BC601: Principles of Conduct in Biochemical Research
Class meets F, 10-12, MRB 123, March 23 through May 14

Course instructor: Jennifer K. Nyborg, Professor of Biochemistry and Molecular Biology.
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Audience: All first or second year graduate students in Biochemistry. All postdocs, research scientists, research associates, etc. who are interested and/or required to fulfill the University (and Federal) requirements for face-to-face RCR training.

Course Objectives: Students will obtain a framework for principled decision making applicable to their scientific endeavors as they specifically relate to research in the biomedical sciences. This training is critical for students who are beginning their research careers in the biological sciences, and to all researchers in the field who have not received RCR training, or require an updated RCR course.

Through lectures, presentations, and discussions, participants will develop an understanding of the many facets of responsible conduct in research, specifically as they relate to research in the field of Biochemistry and the Biomedical Sciences. These include: 1. Ethical reasoning in issues related to the collection of biochemical data, publishing, reviewing, and grant writing. 2. Proper treatment of experimental data, including data recording, analysis, bias, and reproducibility. 3. Data management, including use of image altering software (Adobe Photoshop, etc.), cropping of gels, and maintenance of research notebooks. 4. Publication practices, authorship, and plagiarism. 5. Ethical and humane treatment of research animals, 6. Values in science. These topics, in part, will provide exposure to biases that arise in the execution of research and in the ethical activities related to research.

These topics will be presented over the course of seven two-hour face-to-face class periods, and one four-hour “final” consisting of student presentations. The class periods will be primarily lecture-based, but with a strong emphasis on class discussion and “reasoning exercises.” The material will be complemented by numerous reading assignments that will form the basis for class discussions. In addition, case studies, both real and hypothetical, will help provide a framework for discussions on proper conduct in a variety of unique scenarios. At the end of the semester,

Evaluation: The course will consist primarily of lectures, discussions, outside reading, and student presentations. The material is not amenable to standard format exams, however, several “pop-quizzes” will be given throughout the course to assess whether students have read the assignments.

Regular attendance is mandatory, as each lecture represents 15% of the course. Therefore, attendance will be recorded. Any planned absences must be cleared in advance, and may result in additional assignments or reduced grade.

Grades will be based on student attendance (25%), participation in classroom discussions and case-studies (20%), grades on quizzes (15%), and a 20-30 min. oral presentation on an actual scientific misconduct case (40%). Time commitment outside of the classroom will entail approximately 8 hr. of outside reading, and ~20 hr. preparation for the final oral presentation to the class.

Note: The non-student participants (postdocs) in the course, enrolled to fulfill the University RCR requirement, will not be required to give a final “case-study” presentation at the end of the semester. However, their participation in this activity is welcome.
Required Reading: 1. On Being a Scientists, 2. Responsible Conduct of Biomedical Research: A Handbook for Biomedical Graduate Studies Students. Online resources, handouts, news articles (see below).

COURSE SCHEDULE:
March 23:
Discussion of course content. Movie: The Lab: Avoiding Research Misconduct.

March 30:
Examples of research misconduct found in grants and manuscripts
Scientific misconduct – Why?

April 6:
How to handle suspicions of misconduct
Acceptable data “cleaning”
Errors and negligence

April 13:
Data acquisition, record keeping (Laboratory notebooks)
Publication practices, Authorship
Plagiarism

April 20: Presentation topics due
Conflicts of interest
Can ethics be taught to adults?
Case-studies and discussion

April 27:
Guest Lecture: Dr. Bernard Rollin. University Distinguished Professor of Philosophy and Bioethicist

May 4:
Values in science; the importance of skepticism
Case-studies and discussion
Course wrap-up. Begin student presentations?

May 10 (finals week): Student presentations (TBA)
Depending upon the final class size, we may schedule two meetings to accommodate the potentially large number of presentations.

Resources:
http://www.indiana.edu/~poynter/mr-main.html
Responsible Conduct of Biomedical Research: A Handbook for Biomedical Graduate Studies Students.
On Being A Scientist: Responsible Conduct In Research
http://www.nap.edu/readingroom/books/obas/
Responsible Conduct of Research; Adil E. Shamoo; paperback.
Research Ethics: A Reader; Deni Elliott and Judy E. Stern, Editors; paperback.
“Truth and Consequences” (Science report on the Goodwin case)
The Moral Instinct, NY Times article by Steven Pinker
The Double Blind Gaze by Steven Bratmann