BIOL/CBIO 5050L/7050L
Electron Microscopy Laboratory
Room 154 Barrow Hall
Dr. John Shields
Office: 152 Barrow Hall

The course is designed to give a practical introduction to Electron Microscopic Techniques available on the UGA campus and that may be used in research. We will primarily cover electron microscopy and associated sample preparation techniques, digital imaging, image processing and some analysis techniques. We will also touch on other microscopical techniques (e.g. light and confocal). The purpose of the course is to make you aware of the variety of microscopic techniques that are available, able to perform microscopy and sample preparation techniques as well as to make you a critical reviewer of data and protocols in the scientific literature. This course is designed to be highly practical and hands-on and scheduled from 2-4:45pm on Tuesdays and Thursdays. The nature of the course will require work outside of the assigned class times.

Suggested Text:
Electron Microscopy: Principles and Techniques for Biologists
by John J. Bozzola, Lonnie D. Russell. (Available as an electronic Resource through UGA library).
Reference books specific to your area of work are available at the Center and may be checked out at any time. Other resources are listed on the CAUR website.

Exams and project:
Students will be required to do three **projects**:
1. **TEM project** with supplied tissue
2. **SEM project** of Eleagnus leaf
3. **Personal project** to be determined by the student and instructor which can be based on the student's research. This project should have both SEM and TEM components.

The projects are to be written up as refereed journal submissions and will include a set of images (figures) documenting structures captured from the techniques covered in the course. These figures will be appropriate for submission to a journal in the student's area of study, with complete figure legends (captions describing the figures).
You will also **present your project** as if given at a scientific meeting – 15 minutes, to provide experience in presentation of data.

This class will conform to the **Academic Honesty Policy** set forth by the University as outlined at: http://www.uga.edu/honesty/ahpd/ACOH%20May%20'07.pdf

Course Schedule

8/19 Introduction to EM Facility/Laboratory Safety
21 Specimen Fixation for SEM (*Eleagnus* leaf tissue)
25 Specimen Fixation for TEM, dehydration,
28 TEM Prep continued (infiltration and embedding). SEM prep continued (critical point drying, mounting and coating
[INDIVIDUAL PROJECT PROPOSALS DUE] This is a concise one page abstract of your individual project to be done in lab. It should be a project that can be done in the course of the semester. **(20 pts)**
9/2 Tour of Vet Pathology EM Lab and Histology
4 Introduction to Zeiss SEM
9 Introduction to Zeiss SEM *Continued*
11 Digital image processing and figure creation using Photoshop
16 Knife making and block trimming
18 Work Day – SEM of Leaf Project
23 Grid post-staining [**SEM of Leaf Project Due]**
25 Basic operation of JEOL 1011 TEM
30 Operation of JEOL 1011 Continued
10/2 Support Films
7 JEOL 1011 TEM - Check out Examinations
9 Sectioning
14 Negative staining **(20 pts)**
16 Specimen Preparation for X-ray and carbon coating
21 Backscatter and X-ray on SEM **[SECTIONS ON GRIDS DUE] (20 pts)**
26 OPEN
28 OPEN
11/2 OPEN
4 Oxford X-ray System [**TEM IMAGES DUE] (20 pts)**
9 X-ray Projects (Graduate Students)
11 Shadow casts and Replicas
16 Electron Diffraction
18 Electron Spectroscopic Imaging and EELS or High Pressure Freezing
23 Cryo-preservation & Freeze fracture
Nov. 24-28 THANKSGIVING HOLIDAY
30 OPEN
12/2 Confocal Demo
7 **Project work day**
11 Presentations of Personal Projects (50 pts)
15 ALL WRITTEN PROJECTS DUE. Includes X-ray portion for graduate students