TECHNISCHE UNIVERSITÄT WIEN

INSTITUT FÜR ANGEWANDTE PHYSIK
Institute of Applied Physics
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IAP-SEMINAR

ANNOUNCEMENT

Date: **Tuesday, 21.3.2017**
Time: **16:00 s.t.**
Location: **Technische Universität Wien, Institut für Angewandte Physik, E134**
yellow tower „B“, 5th floor, Sem.R. DB gelb 05 B (room DB05L03), 1040 Wien, Wiedner Hauptstr. 8-10

Lecturer: **Clemens F. Kaminski**
Department of Chemical Engineering and Biotechnology, University of Cambridge, UK

Subject: **Optical superresolution microscopy of molecular mechanisms of disease**

Abstract: The self-assembly of proteins into ordered macromolecular units is fundamental to a variety of diseases. For example, in Alzheimer's Disease (AD) and Parkinson's Disease (PD), proteins that are usually harmless are found to adopt aberrant shapes; one says they 'misfold'. In the misfolded state the proteins are prone to aggregate into highly ordered, toxic structures, called protein amyloids and these make up the insoluble deposits found in the brains of patients suffering from these devastating disorders. A key requirement to gain insights into molecular mechanisms of disease and to progress in the search for therapeutic intervention is a capability to image the protein assembly process in situ i.e. in cellular models of disease.
In this talk I will give an overview of research to gain insight on the aggregation state neurotoxic proteins in vitro (1, 2), in cells (3, 4, 5) and in live model organisms (5). In particular, we wish to understand how these and similar proteins nucleate to form toxic structures and to correlate such information with phenotypes of disease (4). I will show how direct stochastic optical reconstruction microscopy, dSTORM, and multiparametric imaging techniques, such as spectral and lifetime imaging, are capable of tracking amyloidogenesis in vitro, and in vivo, and how we can correlate the appearance of certain aggregate species with toxic phenotypes of relevance to PD and AD (6-8).

(1) Pinotsi et al, *Nano Letters* (2013)
(2) Fusco et al, *Nat. Comm.* (2016)
(3) Kaminski Schierle, et al, *JACS* (2011)
(4) Esbjörner, et al, *ChemBiol* (2014)
(5) Kaminski Schierle, et al, *ChemPhysChem* (2011)
(6) Michel, et al, *JBC* (2014)
(7) Pinotsi, et al, PNAS (2016)

All interested colleagues are welcome to this seminar lecture
(45 minutes presentation followed by discussion).

G. Schütz e.h.
(Seminar-Chairperson)

F. Aumayr e.h.
(LVA-Leiter)