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University of New Hampshire

Simple Guide to Research Integrity for Undergraduate Researchers

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Introduction

Involving undergraduates in research is valuable for their education and important for their career development, vital for science, and rewarding for supervisors. Instilling the importance of research integrity as fundamental to the advancement of knowledge may be challenging, particularly for first time trainees, as they learn the research process and their attendant responsibilities. This simple guide was developed to assist researchers who oversee the work of undergraduate trainees address basic concepts and topics. After the core values which establish the basis for the integrity of research and scholarship broadly, the ordering of concepts/topics does not represent a hierarchy; the sequence of presentation may depend on an individual's preference. Throughout the article the term research "group" is used but "team" or "lab" might be reasonably substituted.

Guidelines

1. The conduct of research and scholarship is driven by [six core values](#):
 - Objectivity ~ conducting the work in a way that personal beliefs or motivations do not introduce bias into the research.
 - Honesty ~ being truthful about the conduct of research.
 - Openness ~ being transparent about the conduct of the work and sharing all the information about the research relevant to its conduct and conclusions.
 - Accountability ~ taking responsibility for the conduct of research and one's actions.
 - Fairness ~ treating others with respect.
 - Stewardship ~ using resources efficiently and attending to one's responsibilities within the scientific enterprise.

Takeaway: Ensure you understand your responsibilities as a researcher that stem from these core values.

2. As a trainee researcher, you will have a lot to learn and many questions. Depending on the scenario in which you are working, your research may be overseen by a faculty mentor, postdoctoral researcher, lab manager/research technician, graduate student, or senior undergraduate student, or some combination thereof. Find out early on whom to go to with questions, to learn from, to seek advice from, and to look to for guidance in your work. It may be one person or several individuals.

Takeaway: Work with the people overseeing your research to develop a mutually beneficial professional working relationship where you can excel in your work.

3. Managing your time effectively can be key to conducting research with integrity. A common reason why researchers behave in ways that negatively impact the integrity of their research is due to poor planning and time management. Although very little may go according to plan, managing time effectively can result in not having to rush through experiments or cutting corners to meet a deadline.

Takeaway: Learn time management skills if you have concerns about managing your time effectively ~ <https://www.rasmussen.edu/student-experience/college-life/time-management-tips-college>



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4. Open, candid, ongoing communication is vital to the success of collaborative research. This includes discussions of:

- Individual & collective responsibilities
- Progress on projects
- Problems/mistakes/concerns

Do not be afraid to ask questions or to acknowledge errors or mistakes.

Takeaway: Establish early in your research experience good communication practices with those with whom you work and strive to be an excellent communicator.

5. Ensuring the integrity of research and scholarly activities includes prioritizing responsible research practices and safe environments. The integrity of a research project may be called into question if the safety of a team or group, or of individual members, was compromised for the sake of the activity. Conducting such activities safely, regardless of the type of activity or location, is of primary importance. Safety should be assessed at the Individual, team, and project/site levels.

Takeaway: Ensure you have completed all required safety training and that you understand your responsibilities as a member of a research team/group that values safety ~

<https://rit.sr.unh.edu/training/rcr-training/hazardous-materials.html>

6. Regardless of where research is being conducted, research team members should be treated with respect. Every member has the right to a safe work and training environment free from mistreatment or inappropriate/unprofessional behavior and that promotes professional, scientific, and personal growth and integrity.

Takeaway: Know the standards of professional and respectful behavior.

7. Collection and generation of data are integral aspects of research. In such activities, data:

- Serve as a record of an investigation.
- Form the basis from which conclusions are drawn.
- Enable replication of procedures and processes.

The integrity of research depends on accurate, detailed, organized, complete, and accessible data. Data management is an integral part of good research practice and comprises activities pertinent to all stages of the research data lifecycle.

Takeaway: Learn good data management practices early in your research experience ~

<https://libraryguides.unh.edu/datamanagement>

8. Behaviors that directly breach the values of research and scholarship and almost universally are deemed unacceptable are called misconduct. At UNH, scholarly misconduct is defined as:

- Fabrication, falsification, or plagiarism in proposing, performing, or reviewing scholarly activities, or in reporting results from scholarly activities.

At UNH, retaliation of any kind against a person who has brought forth an allegation of misconduct or who has provided information about a suspected case of misconduct is also considered misconduct.

Takeaway: Understand what plagiarism is and what is acceptable regarding the treatment of data ~

<https://rit.sr.unh.edu/training/rcr-training/misconduct.html> & <https://ori.hhs.gov/avoiding-plagiarism-self-plagiarism-and-other-questionable-writing-practices-guide-ethical-writing>



9. In addition to plagiarism, writing practices that may be detrimental to the integrity of your research include:

- Inappropriate text recycling
- Inappropriate image manipulation
- Selective reporting of data or methods
- Omitting data or methods without disclosure

Takeaway: Ensure you understand what constitutes ethical writing practices in your discipline.

10. Formal “authorship” refers to inclusion in the list of contributors to research. An author willing to take credit for their contributions must also be willing to assume responsibility for the accuracy and integrity of the work as a whole. Authorship credit should reflect significant contributions to at least one of the following:

- Theoretical development, concept, or design
- Execution of the work
- Modeling or simulation of processes
- Analysis and interpretation of data
- Preparation and revision of the manuscript

Individuals listed as authors, and the order in which they are listed, should reflect the relative contributions to the work by the individuals. In addition, author order should reflect disciplinary norms. Authorship criteria and decisions should be discussed openly and frankly, and agreed upon, preferably in writing, in advance. An individual should only be listed as an author with their knowledge and permission.

Takeaway: Ask about your research group’s/team’s conventions on authorship generally, and for projects you work on ~ <https://rit.sr.unh.edu/training/rcr-training/authorship.html>

11. Use of generative AI writing tools (such as ChatGPT) should be fully disclosed in research.

Takeaway: Ask what, if any, use is acceptable and how it should be disclosed and cited.

12. Most institutions have policies and educational programs addressing research integrity. The policies detail institutional requirements, researchers’ rights and responsibilities, and where to go and what to do if you have questions. Educational programs are directed at:

- Raising the consciousness of faculty, staff, and students regarding the ethical and responsible conduct of research and scholarly activity,
- Establishing a knowledge base that defines normative and/or professional behavior to assist faculty, staff, and students in making ethical and responsible decisions in the conduct of research and scholarly activity, and
- Fostering an institutional culture of integrity in research and scholarly activity encompassing all stages of individuals' careers.

Takeaway: Know where to access the policies and read those that relate to your research ~ <https://www.unh.edu/policy/unh> ~ and participate in the research integrity educational program activities ~ <https://www.unh.edu/research/responsible-conduct-research-scholarly-activity>



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