Advanced Microscopic Techniques; CHM 483/583 BSC 482/582
Spring 2007

Texts:
Light and electron microscopy / Elizabeth M. Slayter, Henry S. Slayter  
Publisher info: Cambridge University Press, 1992  
(Cambridge [England] & New York )

Lecture: Tues. and Thurs. 9:30-10:45  RCBBTSC room 107. Lecture attendance is required during entire semester.

Lab: The first 5-6 Labs will be arranged by us at first class meeting. Following these group meetings, lab time will be arranged by students, please schedule at least 2 hours collection and processing of image data (for your project) per week on appropriate instrumentation.
Lab reports for weeks 1-6 should include sections titled; introduction/goals, methods, results/discussion  
and should include detailed descriptions of the imaging tools used and parameters explored as well as a image(s) with a descriptive figure legend.

Faculty:
Dr. Norton (S-478), 696-6627, norton@marshall.edu, meeting by arrangement
Non-faculty lecture/lab:
David Neff (RCBBTSC-107), 696-3569, dneff@marshall.edu, meeting by arrangement

Grading: undergraduate and graduate credit:  55% research project, 10% each midterm and final exam, 5% quizzes on reading, 10% lab reports, 10% webpage

Masters Projects:  The masters students will be expected to perform comparative, quantitative image analysis of their sample. This will include use of analysis software and possibly instrumental calibration. For full credit, the masters students must prepare a brief but formal operating procedure so their analytical techniques can be carried out by others doing similar work.

Schedule:
week of 1/8 lab: intro. to computer station software/hardware (text chapter 1)
1/9 lecture: introduction to course, introduction to instrumentation and basic terminology, lab schedule setup
1/11 lecture: introduction to microscopic techniques and instrumentation at Marshall U.

1/15MLK day
week of 1/15  lab:SEM basic imaging skills / SEM beam parameters (text chapters 2,8,15)
1/16 lecture: brief history, specimen (matter), labels & contrast
1/18 lecture: probe/specimen interactions in light microscopy, SEM, fluorescence CSLM, and AFM

week of 1/22  lab: SEM beam parameters / SEM image quality and contrast (text chapters 3,4,6,7)
1/23 lecture: student presentation of project ideas (5 min. max/student with discussion, have at least one reference with hard copy for instructor)
1/25 lecture: student project ideas; database searches, literature review

week of 1/29  lab: EDS (x-ray spectroscopy with SEM)
1/30 lecture: microscope probe formation and control lenses, SEM, CSLM (text chapters 9,10,11)
2/1 lecture: microscope probe formation and control & signal detection AFM

week of 2/5  lab: light microscopy and CSLM; basic imaging skills  (text chapters 14,15)
2/6 lecture: signal detection SEM, CSLM, and the eye
2/8 lecture: what is resolution (in space, time and energy)

week of 2/12  lab: CSLM optimize and process images  (text chapters 18 (18.5 & 18.8))
2/13 lecture: data processing with Image J, CAS, and Nanorule
2/15 lecture: Midterm exam (covering reading, lecture and labs)

week of 2/19  lab: atomic force microscopy on PacificNanotecnology NanoR
2/20 lecture: Student projects; introduction, materials and methods
2/22 lecture: Student presentations; introduction, materials and methods (powerpoint style presentation recommended 10 min. max/student)
week of 2/26 lab: class projects
2/27 lecture: Tiffany Blair on web page preparation (Marshall University web administrator)
3/1 lecture: Student projects; progress, problems and preliminary results

week of 3/5 lab: class projects
3/6 lecture: Student projects; progress, problems and results
3/8 lecture: Student projects; progress, problems and results

week of 3/12 lab: class projects
3/13 lecture: Student projects; 1st draft abstracts due
3/15 lecture: Student projects; progress, problems and results

3/18-3/25 spring break

week of 3/26 lab: class projects
3/27 lecture: Student projects; results and discussion
3/29 lecture: Student projects; results and discussion

week of 4/2 lab: class project
4/3 lecture: Student projects; results and discussion
4/5 lecture: Student projects; results and discussion, final draft abstract due

week of 4/9 lab: class projects-final week for data collection and analysis
4/10 Student projects; results and discussion
4/12 Student projects; results and discussion

week of 4/16 lab: class projects, posters must be ready to print
4/17 lecture: Student presentations, practice poster presentations
4/19 lecture: Student presentations, practice poster presentations

week of 4/23 Sigma Xi research day week (troubleshoot and hang posters, web page preparation)
4/24 Sigma Xi research day (final preparation and practice, web page preparation)
4/26 or 27 Sigma Xi research day (this date is tentative)

week of 4/30: web page due, final exam week