Board of Biophysical Journal.

Tilman Gneiting has been both leader of the Computational Statistics group at HITS and Professor of Computational Statistics at the Karlsruhe Institute of Technology (KIT) since 2013. His research focuses on methods of probabilistic forecasting, for example, in the development of the Corona pandemic. Gneiting is among the most-highly cited researchers worldwide. He was a fellow of the European Centre for Medium-Range Weather Forecast (ECMWF) and has served as Editor-in-Chief of the Annals of Applied Statistics. Gneiting was awarded an ERC Advanced Grant in 2012 for his research. The Scientific Director ("Institutssprecher") is a group leader appointed by the HITS share-



holders who represents the Institute in all scientific matters vis-à-vis cooperation partners and the public.



Via Data

The HITS blog can be found on the "Scilogs" portal at <https://scilogs.spektrum.de/via-data/>.

HITS

ERC Consolidator Grants for two HITS researchers



Biophysicist **Frauke Gräter** and astrophysicist **Saskia Hekker** have received ERC Consolidator Grants from the European Research Council (ERC). The funding amounts to ca. two million euros per grant over a duration of five years

each. Both researchers are group leaders at HITS and professors at Heidelberg University.

"This is a great accomplishment that reflects the high quality of our research, and it is also the result of a very intense collaboration with Heidelberg University," says HITS Managing Director **Gesa Schönberger**. Frauke Gräter's project will investigate the role of so-called mechanoradicals in the ageing of collagen, and Saskia Hekker's project will explore the internal structures of stars using global stellar oscillations that are visible at the surface of many stars.

New research group: Stellar Evolution Theory

Since 1 January 2021, astrophysicist **Fabian Schneider** has been leader of the new research group, Stellar Evolution Theory (SET), which investigates the turbulent life of massive binary stars. Schneider had successfully applied for an ERC Starting Grant of about 1.5 million euros from the European Research Council (ERC) and is now establishing his own junior research group at HITS.



New employees and visiting scientists

- Administration:** Silvia Galbusera, Human Resources
- CST:** Johanna Ziegel, visiting scientist (University of Bern, Switzerland)
- DMQ:** Aksel Alpay, visiting scientist (Heidelberg University)
- IT Services:** Simon Kreuzer, HPC system administrator
- MBM:** Elizaveta Bobkova, master student
- SET:** Jan Henneco, doctoral student; Fabian Schneider, group leader
- SDBV:** Alain Becam, Bettina Heinlein, research associates
- TOS:** Julian Schlecker, master student; Nathalie Themessl, visiting scientist (Heidelberg University)

HITS groups 03/2021: Astroinformatics (AIN), Computational Carbon Chemistry (CCC), Computational Molecular Evolution (CME), Computational Statistics (CST), Data Mining and Uncertainty Quantification (DMQ), Groups and Geometry (GRG), Molecular Biomechanics (MBM), Molecular and Cellular Modeling (MCM), Natural Language Processing (NLP), Physics of Stellar Objects (PSO), Scientific Databases and Visualization (SDBV), Stellar Evolution Theory (SET), Theory and Observations of Stars (TOS).

HITSters

Mapping uncertainty: COVID-19 forecasts

Researchers from the Heidelberg Institute for Theoretical Studies (HITS) and the Karlsruhe Institute of Technology (KIT) have developed a web platform that bundles short-term forecasts of coronavirus-infection cases. The open-source German-Polish COVID-19 Forecast Hub project brings together modelers from Germany, Poland, the UK, Switzerland, and the USA. The project systematically compares the modelers' forecasts and processes them in ensemble predictions. The main data sources come from the Robert Koch Institute (RKI) in Germany, the European Centre for Disease Prevention and Control (ECDC), and the Polish Ministry of Health. Melanie Schienle, Professor of Statistics and Econometrics at KIT, leads



the project team together with HITS group leader **Tilman Gneiting** (Computational Statistics). The project is being developed in close cooperation with the US COVID-19 ForecastHub, which is run by the Reich Lab at the University of Massachusetts, Amherst, USA. "We assemble short-term forecasts of confirmed cases and deaths from COVID-19," explains **Johannes Bracher** (KIT

and HITS), the postdoctoral researcher who coordinates the project. "Our main focus lies on forecasts of one or two weeks into the future. Longer forecast horizons could be affected by political interventions, such as lockdowns." Like weather forecasts, the predictions are in real time. As forecasts take the form of probability distributions, they also explicitly map uncertainty. "At this point in the study, we can already state that there is no single model that always works best. But there is promise in ensemble approaches that combine different forecasts," Johannes Bracher adds. The project is funded by the Initiative and Networking

