Research Integrity

presentation prepared by
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www.researchcompliance.caltech.edu
Caltech researchers are expected to adhere to the highest professional standards in the conduct of research.”
What is Research Integrity?

Research Integrity Requires:

• the use of honest and verifiable methods in proposing, performing, and evaluating research, without bias
• Conducting and reporting research results with particular attention to adherence to rules, regulations, guidelines, and policies
• following commonly accepted professional codes or norms; and
• treating colleagues fairly and with respect.
Use Honest and Verifiable Methods: Responsible Conduct of Research

• Using/Practicing the Scientific Method as it Applies to Your Field of Research: Rigor
• Transparency in Reporting & Integrity in Reviewing Research
• Generating Sound and Reproducible Data
• Avoiding Research Misconduct
• Avoiding Conflicts of Interest and Conflicts of Commitment
• Education:
  – Responsible Conduct of Research (RCR)
  – In person, BI252
Use Honest and Verifiable Methods: Avoid Research Misconduct

Research Misconduct:
42 CFR Part 93 §93.103: Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

a) **Fabrication** is making up data or results and recording or reporting them.

b) **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

c) **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

* Authorship (Planning, Disputes)

d) Research misconduct does not include honest error or differences of opinion.
Use Honest and Verifiable Methods: Avoid Conflicts of Interest (and/or Commitment)

- Caltech has a Conflict of Interest Policy, Specific Policy for Federally-Funded Research, and PD Handbook
- What sorts of things could constitute conflict?
  - Paid and Non-Paid Activities
  - Consulting
  - Entrepreneurial Activity
  - Equity Holdings
- Priority Commitment to Caltech/Research
- Problem: Outside interests can result in bias in research or otherwise significantly affect the design, conduct, or reporting of research; compromise IP, lead to other unethical research behaviors
- TRANSPARENCY/DISCLOSURE
  - Foreign Government Talent Programs
Adherence to Rules, Regulations, and Policies: Compliance

- Animal Research
- Biosafety/Dual Use/Recombinant DNA Research
- Reporting Conflicts of Interest and Commitment
- Cost Sharing
- Data Management/Sharing
- Effort Allocation
- Export Control/Foreign Engagement
- Human Subjects Research
- Intellectual Property (Patents, Copyrights)
- Privacy
- Publication/Authorship
- Radiation Use
- Research Misconduct

**Research Security**

- Responsible Conduct of Research
- Salary Caps
- Stem Cell Research
- Sub-Award Monitoring
- Use of Controlled Substances and Chemical Precursors

https://researchcompliance.caltech.edu/  https://researchadministration.caltech.edu/osr
Following Commonly Accepted Professional Codes or Norms

- Ethical Codes: Caltech Honor Code; Caltech Code of Conduct
- Professional Codes: Generally, subject matter specific, but there are some overarching similarities:
  - Common Values
  - Data Management/Sharing
  - Documentation
  - Publication/Responsible Authorship

**SHARED VALUES IN SCIENTIFIC RESEARCH**

**HONESTY**
convey information truthfully and honoring commitments

**ACCURACY**
report findings precisely and take care to avoid errors

**EFFICIENCY**
use resources wisely and avoid waste

**OBJECTIVITY**
let the facts speak for themselves and avoid improper bias

Responsible Authorship

Who determines authorship?
• The PI is responsible for determining authorship in the lab.

• The co-authors of a paper should be all those persons who have made *significant scientific contributions* to the work reported and who share responsibility and accountability for the results.

• NIH has a reference table that provides various scenarios: https://oir.nih.gov/sites/default/files/uploads/sourcebook/documents/ethical_conduct/guidelines-authorship_contributions.pdf

The climate and culture in the laboratory should provide an environment that is productive and collaborative.
Mentoring and Being

Welcome to Career Advising and Experiential Learning!

Caltech | Career Advising and Experiential Learning

Menu

Career Services

Welcome to Career Advising and Experiential Learning!

National Research Mentoring Network (NRMN)
Center for the Improvement of Mentored Experiences in Research (CIMR)
Nature Mentoring Resources

Launching Research Pt. 1: Laboratory Readiness

The purpose of this course, Launching Research, Part 1: Laboratory Readiness, is to inspire students to confidently engage in research and acquire the skills that they will need throughout the course of their education and careers. The purpose is also to introduce them to the resources that research can provide new and exciting opportunities. This course will help students to navigate the complexities of laboratory settings and provide guidelines for navigating the research environment.

This course is divided into three modules. The first module introduces the user to research, providing guidelines for mentorship and mentor-mentee relationships. The second module focuses on the development of a professional image, and the final module addresses research opportunities beyond the laboratory, including opportunities for developing new ideas and projects.

Each module will take approximately 45 minutes to complete, and users are able to pause between lessons within the modules. A certificate is awarded upon completion of the course.

Launching Research Pt. 2: Tools For Investigation and Organization

The purpose of this course, Launching Research, Part 2: Tools For Investigation and Organization, is to inspire students to confidently engage in research and acquire the skills that they will need throughout the course of their education and careers. The purpose is also to introduce them to the resources that research can provide new and exciting opportunities. This course will help students to navigate the complexities of laboratory settings and provide guidelines for navigating the research environment.

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Mentor Training

For all career stages, mentors of research trainees learn to

- Align expectations
- Address equity and inclusion
- Articulate a mentoring philosophy and plan
- Assess understanding
- Cultivate ethical behavior
- Enhance work-life integration
- Foster independence
- Maintain effective communication
- Promote mentee research self-efficacy
- Promote professional development

Mentoring content from Nature journals

Terrormentor mentors, and how to survive them

Tara J. Krick

All the mentors need to do is go about their day-to-day duties, but the trainees must be prepared for a variety of situations. Here are some tips for surviving in a mentorship relationship.

Fostering a sense of belonging

Jocelyn K. Dwyer

Creating a positive and inclusive environment can help foster a sense of belonging among trainees.

TikTok's dancing chemist captures the students

Wendy Mahan

A TikTok video of a chemistry professor dancing while teaching a lecture has gone viral and sparked a debate about the role of humor in education.

The science of how coaching could help tackle toxic research culture

Lisa A. Barrie

Coaching can help researchers learn to communicate more effectively and create a more supportive research environment.

Promoting research self-efficacy

Kristin E. Detterman

Research self-efficacy is a key factor in academic success, and mentors can play a crucial role in fostering it among their trainees.

How to support your new graduate students

Linda S. Rudolph

As a mentor, it's important to provide guidance and support to help new graduate students succeed.

Promoting a sense of community

M. E. Hackett

Creating a sense of community among graduate students can help reduce feelings of isolation and support the overall well-being of trainees.
What if I Have Questions or Need Help with Research Integrity or Compliance Issues?

- Office of Research Compliance
- Office of Technology Transfer and Corporate Partnerships
- Office of Sponsored Research
- Office of Export Control
- Research Compliance Committees (IRB, IACUC, IBC, Radiation, HESC)
- Environmental Health and Safety
- Postdoc Office

There are links to all of these offices/organizations at:
www.researchcompliance.caltech.edu
Thanks!