



## Program and Abstract Book

23. International Workshop on

# Single Molecule Spectroscopy and Super-resolution Microscopy in the Life Sciences

Berlin, Germany

September 13-15, 2017



PICOQUANT

# Program

## Wednesday, September 13

- 12:00 - 13:00 Registration and collection of workshop material
- 13:00 - 13:15 Opening Remarks by Rainer Erdmann, Berlin, Germany

Session: FLIM and FCS 1

Chair: Dagmar Klostermeier

- 13:15 - 13:45 **Julie Biteen**, *Ann Arbor, United States (Invited Talk)*  
Understanding Molecular-Scale Biophysics in Bacteria with Single-Molecule Imaging
- 13:45 - 14:05 **Ephrem Sitiwin**, *Bondi Junction, Australia (Student Award)*  
Application of label-free 2-photon fluorescence lifetime imaging microscopy to measure endogenous melanin profiles in human eye melanocytes, naevus and melanoma cells
- 14:05 - 14:25 **Rhys Dowler**, *Berlin, Germany*  
Quantitative Ultra-fast FLIM
- 14:25 - 14:45 **Elizabeth Hinde**, *Sydney, Australia*  
Imaging chromatin dynamics during the DNA damage response.
- 14:45 - 15:25 COFFEE BREAK

Session: FLIM and FCS 2

Chair: Julie Biteen

- 15:25 - 15:55 **Dagmar Klostermeier**, *Münster, Germany (Invited Talk)*  
Single molecule studies on the regulation of DEAD-box helicase activities by interaction partners and ancillary domains
- 15:55 - 16:15 **Antoine Delon**, *Grenoble, France*  
Combining Fluorescence Correlation Spectroscopy and Adaptive Optics for in depth measurements.
- 16:15 - 16:35 **Kristina Brrun**, *Potsdam, Germany (Student Award)*  
Interaction of drug-loaded liposome carriers with artificial cells - a quantitative study using 2P-FCS and FLIM
- 16:35 - 16:55 **Anjali Gupta**, *Singapore, Singapore (Student Award)*  
Plasma membrane organization and dynamics is probe and cell line dependent
- 16:55 - 17:15 **David Li**, *Glasgow, United Kingdom*  
Latest developments of CMOS single-photon avalanche diodes and programmable time-to-digital conversion for TCSPC applications
- 18:00 - ... WELCOME RECEPTION

## Thursday, September 14

Session: Biological applications 1

Chair: Bianxiao Cui

- 09:00 - 09:35      **Enrico Gratton**, *Irvine, United States (Invited Talk)*  
Measuring obstacles to molecular diffusion in live cells
- 09:35 - 09:55      **Stephan Uphoff**, *Oxford, United Kingdom*  
Single-molecule and single-cell imaging of DNA repair pathways in live cells
- 09:55 - 10:15      **Rebecca Andrews**, *Oxford, United Kingdom (Student Award)*  
A single-molecule sequencing method based on DNA binding
- 10:15 - 10:35      **Till Zickmantel**, *Lübeck, Germany (Student Award)*  
Detection of three discrete conformations of human dipeptidyl peptidase III using solution smFRET
- 10:35 - 11:10      COFFEE BREAK

Session: Biological applications 2

Chair: W.E. Moerner

- 11:10 - 11:40      **Bianxiao Cui**, *Stanford, United States (Invited Talk)*  
The role of membrane curvature at the nano-bio interface
- 11:40 - 12:00      **Klaus Yserentant**, *Heidelberg, Germany (Student Award)*  
Measuring the absolute degree of labeling for protein tag-based labeling in quantitative fluorescence microscopy
- 12:00 - 12:20      **Arvi Freiberg**, *Tartu, Estonia*  
Light-Induced Transformations of the LH2 Antenna Exciton Spectra
- 12:20 - 12:50      **Philip Tinnefeld**, *Braunschweig, Germany*  
DNA Origami Force Spectroscopy
- 12:50 - 13:00      GROUP PICTURE
- 13:00 - 14:10      LUNCH BREAK

Session: Super-resolution microscopy

Chair: Enrico Gratton

- 14:10 - 14:40      **W. E. Moerner**, *Stanford, United States (Invited Talk)*  
The Promise and Challenges of 3D Super-Resolution Microscopy and Single-Molecule Tracking in Cells and in Solution
- 14:40 - 15:00      **Johann Georg Danzl**, *Klosterneuburg, Austria*  
Coordinate-targeted fluorescence nanoscopy with multiple off-states