Fund of the Helmholtz Association. The fund supports new research topics that develop dynamically and require the cooperation of many different fields of the Helmholtz Association. *German-Polish COVID-19 ForecastHub:* <https://kitmetricslab.github.io/forecasthub/forecast>

SARS CoV-2 spike glycoprotein: DFG funds HITS research

The SARS-CoV2 virus is notorious for its characteristic spike protein, which helps the virus invade cells. **Rebecca Wade** and the Molecular and Cellular Modeling group at HITS use computational methods and simulations to investigate the mechanisms by which heparin and heparan sulfate proteoglycans interact with SARS-CoV-2 spike glycoprotein and thereby affect host-cell infection and host susceptibility. The German Research Foundation (DFG) is funding the project as part of their COVID-19 Focus Funding scheme through the project meCocan. The project is being pursued in collaboration with Giulia Paiardi and Marco Rusnati (University of Brescia, Italy).

Research

Behind the Science: The HITS-Stiftung

Last year, we introduced the teams that make life more pleasant and enjoyable for researchers at HITS "behind the scenes." Now, it is time to shed light on the board that makes the existence of the Institute possible in the first place through its



work "in the background": namely the board of HITS shareholders. We begin with the HITS-Stiftung (HITS Foundation) and its board member **Wilfried Juling**.

Mr. Juling, what exactly is the HITS-Stiftung?
The HITS-Stiftung is the majority shareholder of HITS, which is organized as a private, non-profit GmbH (limited company). It was established in 2014 by the Klaus Tschira Stiftung (KTS) with the specific and primary goal of promoting science and research and ensuring basic financing for HITS in the long term. The HITS-Stiftung receives funds from the KTS and is comprised of Managing Directors and a Council. The Managing Directors manage the Foundation and – in particular – the Foundation's assets as well as the

allocation of funds. The Council ensures that the will of the founder, Klaus Tschira, is observed, and it monitors the Managing Directors.

Who all belong to the HITS-Stiftung?
The Council includes members of the Tschira family as well as former President of the Leibniz Association Karl Ulrich Mayer and former Director General of the European Southern Observatory Tim de Zeeuw. Since June 2020, the Managing Directors have consisted of KTS Managing Director Carsten Könneker and me.

You yourself have been a Managing Director of the HITS-Stiftung since 2016. How did that come about?
As a professor at the Karlsruhe Institute of Technology (KIT), I headed the Division of Informatics, Economics, and Society until 2015. I knew Klaus Tschira personally and very well through my close cooperation with the KTS and beyond. After his sudden and much-too-early death, the Council asked me to serve as a Managing Director of the HITS-Stiftung in his place and alongside former HITS Managing Director Andreas Reuter. I was very happy to do so, especially because I got on well with Andreas both personally and professionally.

What are the tasks of the HITS shareholders according to the articles of association?

The three shareholders – which include us, Heidelberg University, and the KIT – meet regularly and have a strategic influence on the goals of HITS in line with the founder's vision. Heidelberg University and the KIT are naturally very heavily involved when it comes to the joint appointment of group leaders, whose position is also linked with a professorship in Heidelberg or Karlsruhe. But we are also responsible for purely formal matters, such as the annual financial statement and the appointment of the Scientific Directors. By the way: Without the HITS-Stiftung as the majority shareholder, no corporate resolutions could be passed.

How is HITS different from other institutions, and what makes it so exciting to you?

It fascinates me to facilitate a private institute that engages in interdisciplinary research on the basis of data analysis and that also explores and develops the necessary methodological tools for such analysis. Financially secure, optimally accommodated, and equipped with a highly sound infrastructure, HITS is an excellent place to conduct research in keeping with Andreas Reuter and Klaus Tschira's motto: "Think Beyond the Limits!"

Imprint | Dr. Peter Saueressig (V.i.S.d.P.), saueressig@h-its.org, Tel. +49 6221 533 245 | Pictures: HITS, Annette Mück | www.h-its.org

Behind the Science



The Charts