

PHOTONICS SEMINAR

Dr. Eric Betzig

Pushing the Envelope in Biological Fluorescence Microscopy

June 5, 2013

2:00-3:00 p.m.

Room 901

Photonics Center

8 Saint Mary's Street

*Refreshments will
be served!*



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. Eric Betzig will describe three methods developed in his lab to address these challenges: super-resolution 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.

Dr. Eric Betzig is a developer of new optical imaging tools. He worked for six years at AT&T Bell Labs on the development of near-field optical microscopy. After a long detour from academia, he returned after learning about fluorescent proteins. This led to his co-invention of Photoactivated Localization Microscopy (PALM), a method to image proteins within cells at near-molecular resolution. Since 2005, he has been a Group Leader at the Janelia Farm Research Campus of the Howard Hughes Medical Institute, where he continues to develop new imaging tools. This includes Bessel beam plane illumination microscopy for noninvasive imaging of cellular dynamics in 3D and adaptive optics for deep tissue imaging.