

The Fluorescence Applications in Biotechnology and Life Sciences Network
and
Fluorescence Imaging Group

invite you to a seminar on

**“Time Resolved Confocal Fluorescence Microscopy:
Novel Technical Features And Applications For FLIM & FCS”**

Dr Volker Buschmann, *Microscopy Division, PicoQuant GmbH*

Tuesday 19th February 2008, 11.30am – 12.30pm

WHERE: Old Geology Building, Theatre 2 – The University of Melbourne

(Old Geology is located next to Chemistry off Monash Rd. Theatre 2 is on the ground floor)

Abstract

Today, time resolved measurements allow us to follow fluorescence dynamics starting in sub-nanosecond range up to fluctuations in the second range and beyond. Our underlying data acquisitions principle (Time -Tagged Time -Resolved (TTTR) single photon recording) offers not only to acquire timing information but at the same time to store also spectral and spatial information for ever detected photon from the sample. Microscopy based on this unrestricted photon data acquisition approach enables one to easily study dependencies between the various fluorescence parameters. Furthermore, the significance and accuracy in common FCS (Fluorescence Correlation Spectroscopy) and FRET (fluorescence resonance energy transfer) analysis schemes can be improved applying sorting and weighting of the detected photons on the basis of the photon arrival time.

We will demonstrate the power of this approach for different techniques: On the one hand, this data format can be easily integrated into a confocal microscope and be utilized for fluorescence lifetime imaging microscopy (FLIM). In measurements with single molecule sensitivity, the nanosecond lifetime information allows easily to remove scattered light and common detector artefacts in standard FCS experiments. Moreover, Fluorescence Lifetime Correlation Spectroscopy (FLCS) offers the

possibility to separate FCS curves for species which differ only in their fluorescence lifetime but, for example, cannot be distinguished spectrally [1]. Another example for using nanosecond timing information is pulsed interleaved excitation (PIE) to identify single diffusing FRET pairs [2].

[1] Benda A., Hof M., Wahl M., Patting M., Erdmann R., *Rev Sci Instr.*, Vol. 76, 033106 (2005).

[2] S. Ruttinger, et al, *Journal of Biomedical Optics*, Vol. 11, 2, 024012 (2006).

Dr. Volker Buschmann

Born 18.12.1992 in Krefeld (Germany), Volker studied Chemistry in Bonn (Germany), Heidelberg (Germany) and Madrid (Spain) (Master 1998). He received his PhD in Chemistry in 2002 in the group of Markus Sauer and Jürgen Wolfrum at the University of Heidelberg about Fluorescence studies on single anchored molecules under aqueous conditions. 2003-2004 saw him do a Postdoc in the group of Ken Weston at Florida State University (Tallahassee, USA) about resonance energy transfer on RNA constructs; during 2004-2006 he did Postdoc in the group of Cristina Cardoso in Berlin (Germany) about single particle tracking in living cells. Since 2006 Volker has been working in the microscopy division of PicoQuant GmbH.

This is a free event