Research Integrity and the Responsible Conduct of Research

In this module, we will discuss conducting and reporting research responsibly and ethically, with special emphasis on research involving humans and non-human vertebrate animal subjects, and demonstrating integrity in scholarly publishing.

Learning Objectives:

1. Define research integrity and the responsible conduct of research.
2. How to obtain education and training in the responsible conduct of research.
3. Identify special requirements for research involving humans and non-human vertebrate animals.
4. Describe standards for the responsible publication of the results from research.

Let us begin.

1. Research Integrity and the Responsible Conduct of Research.

There are many aspects to the responsible conduct of research. For the purpose of this discussion, we will adopt a definition provided by the National Institutes of Health (NIH) in updating its Requirement for Instruction in the Responsible Conduct of Research (NOT-OD-10-019; http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html): “responsible conduct of research is defined as the practice of scientific investigation with integrity. It involves the awareness and application of established professional norms and ethical principles in the performance of all activities related to scientific research.”

This definition introduces two new concepts “ethical principles” and “integrity”.

Ethics may be defined as “an area of study that deals with ideas about what is good and bad behavior: a branch of philosophy dealing with what is morally ‘right or wrong’” (Merriam-Webster Dictionary) or as “norms for conduct that distinguish between acceptable and unacceptable behavior” (Resnick, D.B., 2011).

We can gain insight into the concept of “integrity” by reference to Purdue’s Statement of Integrity and Code of Conduct (http://www.purdue.edu/purdue/about/integrity_statement.html) which speaks of “trust and trustworthiness,” accepting responsibilities, championing “freedom of expression” and “open inquiry,” upholding “standards of fairness,” respecting “equality and the rights of others,” and placing the “highest value on truth and accuracy.” Similarly, Purdue’s Policy on Research Misconduct (Policy III.A.2: http://www.purdue.edu/policies/ethics/iiia2.html) describes the “proper conduct of research” as involving a “commitment to truth, objectivity, and honesty” and an expectation of maintaining “careful research records” and establishing and following “well-defined protocols consistent with all state, federal, and University guidelines” and reporting “discoveries, observations, and scholarly and artistic activities accurately and fairly.”
Engaging in responsible and ethical behavior in the practice of research is vital to ensure the accuracy and completeness of the research record and to preserve public trust in research and researchers.

2. **Education and Training in the Responsible Conduct of Research.**

The NIH (NOT-OD-10-019; [http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html)) and other federal sponsors of research generally include the most or all of the following topics as critical components of education and training in the responsible conduct of research:

a. Conflict of interest – personal, professional, and financial;

b. Policies regarding human subjects and live vertebrate animals in research, and safe laboratory practices;

c. Mentor/mentee responsibilities and relationships;

d. Collaborative research including collaborations with industry;

e. Peer review;

f. Data acquisition and laboratory tools; management, sharing and ownership;

g. Research misconduct and policies for handling misconduct;

h. Responsible authorship and publication; and

i. The scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environment and societal impacts of scientific research.

This is a demanding and broad curriculum, but one with which all researchers must become familiar during their careers. Undergraduates engaging in research may begin to become acquainted with this body of standards, norms and expectations by completing a brief, online course for undergraduate researchers in the Responsible Conduct of Research (RCR) offered by the Collaborative Institutional Training Initiative, or CITI, program administered by the University of Miami. In fact, undergraduates whose research at Purdue is sponsored by the National Science Foundation (NSF) or U.S. Department of Agriculture’s National Institute of Food and Agriculture (USDA FDA) are required to complete this online course before beginning their research.

Instructions to register with CITI and complete the course in the responsible conduct of research are available on the website of Purdue’s Executive Vice President for Research and Partnerships: [http://www.purdue.edu/research/vpr/rschadmin/rcr/Docs/RCR%20Quick%20Reference%20Card.pdf](http://www.purdue.edu/research/vpr/rschadmin/rcr/Docs/RCR%20Quick%20Reference%20Card.pdf). There is no charge for Purdue students to complete this CITI RCR course and, following successful completion, you will be able to save or print a Certificate of Completion. Many other universities also require completion of one or more CITI online courses and may accept your Certificate of Completion from completing the Purdue version of the course.

For more information on RCR education at Purdue, please visit:

(i) The Graduate School’s website at [http://www.purdue.edu/GRADSCHOOL/research/rcr/index.cfm](http://www.purdue.edu/GRADSCHOOL/research/rcr/index.cfm)


To understand better the biology, physiology, health and diseases, and interactions of humans and non-human vertebrate animals, scientists conduct many forms of research involving observations, interventions, and analysis of data and information about living persons and non-human vertebrate animals. Conducting such research involving living persons and non-human vertebrate animals is not a right of scientists, regardless of the importance the researcher may claim for the information and understanding that may result from these investigations. The ability to conduct research involving living persons and/or non-human vertebrate animals as subjects is a privilege, and, like other privileges, has associated obligations which the researcher must satisfy.

