

Fall 2018

Biochemistry/BMC 701:

Credits: 1

Canvas Course URL: <https://canvas.wisc.edu/>

Course Designations and Attributes: Graduate course

Meeting Time and Location:

Thursdays 3:30 pm Room 175 Biochemical Laboratories

Instructional Mode: Face-to-Face instruction/Discussion

Specify how Credit Hours are met by the Course: One 1-hour session per week over approximately 15 weeks.

INSTRUCTORS

Instructor Titles and Names:

Professors Michael M. Cox (cox@biochem.wisc.edu)
Christina Hull (cmhull@wisc.edu)
James Dahlberg (dahlberg@wisc.edu)
John Denu (jmdenu@wisc.edu)
Thomas Martin (tfmartin@facstaff.wisc.edu)
Robert Landick (landick@biochem.wisc.edu)
David Brow (dabrow@wisc.edu)
Margaret Clagett Dame (dame@biochem.wisc.edu)

Instructor: Josh Carson (jcarson@warf.org)

Instructor Availability: by appointment

Instructor Email/Preferred Contact: cox@biochem.wisc.edu

OFFICIAL COURSE DESCRIPTION

Course Description

As approved through governance, presented in the Guide.

Training for the practical aspects of being a scientist and professional responsibility. Will cover research misconduct, the protection of human subjects, the welfare of laboratory animals, conflicts of interest, data management practices, mentor and mentee responsibilities, collaborative research, authorship and publication, peer review, and more.

Enroll Info: Admission to the IPiB grad program

Requisites: Admission to the IPiB grad program

Breadth – Required of all graduate students in the two programs

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

LEARNING OUTCOMES

Course Learning Outcomes:

Students will become familiar with all important topics involving professional responsibility and ethics in research.

GRADING

Grading is based on attendance, participation in Discussion, and submission of two short written assignments. Attendance is required, and absences must be arranged in advance with instructor. Absence at more than one session will lead to class failure and a requirement to re-take the course.

Required for and limited to students in the IPiB and Biophysics graduate programs

1 credit 1 hour + (lecture + discussion) each week

Thursdays at 3:30 PM Room 175 Biochemistry Addition

Schedule:

1. September 6 Lead: Michael Cox (Brow)

Science and Society: Science, scientists, and the scientific method(s).

Science.

Scientific method and its variants

Definition of a scientist

Definition of a scientific idea.

Definitions of hypotheses, theories, etc, in a scientific context.

Central role of reproducibility and honesty

Responsibilities of a scientist.

Interactions with the lay public

2. September 13 Lead: Michael Cox

Basic approaches to research.

How to design an efficient and adequately controlled experiment.

Obtaining the publishable results, reproducibility and quality.

Desirability of corroboration by multiple independent methods.

How to gauge the importance of a problem or question

3. September 20 Lead: Michael Cox (Landick)

Data management practices

- What goes into a notebook
- Special documentation required for patents
- Preserving and storing notebooks and data
- The central importance of honesty and reproducibility.
- Special problems associated with digital image files
- Data deposition in public databases

4. September 27 Lead: Michael Cox (Landick)

Science presentation

- The parts of a science oral presentation
- Summarizing your research: abstracts and specific aims
- Research publications (the sections and how to tackle them)
- Reviews (what can and cannot go in; organization; dealing with unpublished data)
- Paper submission

5. October 4 Lead: Robert Landick

Authorship and Publication

Turning your research into a publication.

- Open Access
- Authorship; who is an author and who is not. Author responsibilities; authorship vs acknowledgement
- Responsibilities in the age of Photoshop – how to handle digital files

6. October 11 Lead: Michael Cox

Collaborative research

- Collaboration
- How and why collaborations are developed
- Collaborations with industry
- Responsibilities of collaborators

7. October 18 Lead: Thomas Martin

Peer review

- the process
- responsibilities
- conflicts of interest
- Papers, reviews, grants.
- The importance of the peer-reviewed literature in the advance of science, in the prosecution of science controversies, and in defining what is and what is not science.

8. October 25 Lead: Christina Hull (Brow)
The protection of human subjects

- human subjects in research
- biosafety requirements
- safe laboratory practice
- ethical standards

9. November 1 Lead: Margaret Clagett Dame (Cox, Hull)
The welfare of laboratory animals.

- live vertebrate animal subjects in research
- biosafety requirements
- safe laboratory practices
- Ethical standards

10. November 8 Lead: John Denu
Conflicts of Interest

- personal
- professional,
- financial

11. November 15 Lead: John Denu
Mentor and mentee responsibilities

- responsibilities
- goals
- personal relationships;
- personal conflicts of interest

12. November 29 Lead: Dave Brow (Denu)
Research misconduct

Fraud in science

- what it is
- what to do if you detect it
- how it impacts careers
- Other forms of scientific misconduct
- How misconduct is handled

13. December 6 **Lead: Christina Hull** **(Denu)**

Careers in science. Navigating the process of becoming a scientist and developing a career.

- work-life balance topics
- goal/prioritization strategies
- personal development resources
- professional development resources
- Some possible careers

14. December 13 **Lead: Jim Dahlberg, Josh Carson, Kris Turkow** **(Cox)**

The interface between academia and industry

- start-up companies: how they happen
- putting innovation into practice from academia
- filing patents based on academic research
- filing patents in industry
- Financial conflicts of interest and how they are dealt with
- WARF and its role
- material transfer agreements (MTAs)

Graded assignments

1. Week 4. Students will compose a "Specific Aims" section for an NIH grant, based on the project they are working on in their first rotation. The format for this assignment will be based on principles covered in class (due week 5).

2. Week 8. Peer Review (due week 9). Students will be given a copy of a manuscript nearing submission in one of the instructors' labs. They will review and write a referee report on this manuscript.

Resources

On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition

Committee on Science, Engineering, and Public Policy, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. ISBN: 0-309-11971-5, 82 pages, (2009)
(Resource available for download on course website)

Protecting Human Research Participants (NIH course and Guide)

(Resource available for download on course website)

Lab Dynamics: Management Skills for Scientists

Carl M. Cohen, Suzanne L. Cohen - Science - 2008 - 177 pages ~\$35
Cold Spring Harbor Laboratory Press

At the Helm, Leading your laboratory 2nd Edition

Kathy Barker 2010 372 pages \$59
Cold Spring Harbor Laboratory Press

At the Bench, A laboratory navigator updated edition

Kathy Barker 2005 465 pages \$59
Cold Spring Harbor Laboratory Press

Entering Mentoring

Jo Handelsman, Christine Pfund, Sarah Miller Lauffer, Christine Maidl Pribbenow
HHMI Free Resource (2005) (Distributed to all course participants)

Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty: HHMI resource (2006) (Resource available for download on course website)

A Career Development Plan for Postdocs

http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/1960/a_career_development_plan_for_postdocs/

Individual Development Plan (IDP) Form: FASEB (Resource available for download on course website)

IDP Evaluation Form: FASEB (Resource available for download on course website)