

Uncovering the structure of stars

What is inside the stars we see in the night sky? For a long time, we could only conjecture about the structure of a star. Nowadays, however, scientists can measure them with novel methods, such as asteroseismology. Astrophysicist **Saskia Hekker** studies oscillations in stars that shed light on the internal structures of stars and the changes they undergo. As of 1 September 2020, she is the leader of the new research group "Theory and Observations of Stars" (TOS) at HITS. She is also Professor in Theoretical Astrophysics at Heidelberg University and is a member of the Center for Astronomy of Heidelberg University. The new group will be hosted at HITS. This joint appointment is a perfect proof for the close cooperation between these institutions. Both Saskia Hekker and Friedrich Röpke are HITS astrophysicists with professorships at Heidelberg University. Saskia Hekker received her PhD from the University of Leiden

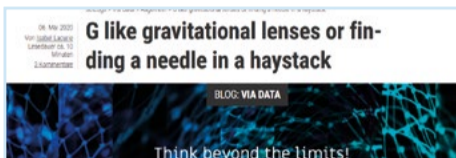


(the Netherlands) in 2007. After positions in Belgium and the UK, she was awarded a Veni Fellowship from the Netherlands Science Organization (NOW) in 2011 to conduct research at the University of Amsterdam. From 2013 on, she worked in Göttingen at the Max Planck Institute for Solar System Research, where she obtained a European Research Council (ERC) Starting Grant in the same year. In 2014, she was awarded a Max Planck Independent Research Group. Using these two grants, Saskia formed the SAGE (Stellar Ages and Galactic Evolution) group which became an international node of the "Stellar Astrophysics

Centre" (SAC), a center of excellence in research on the Sun, stars and extra-solar planets. The TOS group has inherited its SAC international node status from the SAGE group.

Observing stellar evolution

Saskia Hekker and her group aim to better understand the physical processes that take place in stars and how these processes change as a function of stellar evolution. Asteroseismic information from space telescopes combined with astrometric observations and state-of-the-art stellar models provides insights into the stellar structure and the physical processes that take place in stars. The TOS group focusses on low-mass main-sequence stars, subgiants and red giants. These stars are interesting as they go through a series of internal structural changes. Since they are potential hosts of planets and standard candles for galactic studies, both exoplanet studies and galactic archaeology will also benefit from an increased understanding of these stars.



Via Data

The HITS blog for its 10th anniversary year can be found at <https://scilogs.spektrum.de/via-data/>.

HITS

ERC Starting Grant and Emmy Noether group for Fabian Schneider

Astrophysicist **Fabian Schneider**, "Gliese Fellow" at Heidelberg University and visiting scientist in the PSO group (leader: Friedrich Röpke), has successfully applied for two large scientific funds: a Starting Grant of the European Research Committee (ERC) and the Emmy Noether Programme of the German Research Foundation (DFG). The 34-year-old will use the opportunity provided to establish his own junior research group at HITS. By next year, the institute will grow up to 13 research groups, three of



them working in astrophysics. The new group will mainly investigate the turbulent lives of massive binary stars and their explosive deaths in supernovae. A special focus will be on binary star mergers.

Fabian Schneider studied physics at the University of Bonn and completed his Ph.D. in astrophysics at the Argelander-Institut für Astronomie in 2015. Then he joined the Department of Physics of the University of Oxford as a "Hintze Fellow" and did research on massive stars, their magnetic fields and on supernovae. During this time, he

started to collaborate with **Friedrich Röpke** from HITS, a joint venture that became even more intensive after he moved to Heidelberg in 2018. Since then, Schneider has been a "Gliese Fellow" at the Center for Astronomy of Heidelberg University and, at the same time, visiting scientist in the PSO group at HITS. In October 2019, he published a study in "Nature" on the origins of magnetic fields in stellar mergers, together with colleagues from Garching and Oxford.

Junior professorship for HITS scientist

Timo Dimitriadis (CST) has accepted a call for a W1 junior professorship „Volks-wirtschaftslehre mit dem Schwerpunkt Empirische Wirtschaftsforschung“ at Heidelberg University.

New employees and visiting scientists

CCC: Michelle Ernst, postdoc
CST: Jonas Brehmer, doctoral student; Alexander Jordan, Staff Scientist
GRG: Brice Loustau, postdoc
MBM: Camilo Aponte-Santamaría, Staff Scientist; Kai Riedmiller, doctoral student ("HITS Lab")

HITS groups (09/2020): 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), Theory and Observations of Stars (TOS).

