

PRESS RELEASE

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Nano Innovation Award 2019

X-ray vision on nanoparticles & a hall of mirrors for nanomicroscopy

The LMU Center for NanoScience (CeNS) and four spin-off companies jointly honor innovative theses from nanotechnology. Two junior researchers from Bayreuth and Munich receive the attractive Nano Innovation Award 2019.

On July 19, the Nano Innovation Award 2019 was presented at the Center for NanoScience (CeNS) of the Ludwig-Maximilians-Universität (LMU) Munich. Two young researchers from Bayreuth and Munich received the award for promising results as part of their master's or doctoral thesis in application-oriented nanosciences. The Bavarian-wide prize is endowed with €9,000 and is awarded annually by a jury of experts from science and business.

The focus of nanosciences is still on fundamental research. But in many areas, nanoscientific research has been transferred to technical applications - with great economic potential. The Nano Innovation Award focuses specifically on innovative work by junior researchers with promising application potential in technology or medicine.

A better understanding of nanoparticles' interactions



Nanoparticles finely distributed in solution are nowadays widely applied in industrial applications, e.g., as catalysts, as UV-filter in cosmetic products, in sunscreen, or as drug vehicles in biomedical applications. Since experimental access has been very difficult, only little is known so far about the properties and the structure of the interface between nanoparticles and surrounding water molecules. In her Master's thesis, **Sabrina Thomä from the University of Bayreuth** succeeded in investigating the arrangement of water molecules in the vicinity of iron oxide nanoparticles with high-energy X-rays. For this work, she was awarded the Nano Innovation Award in the master's category, worth €3,000. "I was surprised about the detailed insight into the hydration shells and that the water structure around 7 nm colloidal particles does not differ significantly from the structure at bulk surfaces", says Sabrina Thomä, who is currently a PhD student in Chemistry in the group of Mirijam Zobel at the University of Bayreuth.

One million photons – and only one is missing



The Nano Innovation Award for the best doctoral thesis, endowed with €6,000, went to **Thomas Hümmer** from the group of Prof. Theodor Hänsch at **LMU Munich and MPI for Quantum Optics**. In his work, Thomas Hümmer developed a new kind of highly sensitive microscope to explore optical properties of nano-objects. Using two opposing mirrors, light is reflected back and forth hundreds of thousands of times. If a nanoparticle is placed between the mirrors, its interaction with light will be strongly enhanced, allowing detection of light absorption as weak as one photon in a million.

As one of the mirrors is only the size of a human hair, a scanning microscope can be built that enables highly sensitive imaging and spectroscopy of tiny structures for material research, nanotechnology, and life sciences.

Thomas Hümmer has already developed a portable, fully functional prototype of this new microscope. Currently, he works on commercializing his findings by starting his own company.

An institution boosting careers

The LMU Center for NanoScience awarded the Nano Innovation Award together with four companies that are spin-offs from CeNS: attocube systems, ibidi, Nanion Technologies and NanoTemper Technologies. "With this award, we want to emphasize the importance of fundamental research as a basis for industrial applications. At the same time, we would like to encourage researchers to start their own companies with their expertise and ideas, thus making their knowledge applicable for many," says Dr. Philipp Baaske, CEO and founder of NanoTemper Technologies and member of the jury.

The Center for NanoScience (CeNS) is a scientific institution of LMU Munich that promotes and coordinates interdisciplinary research in the field of nanosciences. CeNS spans various disciplines such as physics, chemistry, medicine and pharmacy. In addition to working groups from LMU, CeNS also cooperates with groups from the Technical University of Munich, the University of Augsburg, the Max Planck Institute for Biochemistry and other institutions in the Munich area.

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