

## BC665B: Advanced Topics in Cell Regulation: Modern Methods in Microscopy (Spring 2019) Syllabus

**Instructor:** Tim Stasevich, MRB 285 [Tim.Stasevich@colostate.edu](mailto:Tim.Stasevich@colostate.edu)

**Class:** Wednesday, 1/23–5/8 9AM – 10:50 AM (MRB 312)

**Office Hours:** After class or by appointment

**Description:** This course is designed to provide students with the background knowledge essential for understanding and using modern microscopes to their fullest. The first third of the class will cover the historical development of microscopes and will provide students with a deep conceptual understanding about light and how it is controlled and manipulated by microscopes. The second third will cover modern microscopes, including the standard classroom microscope, phase contrast and differential interference contrast microscopes, fluorescence widefield, confocal, and two-photon microscopes, and finally light-sheet microscopes. The last third (or a little less than a third) of the class will focus on acquiring and analyzing digital microscopy images. Here, ImageJ freeware will be utilized. For the most part, the class is lecture-based, however the last half of each class may be more practical in nature, including hands-on demonstrations and activities.

**Recommended Optional Texts** (handout will be provided when needed):

- *Optics* by Eugene Hecht
- *The Feynmann Lectures on Physics (Chapters 26-36)* by Richard Feynmann, Robert B. Leighton, and Matthew Sands (<http://www.feynmanlectures.caltech.edu/>)

**Online resources:**

- iBiology Microscopy Course – <https://www.ibiology.org/ibioeducation/taking-courses/ibiology-microscopy-course.html>
- Nikon MicroscopyU – <https://www.microscopyu.com/tutorials>
- Olympus Microscopy Resource Center – <http://www.olympusmicro.com/>
- Zeiss Campus – <http://zeiss-campus.magnet.fsu.edu/index.html>
- Leica Science lab – <https://www.leica-microsystems.com/science-lab/>

**Fun Historical Reading**

*Light: a radiant history from creation to the quantum age* by Bruce Watson

**Software:** *Microsoft Excel* – available via CSU site license; *ImageJ* – available for download free at <https://fiji.sc/> (Fiji Is Just ImageJ)

**Grading:** Traditional grading (A,B,C,...) based on homework (40%), a midterm exam (20%), a final exam (30%), and class participation (10%).