- 15:00 - 15:20      **Sebastian Isbaner**, Göttingen, Germany (*Student Award*)  
Nanometer Axial Colocalization of Single Emitters Using Metal-induced Energy Transfer
- 15:20 - 15:40      **Bartosz Turkowyd**, Marburg, Germany (*Student Award*)  
Blue and infrared light-induced photoconversion of green-to-red fluorescent proteins as a new approach in single molecule localization microscopy.
- 15:40 - 16:00      **Ron Tenne**, Rehovot, Israel (*Student Award*)  
Quantum correlation enhanced super-resolution microscopy
- 16:00 - 16:15      COFFEE BREAK
- 16:15 - 18:45      POSTER SESSION and PRODUCT DEMONSTRATION  
16:15 – 17:30 odd poster numbers  
17:30 – 18:45 even poster numbers
- 20:00 - 23:00      DINNER

## Friday, September 15

Session: Methods and techniques 1

Chair: Achillefs Kapanidis

- 09:00 - 09:35      **Niek F. van Hulst**, Castelldefels – Barcelona, Spain (*Invited Talk*)  
Single Molecule Spectroscopy in the Femtosecond Regime
- 09:35 - 09:55      **Tim Schröder**, Braunschweig, Germany (*Student Award*)  
Finding the Highest Labeling Density in DNA Origami
- 09:55 - 10:15      **Arindam Ghosh**, Goettingen, Germany (*Student Award*)  
Dynamics using Metal Induced Energy Transfer (DynaMIET): Probing Nanoscale Biomolecular Dynamics at Single-Molecule Level
- 10:15 - 10:35      **Maabur Sow**, Oxford, United Kingdom (*Student Award*)  
Size and Photophysical Characterisation of Nanodiamonds Using Fluorescence Wide-field Single-particle Imaging.
- 10:35 - 11:10      COFFEE BREAK

Session: FRET

Chair: Madhavi Krishnan

- 11:10 - 11:40      **Achillefs Kapanidis**, Oxford, United Kingdom (*Invited Talk*)  
Illuminating transcription mechanisms by single-molecule FRET

- 11:40 - 12:00 **Flurin Sturzenegger**, Zurich, Switzerland (*Student Award*)  
Probing transition path times of protein binding with single-molecule spectroscopy
- 12:00 - 12:20 **Sarah Adio**, Göttingen, Germany  
Release factor-mediated dynamics of the ribosome during translation termination monitored by single-molecule FRET
- 12:20 - 12:40 **Mikayel Aznauryan**, Aarhus, Denmark  
Folding dynamics of G-quadruplex DNA in dilute and molecularly crowded milieus
- 12:40 - 13:00 **Erik Holmstrom**, Zurich, Switzerland  
Using time-resolved single-molecule FRET to study the conformational dimensions of an intrinsically disorderd nucleic acid chaperone
- 13:00 - 14:20 LUNCH BREAK

Session: Methods and techniques 2

Chair: Niek van Hulst

- 14:20 - 14:50 **Madhavi Krishnan**, Zürich, Switzerland (*Invited Talk*)  
The electrostatic fluidic trap - a new tool for measurements on single macromolecules in solution
- 14:50 - 15:10 **Iman Esmaeil Zadeh**, Delft, Netherlands  
A near infrared single-photon detector with 3 ps timing jitter at 50 MHz count rate
- 15:10 - 15:30 **Dirk-Peter Herten**, Heidelberg, Germany  
Can we approach quantitative microscopy?
- 15:30 - 15:50 **Steven Magennis**, Glasgow, United Kingdom  
Structure and dynamics of DNA under crowding conditions
- 15:50 - 16:00 STUDENT AWARD PRESENTATION
- 16:00 - 16:10 CONCLUDING REMARKS
- 16:10 END OF WORKSHOP

<b>Presenter</b>	<b>Presentation time</b>	<b>Poster #</b>	<b>Title</b>
Berger, Yaron	16:15 - 17:30	P1	Fast and Efficient DNA Molecular Machines: A Bipedal Walker
Braun, Felis	17:30 - 18:45	P2	Chemical Switching in Fluorescence Microscopy
Budde, Jan-Hendrik	16:15 - 17:30	P3	STED-MFIS microscopy: Studying biomolecular systems beyond the diffraction limit with molecular resolution
Chmielewicz, Wioleta	17:30 - 18:45	P4	Protein counting in T-cell antigen receptor proximal signaling microclusters
Damm, Alicia	16:15 - 17:30	P5	Probing the interplay between the conformational dynamics of a bacterial ABC-transporter and its surrounding membrane mechanical properties using single molecule FRET method.
Ghosh, Arindam	17:30 - 18:45	P6	Fluorescence Lifetime Correlation Spectroscopy (FLCS) of microsecond rotational isomerization in a fluorescent protein
Grabenhorst, Lennart	16:15 - 17:30	P7	Detection of zika virus DNA using plasmonic enhanced nucleic acid hybridization probes
Gudnason, Daniel	17:30 - 18:45	P8	DNA mediated conformational control of DNA functionalized Poly(Phenylene-Vinylene)
Huisman, Maximiliann	16:15 - 17:30	P9	A test-tube for fluorescence microscopy
Jolmes, Fabian	17:30 - 18:45	P10	rapidFLIM: The New Innovative Method for Ultra-fast Imaging of Biological Processes
Karedla, Narain	16:15 - 17:30	P11	Fluorescence Lifetime Imaging based Single-molecule Localization Microscopy (FLISLM)
Kaufmann, Tanja	17:30 - 18:45	P12	Single cell measurements of protein-protein interactions upon DNA damage
Kreutzburg, Lars	16:15 - 17:30	P13	Investigation of particle dynamics at the endothelial surface layer using FCS
Langer, Torsten	17:30 - 18:45	P14	Improved Multi-parameter Wide-field Imaging and Spectroscopy System

