



Meteorites and spectral colors: HITS at Explore Science

HITS will be participating in “Explore Science” for the eighth time. This year, the Klaus Tschira Foundation’s science event will follow the theme of “Astronomy”. The two HITS groups “Theoretical Astrophysics” (TAP) and “Physics of Stellar Objects” (PSO) will each provide an interactive stand at the event. At the HITS stand, young, curious scholars – as well as adults who have maintained their curiosity over the years – will have the opportunity to ask where the moon’s craters lie and to build their own spectrograph. “Explore Science” will take place from 13–17 June 2018 at Luisenpark in Mannheim. Admission is free. Entrance vouchers and the complete program are available at www.explore-science.info.



July 7: Open House at HITS

On Saturday, 7 July 2018, from 11:00 am to 5:00 pm, HITS will once again hold an open house. Visitors can look forward to a diverse program consisting of easy-to-understand lectures, guided tours of the institute, exciting hands-on activities for children and adolescents, as well as illustrative presentations by the individual HITS research groups. A stand offering galactic face painting will serve as a small highlight. Food and drinks will also be available. Moreover, there will be ample seating on the HITS campus. A shuttle bus will take guests from the Altstadt train station in Heidelberg to HITS and back again. More information is available at www.h-its.org.



“HITS is proud to be a collaborative partner of the ESO Supernova Planetarium and Visitor Centre.” Dr. Gesa Schönberger, Managing Director. Read more on the page “ESO Supernova.”



Anna Wienhard invited to speak at the ICM

“Groups and Geometry” (GRG) group leader **Prof. Dr. Anna Wienhard** has been invited to present at the International Congress of Mathematicians (ICM). The congress will take place in Rio de Janeiro, Brazil, from August 1–9, 2018. The ICM is hosted by the International Mathematical Union (IMU) once every four years. The conference is the largest international gathering in mathematics and invites a select group of mathematicians to report on the most important developments in the last four years. Being invited to give a lecture at the ICM is among the most prestigious recognitions of research accomplishment in mathematics. During the opening ceremony of the congress, the Fields Medals, the Nevanlinna Prize, the Gauss Prize, and the Chern Medal are awarded.



Tilmann Gneiting at the Imperial College London

HITS researcher und “Computational Statistics” (CST) group leader **Prof. Dr. Tilmann Gneiting** will be the speaker at the Departmental Colloquium series at Imperial College London, UK, on 11 June 2018. His presentation is entitled “Interpretation of point forecasts with unknown directive.” The Department of Mathematics’ Colloquium Series is attended by the world’s leading mathematicians and statisticians and began in 2010.

New members and visiting scientists

- IT Service:** Taufan Zimmer, system administrator
- MBM:** Dr. Krisztina Fehér, visiting scientist (University of Debrecen, Hungary)
- NLP:** Federico López, visiting scientist (research training group AIPHES)

HITS groups

Astroinformatics (AIN), 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 Computing (SCO), Scientific Databases and Visualization (SDBV), Theoretical Astrophysics (TAP).



“CONAN” helps molecular biologists

Proteins constantly move and change their conformation. With molecular dynamics simulations, researchers investigate how proteins could look. Proteins have a highly complicated and dense structure. 3D visualization helps us to understand their appearance, but the analysis is very challenging. Moreover, scientists risk overlooking aspects of their own results. The novel tool called CONAN (CONtact ANALysis) can alleviate these issues. **Dr. Csaba Daday** and **Prof. Dr. Frauke Gräter** (both from the Molecular Biomechanics group) as well as HITS alumnus **Dr. Davide Mercadante** developed the software that compresses 3D visualizations into simpler 2D image capturing (called contact maps). Contact maps measure inter-residue distances, thereby compressing 3D structures into 2D images. This process facilitates data interpretation because important changes are easier to spot. Analysis methods based on contact maps have thus far been used only to better understand single structures. With CONAN, these maps can easily be obtained for many structures, resulting in a contact map movie. The software is standardized, allows for several different types of analyses, is user-friendly, and doesn’t require programming experience. CONAN will help researchers to better understand and present their own results. The tool is open access and free of charge, and it is constantly being optimized.

CONAN: A Tool to Decode Dynamical Information from Molecular Interaction Maps. Davide Mercadante, Frauke Gräter, Csaba Daday. Biophysical Journal, Volume 114, Issue 6, pp. 1267–1273, 27 March 2018.

EuroNeurotrophin project begun

With the ageing population, neurodegenerative diseases (NDs), such as Alzheimer’s disease or Parkinson’s disease, are on the rise. Currently, there is no cure for these diseases, and most of the available drugs fail to tackle ND pathogenesis. Preclinical studies point to the therapeutic potential of neurotrophins, which are the proteins involved in the development and functioning of neurons. In the EU-funded project EuroNeurotrophin, 14 early-stage researchers will learn to use the potential of neuroproteins for the development of therapeutic drugs. Two researchers will be in the Molecular and Cellular Modeling group at HITS and work on the computer-aided design of neurotrophin mimetics. The project will run for four years.



Galactically good: ESO Supernova Planetarium und Visitor Centre

On 26 April 2018, after three years of construction, the ESO Supernova Planetarium and Visitor Centre was inaugurated. The new center at the European Southern Observatory headquarters in Garching (near Munich) is inaugurated from the Klaus Tschira Foundation. The state-of-the-art astronomy center was tailored to convey the wonder and significance of astronomy and astrophysics to the public. The idea for the center emanated from a collaboration between the ESO and HITS, the latter also being a collaborative partner of the new center.

Klaus Tschira assigned HITS to develop the conceptual design and scientifically support the first permanent exhibition, “The Living Universe.” “This was no accident,” said HITS Managing Director **Dr. Gesa Schönberger** at the opening at Garching. “Astrophysics and astroinformatics represent one of the key research areas at HITS.” One of the groups, “Physics of Stellar Objects” (PSO), even focusses its research on the “Supernova”: The researchers model the thermonuclear explosions of white dwarf stars leading to the astronomical phenomenon of Type Ia supernovae.

The ESO Supernova project group at HITS (with **Dr. Dorotea Dudas**, **Dr. Volker Gaibler**, and group leader **Dr. Kai Polsterer**) supplied its long-time scientific expertise in computer graphics, numerical mathematics, astronomy, and theoretical astrophysics to the project. Moreover, the group explored and developed interactive exhibits specifically for the ESO Supernova that will allow visitors to dive in to a broad range of topics by means of interactive computer simulations, virtual reality, and state-of-the-art computer graphics. Some of the interactive exhibits have already been applied successfully to outreach events for kids. The exhibition entitled “The Living Universe” consists of 13 astronomical topics spanning over 2,200 m² with a 255-meter-long spiral ramp that guides visitors through the exhibits. If you want to visit the ESO Supernova in Garching, all information regarding the program and details for planning a visit can be found at the ESO Supernova website: www.supernova.eso.org.

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THE CHARTS

