QBiC

QBiC SEMINAR

Eric Betzig

Janelia Farm Research Campus, HHMI

Friday, June 1, 2012

14:00 ~ 15:30

OLABB 3F Seminar Room (6-2-3 Furuedai, Suita, Osaka)

There will be a video broadcast in CDB Bldg. D, E-206

Pushing the Limits of Biological Fluorescence Microscopy

Summary

Optical microscopy has remained at the forefront of biological discovery for centuries. However, as our understanding of biological systems has increased, so has the complexity of our questions and the need for more advanced optical tools to answer them. For example, there is a hundred-fold gap between the resolution limits of conventional optical microscopy, and the scale at which molecules self-assemble to form sub-cellular structures. Furthermore, as we attempt to peer more closely at the three-dimensional dynamic complexity of living systems, the actinic glare of our microscopes can adversely influence or even kill the very specimens we hope to study. Finally, the heterogeneity essential to life, ranging from organelles within single cells to specialized cell types within tissues and organs, can seriously impede our ability to image at high resolution, due to the resulting warping and scattering of light rays. I will describe three methods developed in my lab to address these challenges: superresolution microscopy for imaging specific proteins within cells at near-molecular resolution; Bessel beam plane illumination microscopy for minimally invasive imaging of the three-dimensional dynamics within live cells and organisms; and adaptive optics to recover optimal images from within optically heterogeneous specimens.

Host:

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