Imaging and Image Processing

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Christine Labno, Technical Director, UChicago Integrated Light Microscopy Core, who used to lead this session and who prepared many of these materials.

Goals: This tutorial is an introduction to imaging and image processing. We will use collection of data via light microscopy and image processing using the Java-based, open source software ImageJ/Fiji as our examples, but the concepts apply to all kinds of images and software-based processing methods.

Audience: As image-based datasets are becoming easier to obtain and evaluate, they are becoming more common in fields across the biological sciences. We hope this tutorial benefits both students who end up using image-based data in their research as well as students who are asked to evaluate image-based data created by others in their field.

Software Installation: If you already have ImageJ or Fiji installed on your laptop, congratulations! You're ready to go. If you don't, go to http://imagej.net/Fiji/Downloads and install the Fiji package that matches your OS (versions are available for Windows, OSX and Linux). If you're installing the version for Windows, I recommend installing the version that comes with Java unless you are positive you already have the correct version of Java installed on your computer.

Tutorial Structure:

8:30 – 9:20am: **Whole group lecture in LBG70.** Patrick talks about the fundamentals of digital imaging. There will be lots of pretty pictures. The slides for this talk are on the BSD-QBio4 GitHub under tutorials -> imaging -> readings.

9:20am – noon: Rotations to the microscope and image processing exercises. Small groups walk across the street to the MBL imaging core (second floor of Lillie building) for hands-on microscopy with Vicky. There will be lots more pretty pictures.

While rotations are happening, the rest of us will form groups of 2-4 people and work through ImageJ problem sets in LBG70 / get coffee in break area / try to look like we're doing something productive. Materials for the problem sets can be found on the BSDQBio4 GitHub under tutorials -> imaging -> data.

For the first hour-ish we will let you try the problem sets on your own, using the ImageJ Basics Handbook and Intermediate ImageJ Handbook (on the BSD-QBio4 GitHub under tutorials -> imaging -> readings). Patrick and TAs will answer questions and offer advise during this time. In the second hour-ish Patrick will work through the problem sets at the front so that everyone can see one possible solution to the problems.