BIOL/CBIO 5040/7040
Electron Microscopy Lecture
Room 216 Biological Science Bldg
Dr. John Shields/Eric Formo
Office: 152 Barrow Hall, jpshield@uga.edu

The course is designed to give a theoretical and practical introduction to Electron Microscopy (EM) and techniques associated with EM. We will also briefly cover analogous instrumentation available on the UGA campus and that may be used in research. We will primarily cover the instrumentation and capabilities of scanning EM (SEM) and Transmission EM (TEM) 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, understand the data and information created, and make you a critical reviewer of data and protocols in the scientific literature. This course is scheduled from 2:30-3:20pm MWF. There are three exams during the course and a final exam.

Course Text:
Electron Microscopy: Principles and Techniques for Biologists
by John J. Bozzola, Lonnie D. Russell. (Available as an electronic Resource through UGA library). Should be available as a used book online if preferred.
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.

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

8/18	Course Introduction/Laboratory Safety
20	History of Electron Microscopy
22	Ultrastructure of Cells
25	Specimen Prep - fixation
27	Specimen Prep - dehydration
29	Sectioning/coating/films
9/1	**Labor Day**
3	Staining/Post staining /EM Artifacts
5	Negative Staining
8	**Exam 1**
10	Electron Guns
12	Electron Optics
15	Vacuum Systems
17	TEM design
19	SEM design
22	Beam/specimen Interactions
24	Electron Detectors - SEM

26 Electron Detectors - TEM
29 X-ray Detectors
10/1 Exam 2
3 Materials Sample Preparation
6 Electron Diffraction
8 STEM and EELS
10 MicroCT – Xray tomography
13 Variable Pressure SEM
15 Cryofixation for TEM and SEM
17 Tomography - TEM
20 Aqueous Samples in TEM
22 X-ray Diffraction (XRD)
24 Helium Ion Microscopes
27 Focused Ion Beam systems
29 Exam 3
31 Fall Break!
11/3 Imaging Devices
5 Image Processing
7 Image Analysis
10 Labeling – overview of techniques
12 Lectins and Enzymes
14 Immunocytochemistry
17 Autoradiography
19 Corrosion Casting
21 TBA
Nov. 24-28 THANKSGIVING HOLIDAY
12/1 Confocal Microscopy
3 Multiphoton Confocal
5 TIRF, FRAP, FRET
8 AFM
9 (Friday Schedule on a Tuesday) Review Session
12/11 Final Exam