



What every *Student* should know about *Responsible* *Conduct of Research (RCR)*

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**List actions that come to your mind
when you think about conducting
research irresponsibly**

?



Some possible answers:

- 1) Falsifying or misrepresenting data**
- 2) Copy sections of published papers in your paper**
- 3) Failing to cite work properly**
- 4) Not revealing some aspect of research that could cause harm to others**
- 5) Fail to obtain approval for publishing/presenting research results if sponsoring agency requires it**
- 6) Including authors on a publication/presentation with minimal contribution (or not including authors)**
- 7) Not being honest about a Conflict of Interest**
- 8) Tampering with equipment**
- 9) Not reporting misconduct you are aware of**



Responsible Conduct of Research

It is important in all stages of research (from planning to reporting) to be aware of ethical issues associated with the research.

Core topics:

Data acquisition, management, sharing, and ownership

Conflict of interest

Human Subjects

Animal Subjects

Research Misconduct

Publication Practices and Responsible Authorship

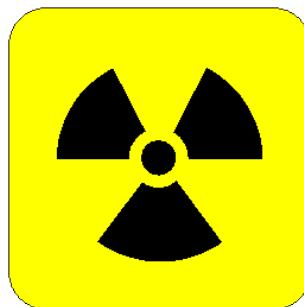
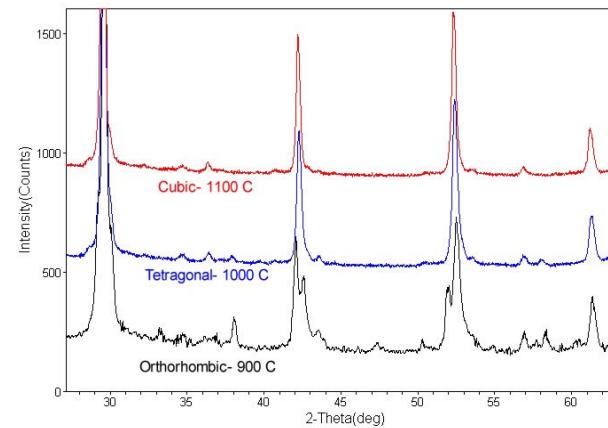
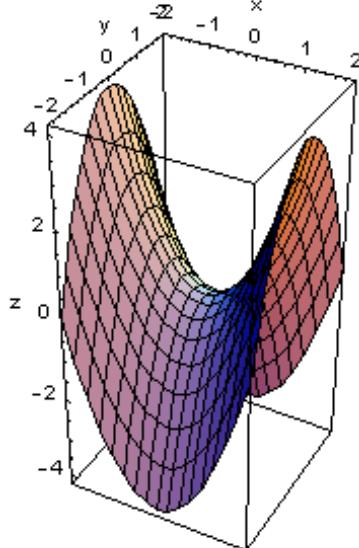
Mentor/Trainee Responsibilities

Peer Review

Collaborative Science

Data

- Data collection, management, sharing, and ownership should be discussed before any data are collected.
- Lab notebooks should be stored in a safe place; computer files backed up. In general, data must be retained for 3 years after research is completed.
- Safety certifications need to be obtained, if applicable, when data collection requires exposure to hazards.
- The integrity of data is of paramount importance. In general, the university owns the data.





Conflict of Interest

Conflicts of interest are to be expected in the complex world of research with many competing demands and interests.

Conflicts of interest or commitment are not necessarily good or bad – what is important is how they are acted on. Reveal any potential conflicts as soon as you are aware of them.

Researchers should report any significant financial conflicts (\$10,000 per year or equity interest > 5%) before any research is undertaken.

Other conflicts include relationships (family, former students), working as a paid consultant, serving on advisory boards, etc.

Human Subjects



An Institutional Review Board (IRB) oversees Human Subjects Research. They will review and monitor research with the aim to **protect the rights and welfare of research subjects**. They are most commonly used for studies in the fields of health and the social sciences where risks to subjects need to be minimized. Such studies may be clinical trials of new drugs, studies of personal or social behavior, opinions or attitudes, or studies of how health care is delivered and might be improved.

The chief objective of every IRB protocol review is to assess the **ethics** of the research and its **methods**, to promote fully informed and voluntary participation by subjects who are capable of making such choices (or, if that is not possible, informed permission given by a suitable substitute).



