

# GRADUATE PROGRAM IN CELLULAR AND MOLECULAR BIOLOGY

## TRAINING IN ETHICAL ISSUES IN SCIENCE

### **Responsible Conduct of Research (PIBS 503)**

To ensure that all students have appropriate training in research responsibility, they are required to take PIBS 503: Research Responsibility and Ethics in the Fall semester of their PIBS year. This course consists of seven 50-minute small group discussions, led by 72 faculty volunteers from various programs within PIBS. The groups discuss issues related to responsible research and ethics. The syllabus satisfies NIH mandates, required for trainees supported on F, K and T-series awards.

*The seven discussion topics, with associated case studies, are:*

- 1) Falsification, Fabrication, and Plagiarism
- 2) Conflict of Interest (scientific and financial)
- 3) Human Subjects in Research
- 4) Animal Use and Care
- 5) Data Management
- 6) Dual Use Issues
- 7) Collaboration and Research in the Global Society

*In addition, students are required to engage in a one-hour discussion of ethical issues with their current research supervisors.*

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## TRAINING IN ETHICAL ISSUES IN SCIENCE (cont.)

### **Rigor & Reproducibility (PIBS 504)**

In response to NIH suggestions to incorporate rigor and responsibility training into graduate and post-doctoral education, the university has developed the 2-hour PIBS 504 course to be taken in the Winter semester of the student's PIBS year.

The content of the course covers 4 main NIH-suggested areas:

- 1) Transparency in Research
- 2) Blinding and Randomization
- 3) Biological and Technical Replicates
- 4) Sample size, Outliers and Exclusion Criteria

For each of these areas, participants watch the [NIH-produced videos](#) (about 5 minutes each) with scenarios depicting common issues in these areas, read the "Discussion Material" and participate in a discussion about each video.

Additionally, the instructor leads a discussion on the following topics:

- 5) Data presentation (scatter vs. bar graphs, best practice for Western blots)
- 6) Sex as a Biological Variable
- 7) Reagent Verification
- 8) Common Statistical Tests

For each module, the instructor presents several examples of issues that can arise and discusses the best practices that allow investigators to be transparent in data presentation and analysis. Examples of data manipulation that have been caught in published papers are shown and discussed.

Trainees are engaged in discussion about issues that have arisen within their own laboratories or issues they have heard about and the instructor helps facilitate sharing of ideas for ways to handle the issues.

Students are also provided with University resources for reporting of issues and getting more information.

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## TRAINING IN ETHICAL ISSUES IN SCIENCE (cont.)

### **Required Bi-Annual Ethics Refresher Training (Summer)**

Recognizing the importance of maintaining a conversation about ethical issues in scientific research and in line with mandates from the NIH Institute of General Medical Sciences, students will be required to participate in RCR topic discussions in CMB 850 through each Fall and Winter semester, so they receive RCR refreshers throughout the academic year.

Additionally, new students receive additional R&R training in some program-facilitated workshops in the summer after PIBS 504, before joining the CMB program formally.

MSTP students may take these workshops, or they may take workshops offered through the MSTP program to satisfy CMB's refresher training requirements.