**Poster presentations**  
(In alphabetical order)

<b>Presenter</b>	<b>Presentation time</b>	<b>Poster #</b>	<b>Title</b>
Li, David	16:15 - 17:30	P15	High linearity, low dead-time time-to-digital converters based on 28nm CMOS process suitable for multi-channel TCSPC applications
Li, Na	17:30 - 18:45	P16	A Single Gold Nanoparticle Enumeration Platform for Nonamplification DNA and RNA Detection Based on the Strand-displacement Reaction
Liu, Feng	16:15 - 17:30	P17	Cooperative hybridization based highly specific discrimination of single-nucleotide mutations
Mojiri, Soheil	17:30 - 18:45	P18	Multi-plane 3D Super Resolution Optical Fluctuation Imaging (SOFI)
Morten, Michael J.	16:15 - 17:30	P19	Conformational heterogeneity in a fully-complementary DNA three-way junction
Nettels, Daniel	17:30 - 18:45	P20	Combining short- and long-range fluorescence reporters with simulations to explore the intramolecular dynamics of an intrinsically disordered protein
Nobis, Max	16:15 - 17:30	P21	A RhoA-FRET biosensor mouse for intravital imaging in normal tissue homeostasis and disease contexts.
Pavlitá, Jan	17:30 - 18:45	P22	Observing photo physical properties of fluorescent dyes by single molecule fluorescence methods
Pisfil, Mariano Gonzalez	16:15 - 17:30	P23	Multi-Species Diffusion Studies in Membranes Utilizing Scanning FCS and Super-Resolution Microscopy
Qin, Shun	17:30 - 18:45	P24	Upgrade your Spinning Disk Confocal Microscope to Achieve Super-Resolution
Reiter, Kim Colin	16:15 - 17:30	P25	Evaluation of trFRET in comparison to smFRET with the model system dsDNA
Rohilla, Sumeet	17:30 - 18:45	P26	Discrimination of Autofluorescence and Immunofluorescence in Lung Tissue Using spectral FLIM
Schneider, Leonardo Berlim	16:15 - 17:30	P27	The Optical Properties of Flavonoids of Syngonanthus nitens Stem Extract

<b>Presenter</b>	<b>Presentation time</b>	<b>Poster #</b>	<b>Title</b>
Sharma, Dharmendar Kumar	17:30 - 18:45	P28	Ensemble and Single Particle Photophysical Characterization of (AgIn) <sub>x</sub> Zn <sub>2(1-x)</sub> S <sub>2</sub> Nanocrystals
Sozański, Krzysztof	16:15 - 17:30	P29	Quantitative Fluorescence Correlation Spectroscopy in 3D Systems under Stimulated Emission Depletion Conditions
Sýkora, Jan	17:30 - 18:45	P30	Mobility of G protein-coupled receptors determined by imaging FCS
Tsukanov, Roman	16:15 - 17:30	P31	Static and Dynamic Applications of Metal-Induced Energy Transfer: Resolving Nanometer Distances and Dynamics at Single Molecule Level
Tuma, Roman	17:30 - 18:45	P32	Dissecting steps in ATP-driven protein translocation through the SecY translocon.
Vera, Andrés Manuel	16:15 - 17:30	P33	Single-Molecule FRET studies of Cohesin-Dockerin Interactions
Yadav, Manoj	17:30 - 18:45	P34	TRPV3 mutants causing Olmsted Syndrome induce impaired cell adhesion and nonfunctional lysosomes
Yserentant, Klaus	16:15 - 17:30	P35	Optimized sample embedding schemes for quantitative correlative light and electron microscopy
Zalami, Daniel	17:30 - 18:45	P36	Non-invasive measurement of the void size distribution in nanoporous triblock terpolymer membranes with single-particle orbit tracking
Zawadzki, Pawel	16:15 - 17:30	P37	Tracking individual components of bacterial Nucleotide Excision Repair in living cells.

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