CBPH 850 MODERN CONCEPTS IN CELL BIOLOGY Fall 2019

Tuesday and Thursday 3:00-5:00 PM, MBRB rm 6201, 4 credit hours
Course Director: Scott Hammond

Exploiting microscopy to reveal subcellular organelle localization, dynamics, and function
(Stephanie Gupton, Joe Costello, Sarah Cohen, Wes Legant, Tony Amelio)
Tue Aug 20  Fluorescence Microscopy for Cell Biology (Gupton)
Thu Aug 22  Confocal and Live-Cell Microscopy (Cohen)
Tue Aug 27  How TIRF Microscopy Works and When to Use It (Gupton)
Thu Aug 29  Superresolution Microscopy (Cohen)
Tue Sept 3  Light Sheet Microscopy, SiM, and New Developments in Microscopy (Legant)
Thu Sept 5  Bridging microscopy and genetics (Amelio)

Genetic Approaches in Cell Biology
(Pat Brennwald, Amy Gladfelter, Jay Brenman, Amy Shaub Maddox, Rob Dowen)
Tue Sept 10  Intro to Yeast Genetics and the Secretory Pathway (Brennwald)
Thu Sept 12  Classical Genetics and Epistatic Analysis of Transport (Brennwald)
Tue Sept 17  Molecular Genetics: Cloning the first Rab GTPase (Brennwald)
Thu Sept 19  Advanced Yeast Genetics (Brennwald & Gladfelter)
Tue Sept 24  Introduction to Fly Genetics (Brenman)
Thu Sept 26  Modern Fly Genetics (Brenman)
Tue Oct 1  C. elegans as a Model System for Cell Biology (Shaub Maddox)
Thu Oct 3  Metabolism and gene regulation in C. elegans (Dowen)

Genomics, Proteomics, and Bioinformatics in Cell Biology
(Scott Hammond)
Tue Oct 8  RNAi and other loss of function approaches
Thu Oct 10  Genome Editing with CRISPR/Cas9
Tue Oct 15  Break day (exam, no class)
Midterm exam – take home exam – due Mon Oct 21 at 11:00 AM
Thu Oct 17  Fall Break-NO CLASS
Tue Oct 22  High Throughput Genomics
Thu Oct 24  Single cell approaches to cell biology
Tue Oct 29  Bioinformatics

Protein Quality Control and Proteostasis (Doug Cyr)
Thu Oct 31  Quality Control
Tue Nov 5  Chaperones
Thu Nov 7  ER Quality Control
Tue Nov 12  Quality Control and Human Disease

Discoveries & Controversies in Membrane Trafficking
(Stephanie Gupton, Patrick Brennwald, Jimena Giudice)
Thu Nov 14  An InterGolgi Assay and the Directionality of Transport
Tue Nov 19  Coat Proteins and Vesicle Production
Thu Nov 21  Fusogenic Factors from Yeast to Man & the SNARE Hypothesis
Tue Nov 26  Resolutions & Ongoing Controversies in Membrane Trafficking
Thu Nov 28  Thanksgiving-NO CLASS

Final exam - take home exam - due Mon Dec 3 at 11:00 AM
**Time & Place**
Class will meet Tuesdays and Thursdays from 3:00-5:00 PM in 6201 MBRB unless noted otherwise.

**Format**
Classes usually begin with a faculty member discussing the key ideas and points in a given area. The second half of each class is usually reserved for a student led discussion of papers from the primary literature, although there will sometimes be demonstrations or tutorials. Because the course is driven by discussions of the primary literature, it provides excellent experience both in cell biology and in the analysis of scientific papers. Active participation of all students in presentations and discussions is a key part of the course.

**Course Website**
Course materials such as reading assignments and discussion papers will be posted to the course website on Sakai.

**Student Assignments**
For most of the classes, groups of students will be assigned to present and lead discussion on research papers. Students listed first and marked with an asterisk are expected to present a few minutes of introduction and background information to “set the stage” for discussing the paper. The student(s) who are presenting a paper are expected to lead the discussion, but **EVERYONE IS EXPECTED TO HAVE READ EACH PAPER AND TO CONTRIBUTE TO THE DISCUSSION.**

**Optional text**
Although the reading materials for course such as review articles and research papers will be posted to the Sakai website, those who need to strengthen their background in a given area (or want become more expert) will benefit greatly from reading the relevant chapters in Alberts et al, Molecular Biology of the Cell (6th edition). Alberts is a superb text that provides a systematic coverage of cell biology.

**Grading**

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<th>Component</th>
<th>Weight</th>
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<tr>
<td>Paper Presentations:</td>
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<td>Class Participation:</td>
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<td>Midterm exam</td>
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<td>Final exam</td>
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Students are also required to complete an anonymous course evaluation at the end of the semester.