

OPTICAL MICROSCOPY AND IMAGING IN THE BIOMEDICAL SCIENCES

October 7 - October 16, 2008

COURSE SCHEDULE

Tuesday, October 7

ORIENTATION 7:00 p.m. SPECK AUDITORIUM – Rowe Bldg.

Introductions
Overview of course Colin Izzard, Robert Hard and Faculty

PIZZA PARTY 7.45 p.m. LOEB, SECOND FLOOR

*Lectures will be in Speck Auditorium – Rowe Building (R)
Laboratory will be in Loeb (L), second floor
Meals will be in Swope (S) dining room*

Wednesday, October 8

8.30	R	Geometric optics and image formation	Rottenfusser
10.00	L	Coffee	
10.15	L	Rotation I: Different microscope stands	Commercial Faculty
11.00	R	Image formation (continued)	Rottenfusser
12.00	S	Lunch	
1.00	L	Specimen preparation Specimen requirements	Hard and DePasquale
1.30	L	Practice in use of different microscope stands Koehler illumination Use of diaphragms	Commercial Faculty
5.00	R	Lens Design	Rottenfusser
6.00	S	Dinner	
7.00	R	Detection of light and fundamentals of electronic image formation	Moomaw
9:00	L	Rotation II: Video cameras, image processors	Commercial Faculty

Thursday, October 9

8.30	R	Wave Optics, Diffraction and Abbe's theory	Hard
10:00	L	Coffee	
10.15	L	Demonstration: Abbe's diffraction apparatus	Hard
11.00	R	Digital Imaging I	Murray
12.00	S	Lunch	
1.00	R	Phase contrast microscopy; Dark field microscopy	Hard
1.45	R	Incident light microscopy: Interference reflection microscopy and other applications	DePasquale
2.30	L	Laboratory: Resolution tests. Phase contrast Demonstrations: Dark-field Microscopy and Interference Reflection Microscopy	Hard, Izzard and Commercial Faculty
4.00	L	Laboratory: Use of video cameras	Commercial faculty
4:30	L	Image Basics I	Commercial faculty
5.30	L	Problem Set 1 Video cameras, resolution test slide, phase contrast	Students Only
6.00	S	Dinner	
7.00	R	Polarization microscopy I	Hard
8.30	L	Laboratory: MacroPol exercises	Hard and Sigurdson

Friday, October 10

8.30	R	Polarization microscopy II	Hard
9.30	L	Coffee	
9:45	L	Laboratory: Polarization microscopy	Hard, Sigurdson and Commercial Faculty
12.00	S	Lunch	
1.00	R	Differential interference contrast microscopy	Hard
2.30	L	Laboratory: Differential interference contrast microscopy	Hard, Izzard and Commercial Faculty
6.00	S	Dinner	
7.00	L	Laboratory: Image Basics II	Commercial Faculty
7:30		Video DIC and POL exercises	Hard, Izzard and Commercial Faculty
9:00	L	Problem Set 2 Video cameras, POL and DIC	Students Only

Saturday, October 11

8.30	R	Introduction to fluorescence	Waterman
10.00	L	Coffee	
10.30	R	Laboratory: Fluorescence microscopy, sample preparation	Waterman, Izzard, DePasquale, Commercial Faculty
12.00	S	Lunch	
1.00	R	Advanced fluorescence microscopy I Colocalization, TIRF, Live Cell and Speckle Imaging	Waterman
2.00	L	Laboratory: Fluorescence microscopy, sample prep. continued	Waterman, Izzard, and DePasquale

Saturday Schedule continued on next page

4.30	R	Demonstration: Spectra and Optical filter properties Low-light level cameras. Image intensifiers; cooled CCD cameras, video rate and slow-scan	Commercial Faculty Moomaw
6.00	S	Dinner	
7.00	L	Signal to noise ratio in fluorescence microscopy.	Moomaw
7.30	L	Demonstrations: Characteristics of low-light level cameras; Image intensifiers; cooled video-rate and slow-scan CCDs	Commercial Faculty
9.30	L	Problem Set 3 Low-light level cameras and image processors with fluorescent labeled specimens	Students Only

Sunday, October 12

8.30	R	Advanced Fluorescence II FRAP/FLIP, Fluorescence Correlation Spectroscopy, Fluorescence Polarization	Piston
9.30	R	Advanced Fluorescence III - FRET and FLIM	Piston
10.30	L	Coffee	
11.00	R	Digital Imaging Principles - II	Murray
12.30	S	Lunch	
1.30	L	Demonstrations: Digital image processing	Murray and Commercial Faculty
5.00	R	Digital imaging principles - III	Murray
6.30	S	Dinner	
7.30	R	Digital Image Restoration	
9.00	L	FRET/FLIM Demo	Piston and Commercial Faculty

Monday, October 13

8.30	L	Laboratory: Digital image restoration systems	Commercial Faculty
10.00	L	Coffee	
10.30	L	Laboratory: Digital image restoration systems (con't)	Commercial Faculty
12.00	S	Lunch	
1.00	R	Confocal scanning microscopy	Murray
2:30	L	Laboratory: Introduction to confocal scanning microscopy	Sigurdson and Commercial Faculty
6.00	S	Dinner	
7:00	R	Structured Illumination, Super-Resolution	Faculty
7:45	R	Multiphoton Imaging	Piston
8:30	L	Demonstration: Multiphoton; & Preparation for Problem Set Presentation	Piston

Tuesday, October 14

8.30	R	3D Visualization	Frischmann
10.00	L	Coffee	

Tuesday Schedule continued on next page

10:30	L	Problem Set Discussion	All
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12.30	S	Lunch	
1.00		Free Time -Revisit equipment/exercises Pursue own projects	Commercial Faculty
6.30	S	Cocktails - Lounge	
7.30	S	Banquet - Meigs Room	
9.15	L	Free time	

Wednesday, October 15

8.30	L	Comparative Exercises Two photon excitation fluorescence versus confocal microscopy versus deconvolution	Hard, Sigurdson, and Commercial Faculty
11:00	L	Comparison of results	Sigurdson
12.00	S	Lunch	
Afternoon Demos			Commercial Faculty
1.00	L	Culture chambers	
2:00	L	TIRF/FRAP	
3:30	L	Spinning Disk Confocal	
5:00	L	Structured Illumination	
6.00	S	Dinner	
7.00		THE KIDD Open discussions	Academic and Commercial Faculty

Thursday, October 16

7.00	S	Breakfast and Departure	
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