All living vertebrate animals, both human and non-human, are sentient creatures; that is, they have the capacity to experience both pleasure and pain. As sentient creatures, all living vertebrate animals have a special moral status which requires that researchers take special precautions to minimize pain, stress, and distress, and promote benefit. In addition to their status as sentient creatures, living humans are also autonomous beings capable of making and acting on their own decisions. In respecting their autonomy, all potential human subjects have the right to a full and complete description of the purpose and procedures for proposed research as well as full information on all known or recognized potential risks associated with participation in the proposed research, so that they can make an informed decision whether to participate. They must also be able to withdraw from participation in research if they wish.

Researcher’s obligations to living, non-human vertebrate subjects of research are codified in U.S. federal law and regulations, and researcher obligations to human subjects of research are summarized in several international codes and in U.S. regulations.

Before conducting research with living human or non-human vertebrate animals, researchers must complete additional education and training also offered online through the CITI program, and the Principal Investigator (PI) must obtain permission from designated review panels to conduct their research, which is described in a detailed, written protocol. Changes in the protocol for research must also be approved before being implemented.

The leader of a research project, or PI, is responsible for obtaining protocol approval by submitting appropriate applications and forms to conduct research and for ensuring that annual reporting requirements are met for each of his/her research projects. At Purdue, a PI must be a CITI-certified professor. Students CANNOT serve as PIs on a study (Purdue OVPR, 2012). Institutional Review Boards, or IRBs, review and approve (or disapprove) proposed research involving human subjects. Institutional Animal Care and Use Committees, or IACUCs, review and approve (or disapprove) proposed research involving living, non-human vertebrate animal subjects.

Before engaging in a research project involving living human or non-human vertebrate animals, an undergraduate researcher must obtain a copy of the approved protocol (and any approved
amendments to the protocol) for the study, and read it, to ensure that they know the scope of the approved research.

For more information, please refer to:
For human subjects research: https://www.irb.purdue.edu/index.php
For research with non-human vertebrate animals: http://www.purdue.edu/research/vpr/rschadmin/rschoversight/animals/index.php.

4. Responsible publication of the results from research.

Within the research community, researchers trust each other to report the procedures and results from their research accurately and completely. It is critical personal responsibility of authors to ensure the integrity of their descriptions of research whether in the form of proposals, primary journal publications, review articles, proceedings chapters, posters, or presentations. Purdue’s Policy on Research Misconduct defines Research Misconduct as Falsification, Fabrication, or Plagiarism in proposing, performing, or reviewing research, or in reporting research results, when committed intentionally, knowingly, or recklessly (Policy III.A.2: http://www.purdue.edu/policies/ethics/iiia2.html).

Plagiarism is defined by the same Policy as “the appropriation of another person’s ideas, processes, results, or words with giving appropriate credit.” Unfortunately, traditional considerations of plagiarism have focused on the reuse of the exact words of another author without giving credit, and have neglected to include appropriation of ideas, processes, or results, which are also forms of plagiarism.

All the work that you refer to, ideas that you borrow, phrases from books, or online content that you mention, must be attributed to the original author(s) who created them. The exact words of another author must be enclosed in quotation marks and accompanied by a citation. If the exact words of the initial author are important to repeat, repeat them exactly, don’t change a couple words, enclose them in quotes and include a citation. When you summarize or paraphrase the words, results, concepts or conclusions of another author, you express them in your own words but still include a citation to the source. Even if you change several words, the meaning still belongs to the original author, so don’t fall into the trap of simply switching out words and claiming them as your own.

There are a number of acceptable formats for citations. Chose one that is specified by the journal or appropriate to the discipline; then follow the chosen format precisely. In general, it is better to over-cite than to under-cite and risk plagiarism.

Self-plagiarism occurs when a person reuses his/her own work without citing the original source. This could be reusing all or parts of a paper for different classes, or for different publications (ORI, 2013a; ORI, 2013b). Always cite any ideas that you reuse from your previous works. If you are using entire sentences or paragraphs, cite them as direct quotations. If you want to reuse any data collected during experiments, talk with your Professor first. Reusing tables and charts derived from your own data without citation is also considered self-plagiarism. Remember, research results and scholarship is only original once; reusing it without citation is
misrepresenting it as original when it is not. When in doubt, seek reference assistance at your local library or on-line, since many references clearly detail accepted and unaccepted citation practices.

For more information on avoiding plagiarism, please refer to:

a) Purdue Online Writing Lab: You will find good overview and guidelines with respect to plagiarism on this site, including citation resources for APA, MLA, and Chicago style. Link: https://owl.english.purdue.edu/owl/resource/589/1/
b) Purdue’s Graduate School: These guidelines provided by the Graduate School with help avoid plagiarism, self-plagiarism, and any other questionable writing practices. Link: http://www.purdue.edu/GRADSCOLLEGE/documents/rcr/ORI_Plagiarism_Guidelines.pdf
c) Purdue’s Executive Vice President for Research and Partnerships “Avoiding Plagiarism” website: http://www.purdue.edu/research/vpr/rschadmin/plagiarism/

Thank you for watching this video. We hope that you gained some basic knowledge about the responsible and ethical conduct of research. For detailed information on all these topics, please refer to the various URLs present in the document accompanying this video.

References