



PICOQUANT GmbH

News Release

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PicoQuants 15th "Anniversary" International Workshop on "Single Molecule Spectroscopy and Ultrasensitive Analysis in Life Sciences"

The International Workshop on "Single Molecule Spectroscopy and Ultra Sensitive Analysis in the Life Sciences" organized by PicoQuant GmbH celebrated its 15th anniversary this year. It was successfully held from September 15-18, 2009 at the WISTA Campus in Berlin-Adlershof, Germany. The aim of this annual workshop is to provide an interdisciplinary platform for users as well as developers from Physics, Chemistry and Biology to share their experience, exchange information and report their recent findings and developments in the rapidly evolving field of ultrasensitive optical detection and microscopy down to the single-molecule level. Due to the tremendous technical developments in the recent years it has become possible to detect, identify, track, and manipulate single molecules in an ambient environment or even in a live cell. Single-molecule approaches have changed the way many problems, especially in biology, are addressed, and new knowledge derived from these approaches continues to emerge.

Today, single molecules can be detected using widefield and confocal fluorescence microscopy, scanning optical nearfield microscopy (SNOM), atomic force microscopy (AFM) or Raman scattering. Even superresolution measurements below Abbe's classical diffraction limit are possible with classical light microscopes using techniques like stimulated emission depletion microscopy (STED), photo-activated localization microscopy (PALM) or stochastic optical reconstruction microscopy (STORM).

Many of the latest results obtained with these methods were presented at the 15th anniversary workshop, which was celebrated by opening one afternoon session to the public. This "open afternoon", which attracted more than 40 additional listeners from the local campus, included as a highlight a plenary talk given by the 2009 Otto-Hahn-Preis winner Stefan W. Hell (MPI Göttingen, Germany) about „Far-field optical nanoscopy“.

Overall, the 15th workshop was an outstanding event. It brought together the top researches in this field from all over the world. More than 170 participants enjoyed additional plenary lectures, given by Toshio Yanagida (University of Osaka, Japan) and W.E. Moerner (University of Stanford, USA) as well as 44 highly up-to-date talks. Latest results were discussed during two poster sessions with more than 70 Posters and the informal gatherings during the reception and course dinner lead to fruitful discussions about new ideas, projects and new networks.

In the field of microscopy development there was again a strong emphasis on high resolution techniques (Hess, Sauer, Hell) and on combined microscopy techniques to manipulate the sample for example with an AFM or optical tweezers under optical inspection (Taekjip Ha, Jan Vogelsang, Gopal Balasubramanian). Interestingly, one of the the most prominent features of single molecules, the "fluorescence blinking", in early days used as proof for reaching the single molecule level, then just regarded as an obstacle on the way towards bright and stable dye labels, is now again the key functionality for most optical high resolution techniques (Dertinger, Thorben, Cordes).

The workshop also showed that among more recent single molecule analysis schemes like FLCS (Hof) and Photon Antibunching (Herten) many single molecule assays and analysis procedures have been successfully transferred to regular use in commercial fluorescence microscopes (Künemuth,

PicoQuant GmbH
Rudower Chaussee 29 (IGZ)
12489 Berlin
Germany
Shipping address: Kekuléstr. 7

Tel: +49 30 6392 6560
Fax: +49 30 6392 6561
E-mail: info@picoquant.com
<http://www.picoquant.com>

Bank: Berliner Volksbank, 10892 Berlin
Account.-No.: 5610921002
Sort-Code: 10090000
IBAN: DE86100900005610921002
SWIFT Code: BEVODEBB

Managing Director: Rainer Erdmann
HRB 60901, AG Berlin-Charlottenburg
Tax-ID.: 37/464/20131
VAT-ID: DE812140373
WEEE-Reg.-No.: DE96457402

Krämer, Petrasek). They are now regarded as common and standard tools to study dynamics and conformations starting for example from small proteins (Schuler, Eaton) up to general questions in structural biology (Seidel).

A good tradition of the workshop is a special award of for the best student talk. As the quality of the students talks proved again to be excellent, it was impossible to nominate only one winner. The price therefore had to be split between Sebastian van de Linde (University of Bielefeld, Germany) and Stephan Uphoff (University of Oxford, UK) who each received 500 Euros.

The workshops was closed with a brief summary given by one of the single molecule pioneers, Michel Orrit from the university of Leiden. He took special emphasis on the great variety of methods (even in a combined way) now routinely used for single molecule investigations like fluorescence, scattering and AFM. Beside the traditional applications in the life sciences we saw also outstanding research results using e.g. single nanodiamonds for magnetometers, gold and silver particles for fluorescence enhancements and nanoantennas for light harvesting. In the life sciences the applications are also becoming more and more challenging. First observations of single molecules in a living mouse were reported as well as new insight to very complex protein folding processes.

Encouraged by this success the 16th workshop is already announced and will take place September 15 – 17, 2010 in Berlin-Adlershof, Germany. Details will be made available as soon as possible on the workshops website at http://www.picoquant.com/_workshop.htm

Invited speakers were the following:

- Jörg Enderlein (University of Göttingen, Germany)
- Taekjip Ha (University of Illinois, USA)
- Stefan W. Hell (MPI Göttingen, Germany)
- Sam Hess (University of Maine, USA)
- Johan Hofkens (KU Leuven, Belgium)
- Niek van Hulst (ICFO, Barcelona, Spain)
- W.E. Moerner (Stanford University, USA)
- Michel Orrit (Leiden University, The Netherlands)
- Markus Sauer (University of Bielefeld, Germany)
- Benjamin Schuler (University of Zürich, Switzerland)
- Claus A.M. Seidel (University of Düsseldorf, Germany)
- Toshio Yanagida (Osaka University, Japan)

Contact

Anika Vöge; mkt@picoquant.com
www.picoquant.com

About PicoQuant GmbH

PicoQuant GmbH is a research and development company, founded in 1996 and based in the Technology Park Berlin-Adlershof, Germany. Furthermore PicoQuant Photonics North America Inc. (PQPI) was established in April 2008. The company is leading in the field of Single Photon Counting Applications. The product line includes pulsed light sources, photon counting instrumentation, fluorescence lifetime spectrometer and time-resolved confocal microscopes. It employs around 40 people.