BIOLOGY 556: SCANNING ELECTRON MICROSCOPY SPRING 2009

Solo use of the Facility equipment is predicated on successful completion of proficiency examinations for each instrument.

Your goal in this course is to learn to prepare a variety of specimens for scanning electron microscopy, and to image those samples at high resolution in the SEM. Using various detectors, you will be able to image a sample based on morphology, atomic number, and chemical composition at the surface. You will be able to diagram the various related pieces of sample preparation instrumentation and design preparation protocols for a variety of samples. You will learn basics of imaging. For the final portfolio, you will apply your knowledge of sample preparation and instrument operation to image 15 samples of your own choosing.

Initially students will work together in groups, but after the SEM practical each student **will work independently** on individual samples.

This course will take a minimum average of 3 hours per week in the laboratory. Students are not permitted to work in the laboratory outside of 8:30 am-5 pm M-F without express permission of Dr. Barlow. Students must log all their time in the laboratory and submit their weekly records along with their lab reports..

This class can fill a large portion of your life, so be sure you have the time for this class.

REFERENCES AVAILABLE IN THE LABORATORY

ELECTRON MICROSCOPY, J. Bozzola and L.Russell (1992)
BIOLOGICAL ELECTRON MICROSCOPY M. Dykstra (1992)
SCANNING AND TRANSMISSION EM Flegler et al. (1993)
WORKING WITH A SEM S. Chapman (1986)
Principles and Practice of X-Ray Microanalysis Oxford Instruments 1999

GRADING: Late assignments incur a grade increment/day late penalty

Topics to be covered, and the reports due for each:

Instrumentation practicals	required for unsupervised use of equipment	cr/ncr
Scope Test	SEM solo exam	cr/ncr
Imaging Basics	Making images look better	5 points
Lab report I	Working Distance	9 points
Lab report II	Tilt Comp	9 points
Lab report IIb	Dynamic Focus	9 points
Lab report III	Resolution & spot size	9 points
Lab report IV	Resolution & Working Distance	9 points
Lab report V	Accelerating voltage	9 points
Lab report VI	BSE & X-ray spectrum	9 points
Lab report VII	BSE & X-ray maps	9 points
Lab report VIII	SEM Image portfolio	9 points
Lab report IX	SEM Image portfolio/Class presentation	cr/ncr
Lab report X	Lab worklog of time and purpose in lab	5 points
Instrumentation Final Exam (Must pass to pass course)		9 points

Lab reports will consist of labeled images and discussion highlighting each of the techniques discussed. Additional guidelines/deadlines will be given in lab.

The lecture is Wednesday afternoon from 13:00-14:50 in LS 132. Wednesday afternoon lab (3:05-5:40 pm) will be a laboratory demonstration and student practice session in the EM Facility (Physical Science room 1). Until the solo exam, all students, in pairs, will meet weekly to practice on the SEM. Upon successful completion of the SEM solo exam, students will sign up for independent time on the scope as needed to carry out the laboratory exercises. Students will also maintain a log of equipment and preparation time in the lab, to be used as part of the final grade.