The 116th iCeMS SEMINAR

CeMI Seminar Series 32 **Leica Scientific Forum Kyoto 5**

Wed 29 August 2012
12:50-17:10

Venue: 2nd floor Seminar Room (#A207) Main Building
iCeMS Complex 1, Kyoto University

<Part 1: 13:00 - 13:45>

"Visualizing biochemical activities in living cells"

Prof. Kai Johnsson

École Polytechnique Fédérale de Lausanne

<Part 2: 13:45 - 14:30>

"Understanding regulation in biological systems through single-molecule imaging"

Assoc. Prof. Scott C. Blanchard

Weill Medical College of Cornell University

<Part 3: 14:50 - 15:35>

"Cellular trafficking of low-density lipoprotein derived lipids: insights from imaging"

Prof. Elina Ikonen

Institute of Biomedicine, Faculty of Medicine, University of Helsinki

<Part 4: 15:35 - 16:20>

"Spatial Control of Exocytosis: New nanoscopes and analysis to 'connect the dots'"

Assoc. Prof. Derek Toomre

Department of Cell Biology, Yale University School of Medicine

<Part 5: 16:20 - 17:10>

Poster Session in the Exhibit hall next to the seminar hall

Bring your posters. If you are interested in showing your poster, particularly to speakers, please contact Prof. Kusumi (address below) by August 20.After the poster session, an informal meet-the-speaker reception will take place at the Lounge, next to the seminar hall. Please join us for more personal discussions.

Contact: Aki Kusumi at fax: 751-4113
Hosted by: iCeMS (Institute for Integrated Cell-Material Sciences), Kyoto University
Co-hosted by: Center for Frontier Medicine, Global COE Program, Kyoto University

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Abstracts for August 29 iCeMS Seminar

Prof. Kai Johnsson <13:00 -13:45>

The visualization and characterization of biologically relevant molecules and activities inside living cells continues to transform cell biology into a truly quantitative science. However, despite the spectacular achievements in some areas of cell biology, the majority of cellular processes still operate invisibly, not illuminated by even our brightest laser beams. Further progress will therefore not only depend on improvements in instrumentation but increasingly on the development of new (fluorescent) sensors and other synthetic probes to target and characterize these activities. The research conducted by Dr. Johnsson addresses these needs by developing and applying chemical approaches to observe and manipulate protein function in living cells. In this talk, Dr. Johnsson will discuss (i) the design of new fluorescent probes and their applications in biology, (ii) chemical tools to study centrosome biology, as well as (iii) semisynthetic fluorescent sensor proteins.

Assoc. Prof. Scott C. Blanchard <13:45-14:30>

Dr. Blanchard has employed a battery of biophysical tools, including single-molecule fluorescence and fluorescence resonance energy transfer imaging, in order to gain new insights into the fundamentally dynamic nature of biological systems. Two, highly conserved biological processes remain the principle model systems investigated by his lab: ribosome-catalyzed protein synthesis and neurotransmitter-sodium symporter transport proteins that facilitate the movement of solute molecules across cellular envelope. Progress towards Dr. Blanchard's long-term goals of obtaining a deeper, quantitative understanding of how biological systems are regulated in the cell and directly imaging single-molecules in real time within living cells will be discussed.

Prof. Elina Ikonen <14:50 - 15:35>

Dr. Ikonen will discuss cholesterol and sphingolipid trafficking upon entry into the endocytic route via LDL-receptor mediated uptake. These include aspects of 1) lipid flow for recycling vs. degradation, 2) post-degradative exit of endo-lysosomal cholesterol and sphingolipids, and 3) delivery of degradation products to the plasma membrane.

Assoc. Prof. Derek Toomre <15:35 - 16:20>

A main focus of Dr. Toomre's talk will be the application on state of the art super-resolution microscopes (TIRFM, PALM, STED, SIM) to see cellular processes (e.g. cytoskeleton, membrane traffic) at an unprecedented resolution. A challenge, however, is to know how to connect the dots when analyzing spatial point processes so as to tell in an unbiased manner if they are 'linked' (same object) or correlated (same region). Herein, Dr. Toomre will discuss methods to see and control the dots (exo/endocytic events) and novel spatial statistics methods to quantify them. This reveals surprising spatial 'hotspots' and 'zones of exclusion' in cells and their potential significance will be discussed.

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