

From microscopy to nanoscopy: 2011 Meyenburg Award goes to Stefan Hell

The EUR 50,000 Meyenburg Award in 2011 goes to physicist Stefan Hell. He is honored for developing a whole new kind of light microscopy which makes it possible for the first time to observe living cells down to nanomolecular scale. The Meyenburg Award will be presented on Thursday, November 17, 2011 at a symposium held at the German Cancer Research Center (DKFZ).

Ever since Abbe's law of the diffraction barrier was established in 1873, it was held that resolution in light microscopy is limited by this barrier of 200 nanometers: For two dots to be distinguished, they need to be at least half the wavelength of visible light away from each other. It was not until 120 years later, in the early 1990s, that physicist Stefan Hell, director at the Max Planck Institute for Biophysical Chemistry in Göttingen and also divisional head at the German Cancer Research Center (DKFZ) in Heidelberg, was able to break the diffraction barrier and, thus, reach nanometer resolution.

Electron and scanning probe microscopes also make it possible to observe structures at nanoscale. However, for these techniques, samples need to be cut into ultra-thin sections, which makes it impossible to study intact or even living cells in this way.

In 1990, as a first step, Stefan Hell invented the 4Pi microscope, in which a sample is illuminated from two directions instead of only from one. This concept already improved the resolution by four to seven times. The next step towards even better resolution and finally breaking Abbe's diffraction law was stimulated emission depletion (STED) microscopy, a laser light technique based on the properties of fluorescence dyes which are used for dyeing proteins or DNA. STED can visualize biological structures that are up to 2000 times thinner than a human hair (20 to 50 nanometers). Most recently, Hell has succeeded in obtaining images of strands of human DNA using the STED method. In the future, it might thus become possible to discern repeats or losses within the DNA – defects which can cause severe diseases or even cancer.

Stefan Hell was born in 1962 and earned a PhD in physics from the University of Heidelberg in 1990. Following research positions at the European Molecular Biology Laboratory (EMBL) in Heidelberg and the University of Turku, Finland, he joined the Max Planck Institute for Biophysical Chemistry in Göttingen where he was appointed a Max Planck Director in 2002. Since 2008, Hell has been head of the Division of Optical Nanoscopy at DKFZ. For his work, Hell has already been honored with numerous awards including the German Future Prize for innovation and technology awarded by the German President (2006), the Gottfried Wilhelm Leibniz Prize (2008) and the Family Hansen Award (2010).

The award ceremony will take place at a scientific symposium hosted on this occasion by the Meyenburg Foundation on November 17, 2011, 1 p.m. to 5.30 p.m. at DKFZ's Communication Center. Among other contributors, physicist and extreme climber Alexander Huber will talk about the topic "Am Limit - Ein Physiker geht die Wände hoch" (At the limit – A physicist goes up the wall). Attached please find the complete program.

Dr. Marion Meyenburg, daughter of founders Wilhelm and Maria Meyenburg, will personally present the award to Stefan Hell at the end of the symposium. The Meyenburg Award honors outstanding achievements in cancer research and cancer treatment. Established in 1981, it is awarded annually and is one of Germany's science prizes with the highest award sums. The value of this distinction is also highlighted by the fact that several Meyenburg laureates have

been awarded the Nobel Prize for Medicine. Dr. Andrew Fire, Meyenburg Award winner of 2002, was awarded the Medicine Nobel Prize in 2006. In 2009, Dr. Elizabeth Blackburn, Meyenburg laureate in 2006, was awarded the Nobel Prize for Medicine.

Date: Thursday, November 17, 2011, 1 p.m. to 5:30 p.m.,
Kommunikationszentrum, German Cancer Research Center (DKFZ)

Journalists and interested members of the public are very welcome to attend.

For a picture of Stefan Hell please click:

<http://www.dkfz.de/de/presse/pressemitteilungen/2011/images/HellStefan.jpg>

The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) with its more than 2,500 employees is the largest biomedical research institute in Germany. At DKFZ, more than 1,000 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. Jointly with Heidelberg University Hospital, DKFZ has established the National Center for Tumor Diseases (NCT) Heidelberg where promising approaches from cancer research are translated into the clinic. The staff of the Cancer Information Service (KID) offers information about the widespread disease of cancer for patients, their families, and the general public. The center is a member of the Helmholtz Association of National Research Centers. Ninety percent of its funding comes from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg.

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