

Dear Faculty, IGERT Fellows, IGERT Associates and Students,

You are cordially invited to attend a Seminar presented by Stephanie Coffman. Please plan to attend.

Erica Freeman

IGERT Fellow

Date: Friday, June 6, 2014

Location: Bourns A265

Time: 11:00am

Cell Segmentation: Quantitative High-speed Imaging Of Entire Developing Embryos With Simultaneous Multiview Light-sheet Microscopy

Abstract:

Live imaging of large biological specimens is fundamentally limited by the short optical penetration depth of light microscopes. To maximize physical coverage, we developed the simView technology framework for high-speed in vivo imaging, which records multiple views of the specimen simultaneously. simView consists of a light-sheet microscope with four synchronized optical arms, real-time electronics for long-term sCMOS-based image acquisition at 175 million voxels per second, and computational modules for high-throughput image registration, segmentation, tracking and real-time management of the terabytes of multiview data recorded per specimen. We developed one-photon and multiphoton simView implementations and recorded cellular dynamics in entire *Drosophila melanogaster* embryos with 30-s temporal resolution throughout development. We furthermore performed high-resolution long-term imaging of the developing nervous system and followed neuroblast cell lineages in vivo. simView data sets provide quantitative morphological information even for fast global processes and enable accurate automated cell tracking in the entire early embryo.

