

Departmental Colloquium

Thursday, September 21, 2017, 4:00 pm

Refreshments: 3:30 pm

GFS 116

Professor Alanna Schepartz

Department of Chemistry

Yale University

Visualizing organelle dynamics in live cells for (almost) forever at super-resolution

Abstract:

Imaging cellular structures and organelles in living cells by long-time-lapse super-resolution microscopy is extremely challenging, as it requires dense labeling, bright, photo-stable dyes, and non-toxic conditions. This lecture will describe a family of new chemical tools—high-density, environment-sensitive (HIDE) membrane probes—that enable exceptionally long-time-lapse, live-cell nanoscopy of discrete cellular structures and organelles with high spatio-temporal resolution. HIDE-enabled nanoscopy movies span tens of minutes, whereas movies obtained with analogously labeled proteins span tens of seconds. HIDE probes function in multiple organelles, do not require transfection or toxic additives, and are compatible with multiple super-resolution modalities. They have been applied to reveal 2D dynamics of the mitochondria, plasma membrane, and filopodia, and 2D and 3D dynamics of the endoplasmic reticulum, in living primary and cultured cells. HIDE probes also facilitate the acquisition of live cell, two-color, super-resolution images, greatly expanding the utility of nanoscopy to visualize the complex dynamic processes that underlie all cell biology.

Host: Matthew Pratt

The scientific community is invited