

SYLLABUS

ADVANCED TOPICS: MICROSCOPY Biology 518, SPRING 2007

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Office Hours: M, W, F: 1:30 pm - 2:20 pm (or by appointment)

Supplies: You will need a three-ring binder for the numerous handouts I will give you during class.

GENERAL OVERVIEW OF COURSE:

Microscopy (Biology 518) is a project-driven, techniques-based class. You will learn various procedures while using them to complete a research project. There are few traditional lectures. Instead, our scheduled class hours will consist of demonstrations of techniques by the instructor, small-group work with particular methods or instruments, or one-on-one working sessions. "Homework" will consist of your coming into the lab on your own time to practice and perfect techniques as you work on your project. Before you are free to work with an instrument on your own, you will need to pass a "precautions quiz" and/or "proficiency quiz" on use of that instrument.

You will learn techniques sequentially, working towards the basic goal of using microscopes to produce professional-quality photographs of some biological subject. By the end of the semester, you will be know how to

- (a) preserve and prepare specimens for light and electron microscopy,
- (b) operate the transmission & scanning electron microscopes,
- (c) take photographs using a compound light microscope,
- (d) use digital imaging programs to produce black and white photographic prints
- (e) interpret (make sense of) microscopical images of biological structures

You should expect each new technique to seem very complicated when it is first introduced. Techniques become easier and even routine as you repeat them and develop confidence in your abilities. By the end of this semester, you will probably feel like the once-famous American invertebrate zoologist Libbie Hyman did near the end of her long and scientifically productive life—that she was just beginning to get good at her work. **Throughout the course, however, you should strive for perfection in all of your work.**

In the world of biological research, learning about techniques is just a means to an end. The ultimate goal is to make discoveries and/or resolve questions about some biological system. This involves selecting a study organism, becoming familiar with the relevant published scientific literature about that organism, and formulating specific research goals. Formulating specific goals will lead you to work efficiently and provide you a practical basis for evaluating whether you have adequately learned to perform a particular technique. Also, if you have personal goals for the class, you are more likely to feel that the time you invest in the class is well spent.

Success in this class will involve training your mind as well as your hands.

Microscopy is an intellectual as well as a technical endeavor (like Tai chi, perhaps). You will need to be thoughtful and careful, plan before acting, pay attention to details, be patient, and be persistent. Few techniques work perfectly the first time you attempt them. Also, to produce really good photomicrographs you will need to exercise your artistic sensitivities!

GENERAL GUIDELINES and RULES FOR ROOM USE:

1. For your own health, be extremely careful of all chemicals used in this class. You must wear rubber gloves when working with chemicals and follow correct procedures for disposing of waste chemicals.

2. The instruments and supplies we use in this course are very expensive, so please do not abuse them. Learn and follow appropriate precautions for use of each instrument.

Until you have passed the relevant proficiency quiz, you may use an instrument only in pairs (one person checking the other).

If you detect problems with any instrument:

* Contact me (G. Shinn) immediately.

* Also, leave a note on the machine indicating your name, the date and time, and what specific type of problem you have encountered (so other possible users will know).

3. MG 1010 (The Microscopy Suite), the Old Hospital EM Center, and MG 3095 (my research lab) are community-use facilities—keep them clean & replace items as necessary.

These rooms contain a lot of things (delicate tools, important pictures or negatives, data sheets, etc.) that are NOT meant for use by students in the microscopy course. Please don't rummage through cupboards, empty out bowls that have specimens in them, borrow supplies for other research labs, etc.

4. Sign up for all use of instruments. This will allow you to plan your time appropriately and will allow the management to track you down if you leave a mess, forget to lock up, etc.

* Limit reservation times to 3 hours (so others have a chance and so that you do not get overly tired and start to make stupid mistakes).

* Your reservation is forfeit if you are more than 15 minutes late.

5. Keep outside doors to the microscopy suite and EM center locked at all times—especially after hours, even when you are inside. This is to prevent entry of innocently curious wanderers as well as malicious strangers.

6. I expect all students to attend all class meetings and to keep up current on all assignments. Please tell me in advance of any legitimate absences (such as for interviews, etc.)

7. Numerous small adjustments to the tentative schedule will be made as the course progresses—I may inform you of changes by e-mail; other changes will be announced during class.