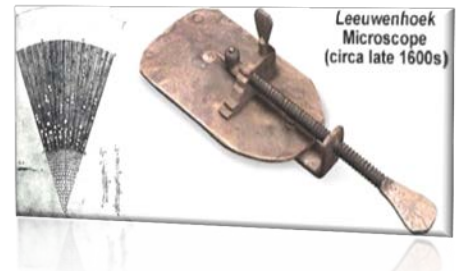


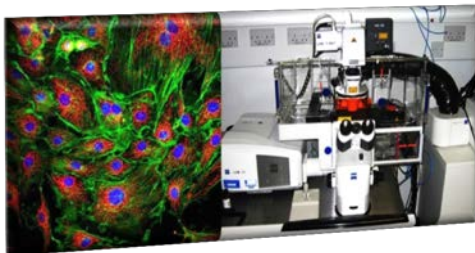
BIOLOGY 698-004: ADVANCED IMAGING TECHNIQUES

INSTRUCTOR:	Dr. Dirk Bucher ▪ bucher@njit.edu	INSTRUCTOR:	Dr. Gal Haspel ▪ gal.haspel@njit.edu
OFFICE:	Central King Bldg.	OFFICE:	Central King Bldg.
OFFICE HOURS:	W: 2:00pm – 3:00pm	OFFICE HOURS:	W: 2:00am – 3:00pm
COURSE SCHEDULE:	W: 10:00AM – 12:55PM ▪ CKB 326		

COURSE DESCRIPTION: Imaging tissues, cells, and organelles is an integral part of modern biology. This combined lecture and lab course will introduce the students to a variety of approaches to examine biological structures at different scales (from molecules to organisms): conventional light microscopy, fluorescent microscopy, modern high resolution light microscopy, and electron microscopy. In addition, the course will cover optical approaches to study the dynamics of cellular function, including calcium and voltage imaging, and molecular interactions.



Classes will be composed of a lecture followed by a lab session. In typical lab sessions students, often working in teams, will address a cell physiological problem utilizing microscopy techniques as well as learning basic cell biological techniques such as handling/maintaining cells and introducing probes. Students will be required to keep laboratory notebooks where they keep record of that day's experiments. Course grade will be based on lab reports, presentations of an imaging technique or cell biology subject.



COURSE PREREQUISITES:

Basic knowledge of cell biology and basic optics is recommended.

REQUIRED TEXT:

None, but extensive online material will be provided.

IMPORTANT RULES COURSE POLICIES:

- ⊗ **Academic Integrity:** The University Code on Academic Integrity is strictly enforced! (<http://www.njit.edu/education/pdf/academic-integrity-code.pdf> ▪ <http://www.ncas.rutgers.edu/oas/ai>).
- ⊗ **Electronic Devices:** The use of cell phones and other electronic devices during class or exam times is prohibited.
- ⊗ **Attendance and Participation:** Students must attend all classes and laboratory steps. Absences from class will be recorded. Two (2) absences will result in a warning. More than 2 absences may result in removal from the class. Absences also will hinder your ability to fully participate in class discussions and problem solving sessions and, therefore, affect your grade. There will be no makeup for missed laboratory sessions.

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GRADING POLICY:

GRADING	POINTS
Literature Presentations & Participation	50%
Laboratory Reports	50%
TOTAL	100%

GRADUATE GRADING SCALE			
A	88-100	C+	67-73
B+	81-87	C	60-66
B	74-80	F	0-59

- ⊕ Two days in the course are dedicated to student presentations. All students will be assigned research methodology papers on both days that they will present.
- ⊕ For each lab day, students are expected to write short reports (1-3 pages) about their results of the day that are due no later than the following week.
- ⊕ There will be a group assignment to produce presentation posters.

COURSE OUTLINE:

WEEK	DATE	LECTURE TOPICS
Week 1	1/20	Introduction
Week 2	1/27	Contrast
Week 3	2/3	Fluorescence
Week 4	2/10	Stains
Week 5	2/17	Student Literature Presentations-cell biology
Week 6	2/24	Confocal Microscopy
Week 7	3/2	Quantifying Images
Week 8	3/9	Two-photon
Week 9	3/16	MARCH 13-20: SPRING BREAK – NO CLASSES
Week 10	3/23	Superresolution
Week 11	3/30	Electron Microscopy
Week 12	4/6	Calcium
Week 13	4/13	Voltage
Week 14	4/20	Optogenetics and Other Actuators
Week 15	4/27	Student Literature Presentations – Students Choice
Week 16	5/4	TBD
FINALS		FINAL EXAM WEEK: MAY 6-12, 2016