HITSters

Getting health data into shape

A multidisciplinary team has taken over the challenging task of gathering together the vast amount of data from large epidemiological studies and public health research in Germany with the goal of making these data accessible to the research community in line with data protection principles. With this goal in mind, a research data infrastructure for personal health data in Germany is set to be established: nfdi4health. The project – along with 8 other German research data infrastructures – will be funded by both the German Federal Government and German state governments. In support of the establishment and promotion of all research data infrastructures,



both the German Federal Government and individual states together intend to provide up to EUR 90 million annually until 2028.

HITS will be directly involved in the initiative as one of 18 partners under the direction of the Information Centre for Life Science (ZB Med). HITS will make its software suite "SEEK" available to the initiative and assume a leading role in the data standardization.

First application case: Task Force COVID-19

In the light of the corona pandemic, the "Task Force COVID-19" arose as part of the "nfdi4health" initiative. Research on the virus and on COVID-19 has led to a wealth of studies in a short period of time. In order to pool this valuable data, the task force aims to create a comprehensive inventory of German studies on COVID-19 with structured health data from study registries, health databases, vaccination

studies, and other sources. In addition, the working group will also develop guidelines, training material, and standards for data management as well as for the use of data, etc. The information will be made available via the websites of the Task Force COVID-19 and the "Competence Network Public Health COVID-19," an ad hoc association of over 25 scientific societies and organizations. The Task Force of 11 partners, including the Charité and the Robert Koch Institute, is now funded with approximately EUR one million by the German Research Foundation (DFG).

The SEEK platform, developed at HITS by **Wolfgang Müller** and his group with partners in the UK, plays a central role as a "hub" for bundling data and "metadata" (data about data). Moreover, HITS is also contributing its experience in the standardization of data. HITS scientist **Martin Golebiewski** leads a group that is working on a data model that will capture and structure data from all German studies and harmonize their metadata description.

More information: <https://www.nfdi4health.de>

Research

Behind the Scenes: Keeping Things Clean

"I love cleaning!" **Sevasti Efthimiou** laughs as she sits down at the spick and span table in the seminar room. As a team leader at WISAG Industrial Cleaning Baden-Württemberg, she and her colleagues **Marija Schlegel** and **Susana Menderez** make sure that HITS stays clean. Our interview with Sevasti constitutes the next chapter in our series "Behind the Scenes," which sheds light on the teams that make life at HITS so much better – and in this case, cleaner – in one way or another.



What does daily life look like for the cleaners at HITS?

SE: Susana and I begin at 6:00 in the morning and work until 3:00 in the afternoon. Marija is on duty from 7:00 to 11:00. By the time we get everything clean, we've walked a ton and climbed a lot of stairs. It's physically exhausting, but it also keeps us fit.

What makes a good cleaner?

SE: Being on time, reliable, and staying neat and clean are very important.

What do you like about your job?

SE: We feel good when we're at the Institute and are happy that the HITSters are so friendly and respectful. That's why we like being here. Unfortunately, that's not always the case in our line of work.

What prejudices do cleaners have to deal with?

SE: People often look at you funny. I used to work as a retail saleswoman in the textile industry. Some of my friends couldn't understand why I changed jobs at all. It's really sad how little respect people have for our job. But what a lot of people don't know is that the cleaning business is really family friendly. It lets a lot of women work and earn their own money and also take care of their families.

How has corona affected your work?

SE: At the beginning of the crisis, the building was empty all of a sudden because almost all the employees were working from home. It was a strange feeling. But then some work slowly

started to pick up here again. Special hygiene rules had to be implemented, so we only had to work reduced hours sometimes. Now, the cafeteria is back open, and the building is filling back up.

What is the most useful tool you have?

SE: Cleaning cloths are the no. 1 thing. They get rid of any stain. There are different colored cloths for different jobs, and they all have to be washed and used separately. Of course, we wear gloves. Hygiene is extremely important, and especially now since corona began.

How do HITSters feel about cleanliness?

SE: Most of them are actually very clean. We are always happy when the offices are tidy and there's no clutter on the desks. Unfortunately, the bathrooms aren't always kept clean even though everyone should know that they have to share them with everyone else – unlike their desks.

What do most people get wrong when cleaning at home?

SE: They leave too many things lying around and start cleaning in the wrong place. It's good to have a plan. You should start cleaning in the back of the room and finish at the door. And one more tip: Use a microfiber cloth for windows. It doesn't smear, it's almost streak-free. Everyone should have one at home.

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Behind the Scenes



The Charts

