

Optical Methods in Neural Science

Course #: G80.3202001

Time: Tuesday, 2-4 pm

Room: Meyer, 815

The past decade has seen a rapid rise in the application of optical tools to neurobiological research. Much of this growth has stemmed from new advances in light microscopy, fluorescent probes, light-activated effectors, and digital image processing. This special topics course will introduce the principles and practice of these methods in neural science. Topics will include the following:

1. Physics of light
2. Light microscopy
3. Fluorescence microscopy
4. Confocal & 2-photon microscopy
5. Synthetic fluorescent probes
6. Genetic fluorescent probes
7. Calcium imaging
8. Voltage measurements
9. Photo-activation
10. In vivo studies
11. Image analysis

We will meet once a week, and each class will consist of a lecture followed by a group discussion of related primary literature. We will focus on recent papers in a variety of systems, including cultured neurons, brain slices and living animals. When possible, we will emphasize important considerations for design and construction of optical equipment. There will be no exam and grading will reflect the level of class participation.