

**CAMB 709 Quantitative Imaging and Analysis for Biologists (QIAB)
Fall 2021**

- Course Coordinators:** Andrea Stout, Ph.D: astout@pennmedicine.upenn.edu
Melike Lakadamyali, Ph.D: melikel@pennmedicine.upenn.edu
- Teaching Assistants:** Charlie Bond: bondcr@pennmedicine.upenn.edu
Melina Gyparaki: melinat@sas.upenn.edu
- Required materials:** A laptop with the free software Fiji (<https://fiji.sc/#download>) installed
- Lectures:** In-person on Tuesdays, 10:15 –11:45 AM in room 253 BRB II/III
- Workshops:** In-person on Thursdays, 10:15 – 11:45 AM in room 253 BRB II/III
- Quizzes:** On Canvas
- Fiji Exercises:** Submitted through Canvas
- Final Presentations:** During class sessions 11/30/21 and 12/02/21
- Grading for the course:** Your final grade will be based on the following:

Participation (30%): participation during Tuesday class sessions and attendance at Thursday workshops

Out-of-class homework (30%): Canvas quizzes and Fiji exercises. We will not assign grades but will keep track of each student's submissions

Final presentations (40%): The last two class sessions are set aside for student presentations: each student must give a very short (no more than 10 minutes) presentation that is either (a) an explanation of an image analysis protocol that makes use of one or more methods discussed in this class; or (b) an instructional presentation on how to use a Fiji plugin or other open source software (such as CellProfiler) that we did not cover in class.

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Tues, Sep 7	Light microscopy fundamentals	Andrea Stout
Thurs, Sep 9	Microscopy Practical Sessions	Melike Lakadamyali, Andrea Stout
Tues, Sep 14	Image data: signals, noise, sampling	Andrea Stout
Thurs, Sep 16	Microscopy Practical Sessions	Melike Lakadamyali, Andrea Stout
Tues, Sep 21	Intro to Fiji & digital data	Andrea Stout
Thurs, Sep 23	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Sep 28	Fluorescent probes; sample prep	Melike Lakadamyali
Thurs, Sep 30	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Oct 5	Processing and simple measurements	Andrea Stout
Thurs, Oct 7	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Oct 12	Macros	Andrea Stout
Thurs, Oct 14	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Oct 19	Intro to segmentation and object labels	Andrea Stout
Thurs, Oct 21	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Oct 26	Working with 3D and 4D data	Andrea Stout
Thurs, Oct 28	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Nov 2	Machine learning with Fiji and ilastik	Andrea Stout, Sandra Maday
Thurs, Nov 4	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Nov 9	Quantifying dynamic processes	Melike Lakadamyali
Thurs, Nov 11	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Nov 16	Guest Lecture	Andy Moore, HHMI Janelia
Thurs, Nov 18	Hands-on Fiji workshop	Andrea or Melike and TA
Tues, Nov 23	Quantitative Colocalization	Andrea Stout
Thurs, Nov 25	THANKSGIVING – NO CLASS	
Tues, Nov 30	Student presentations I	
Thurs, Dec 2	Student presentations II	