Institutional Review Board
for Human Participants



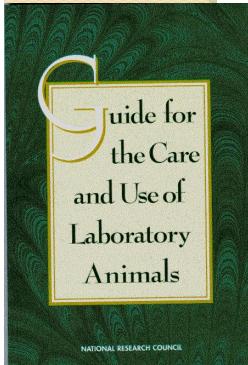
Animal Subjects

Animal Welfare Act, passed by Congress in 1966

- Established legal standards for laboratory animal care and use
- U.S. Department of Agriculture is responsible for implementing and enforcing the law
- Applies to all animal research

Institutional Animal Care and Use Committee Guidebook

- Summarizes the Federal rules for animal research programs
- Requires institutions engaged in animal research to establish an animal care and use program
- Program must include (some examples):
 - An Institutional Animal Care and Use Committee (IACUC)
 - Procedures for self monitoring (facilities inspections)
 - Adequate veterinary care program



Research Misconduct



- Research misconduct is serious and has received considerable public attention.
- Researchers who act dishonestly
 - Waste public funds
 - Harm the research record
 - Distort the research process
 - Undermine public trust
 - May adversely impact public health and safety

Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting results.

- Fabrication is making up data or results and recording or reporting them.
- 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.
- Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving them appropriate credit



Publication Practices

Researchers typically share the results of their activities with colleagues and the public through publication.

Results of publication should meet some minimum standards:

- A full and fair description of the work,
- An accurate report of the results,
- An honest and open assessment of the findings.

Practices that should be **avoided**

- Honorary authorship (no significant contribution such as minor grammatical editing)
- Duplicate publications (you already published something very similar)
- Omitting authors that made significant contributions - (Int. Committee of Medical Journal Editors recommends limiting authorship to persons who contribute to the conception and design or data collection and interpretation, and assist in drafting and finalizing the manuscript).

Authors are usually listed in order of importance. The designation first or last author usually carries special weight (most significant contribution).

Conducting Research

Mentor & Trainee



Mentors often provide guidance in the following areas:

- Technical understanding and skills
- Research ethics
- Development of research projects
- Meeting and networking with colleagues
- Understanding cultures of disciplines
- Opportunities to present or publish work
- Opportunities for postdoctoral training & career positions
- Interacting with funding agencies and obtaining funding

Transition to independent researcher

The ultimate goal of research training is to produce successful, independent researchers. The mentors final responsibility is to help the trainee become firmly established as independent researchers.

Peer Review

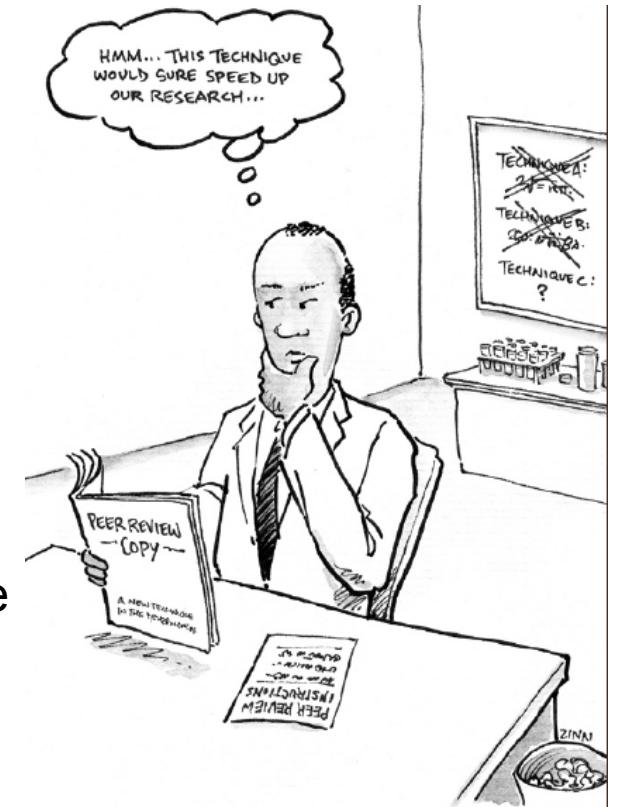
Peer review (the evaluation by colleagues with similar knowledge and experience) is an essential component of research and the self-regulation of professionals.

- Grant reviews, Manuscript Reviews
- Personnel reviews
- Expert testimony

Important to **preserve confidentiality**:

Peer review occurs with the understanding that the information will not be used or shared with anyone else.

You are not allowed to use an idea or information contained in a grant proposal or unpublished manuscript.



Collaborative Science

Issues that may arise:

- Obligation to keep certain research information confidential
- Companies sponsoring research may seek to protect their interests
- Interdisciplinary collaborations (often necessary to have expertise outside your area)
- Researchers seeking patents cannot publish or present their research findings before applying for patents

