

Physics & Astronomy 519: Responsible Conduct of Research

Instructor: Michael Schmitt

Syllabus

This course will be given during the 2020 winter quarter. There will be four one-hour presentations. Attendance is mandatory.

Session 1:

1. Motivations
2. Scope of the course
3. Requirements for passing this course
4. How to report compliance concerns
5. Review of the Scientific Method
6. Good Practices
 - a. Data Integrity
 - b. Recording
 - c. What is relevant?
 - d. Reproducibility
 - e. Statistical fluctuations vs. Systematic biases vs. Discoveries
 - f. You can't fool Mother Nature

Session 2:

1. Scientific Misconduct – Case Studies
 - a. Premature Higgs discovery
 - b. Cold fusion
 - c. Element “X”
 - d. Molecular Transistors (Schön Affair)
 - e. Post-mortem & Conclusions
2. Avoiding misconduct

Session 3:

1. Importance of diversity and inclusion for scientific research
2. Facts about implicit bias and discrimination
3. Ethical interactions among researchers
 - a. Within a research group
 - b. Within a department
 - c. Within a field (conferences, letters of recommendation)
4. How to respond to ethics violations

Session 4:

1. Principles of good scientific writing
2. Proper referencing
3. Authorship
4. Plagiarism
5. Peer review

Requirements

Students and postdocs must complete the following in order to obtain a passing grade:

1. Attend all four lectures.
2. Complete an online quiz based on the lectures, composed by the instructor.
3. Take the Northwestern CITI online course (www.citiprogram.org) and pass the CITI quiz.