An Introduction to Resources for the Responsible and Ethical Conduct of Research

Purpose

This document is developed to provide *students* and *post-doctoral researchers* an introduction and list of RIT and external resources on the Responsible and Ethical Conduct of research (RCR) for those individuals who are engaged in research activities that are supported by the National Science Foundation (NSF).

Background of NSF Requirement

The America COMPETES Act of 2007 (*America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science*) directed that the National Science Foundation (NSF) require institutions like RIT receiving NSF financial assistance for science and engineering research or education to implement mentoring and training in the responsible and ethical conduct of research for undergraduate and graduate students as well as postdoctoral researchers.

As of January 2010, institutions like RIT must certify at the time of NSF proposal submission that the institution has a plan to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students, and postdoctoral researchers who are supported by NSF funded projects to conduct research.

RIT RCR Plan Requirements and Your Obligations

The RIT plan for RCR is available at the website of the RIT Office of Sponsored Research Services. https://www.rit.edu/srs/research-compliance#responsible-conduct-of-research-requirements. Part of RIT's plan is ensuring that students and researchers all have access to basic information and resources on the RCR issues set forth in this document, as well as the ability to discuss any of these issues with the Principal Investigator (PI) supervising and mentoring their research on a particular NSF project.

In addition to reviewing this document, as a graduate student or postdoctoral researcher on this NSF funded project you are required to complete a brief online tutorial on RCR that is located on the CITI training website. https://www.citiprogram.org. All undergraduate students working on the project may also complete the RCR online tutorial, but it is not required. The links and instructions for registering and completing the NSF required RCR course are also located on the SRS website listed above.

Online Tutorial Directions

- Go to www.citiprogram.org

- Go to Create Account and click "Register"

- In the "Select your Organizational Affiliation" menu, enter "Rochester Institute of Technology".

- Create your username/email address to be your exact RIT email address (no alias or personal email address)

- Select the "Learner group" based on your field of research.

- Select the Responsible Conduct of Research (RCR) module to be course closest to your field of research, and make sure it is a RCR course with RCR term clearly in the title of the course.

- If you used your exact RIT email address, your completion record will automatically update in your Novelution Sponsored Research Module profile.

RCR as an Extension of RIT's Existing Compliance Policy

Research and scholarly activities within RIT are a critical part RIT's mission to advance knowledge and scientific improvements for the betterment of our global society.

Therefore, it is critical that the entire RIT research enterprise conducts its activities in a responsible manner and with the highest ethical standards if it is to preserve the trust of the public, governments, and industry partners. RCR is in some respects a specific research extension of the RIT Compliance Policy and Code of Ethical Conduct statement that: "All members of the RIT community should take effective measures to conduct themselves ethically, with integrity, and in compliance with applicable laws and regulations." http://www.rit.edu/academicaffairs/Manual/

External RCR Resources

The federal government and sponsoring agencies offer abundant RCR resources and training relative to RCR education requirements, including:

- NSF: Responsible Conduct of Research

- AAAS & NAS: Online Resource on Research Integrity

- NIH: NIH Requirement for Instruction in the Responsible Conduct of Research in NRSA Training Grants (updated 2/17/2022)

- The Federal Office of Research Integrity: Introduction to the Responsible Conduct of Research

- Ethics in Science and Engineering National Clearinghouse http://www.umass.edu/sts/digitallibrary/

The Committee on Science, Engineering, and Public Policy, and the National Academy of Sciences, along with the National Academy of Engineering, and Institute of Medicine have jointly published a book on research ethics called, On Being a Scientist. The book was designed to supplement lessons in ethics provided by research supervisors and mentors. The book describes some of the personal and professional issues that researchers encounter in all lines and disciplines of their work. The book includes a number of hypothetical scenarios offering guidance in thinking about and discussing these common ethical scenarios in research.

Ethical and Responsible Conduct of Research at RIT

RCR has an overall institutional philosophy of creating and maintaining an environment for research that conforms to the highest ethical principles, fosters intellectual honesty and integrity, and encourages scientific advances of the highest quality. Researchers of all disciplines agree that shared values of honestly conveying research information, accurately reporting findings, efficiently using resources, and objectively reporting results are the tenets of RCR. The following issues are the minimum content areas that will comprise the responsible conduct of research training issues at RIT:

- **Research Misconduct**
- **Conflict of Interest and Conflict of Commitment Human Subjects in Research**
- **Research Involving Animals**
- **Data Acquisition, Management, Sharing and Ownership**
- **Publication Practices, Citation, Plagiarism, and Responsible Authorship Mentor/Trainee Responsibilities**
- **Peer Review Collaborative Science**

The depth of knowledge in these areas for students will necessarily vary depending on the nature of the research discipline, the subject of the research, and the expertise of those involved in the project and mentoring the students. All students supported to conduct research on an NSF funded project are encouraged to discuss these issues with the Principal Investigator (PI) supervising their research. The PI understands that part of the supervision on this project is to discuss any applicable RCR issues. A brief summary and/or further resource links are listed below for these RCR topics.

A. Research Misconduct

The Federal Office of Research Integrity (ORI) under the U.S. Department of Health and Human Services defines research misconduct as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research 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 appropriate credit.

Faculty and the administration of universities are responsible for maintaining the highest level of intellectual integrity and conduct in the areas of research and scholarship for their faculty, administrators, students and staff, visiting scientists and scholars, and all others under the auspices of the university. The RIT Community must report incidents of research misconduct and these complaints will be addressed pursuant to established RIT procedures. RIT's Policy on Research Misconduct is located in the RIT Policy Manual http://www.rit.edu/academicaffairs/policiesmanual/sectionC/C2.html.

B. Conflict of Interest and Conflict of Commitment

RIT expects all members of its community to avoid ethical, legal, financial, or other conflicts of interest or commitment, including even the appearance of a conflict, that might impede or compromise their responsibilities or the mission of RIT (http://www.rit.edu/academicaffairs/Manual/). A Conflict of Interest can occur when the a person's personal, professional, commercial, or financial interests or activities outside of the Institute have the possibility of: compromising the employee's judgment; biasing the nature or direction of scholarship; influencing the employee's decision or behavior with respect to teaching, student affairs, promotions and appointments, use of Institute resources, interaction with human subjects, or other matters of interest to the Institute; or result in personal or a family member's gain or advancement at the expense of the Institute.

Conflict of Commitment refers to when a person's internal or external commitments, relationships, or activities have the possibility of interfering or competing with the Institute's mission or the employee's responsibilities. All regular employees at RIT complete an annual conflict of interest disclosure. More information on that policy is available here http://www.rit.edu/academicaffairs/Manual/sectionC/C4.html and the actual disclosure process is initiated at the RIT Office of Compliance and Ethics website https://www.rit.edu/fa/compliance/conflict-interest-commitment. Any student or postdoctoral researcher who believes they have a conflict of interest should discuss the matter with the PI and disclose it to the RIT Office of Compliance and Ethics promptly.

C. Research Involving Human Subjects

Research involving human subjects is governed by strict federal regulations designed to protect the rights and welfare of human subject participating in research programs. RIT's Office of Human Subjects Research http://www.rit.edu/research/hsro/ manages all resources and compliance with Human Subjects requirements at RIT. The RIT Office of Human Subjects Research and the RIT Institutional Review Boards (IRB) were created to comply with federal regulations and to ensure protection for the rights and welfare of human research subjects.

All research or clinical investigations involving human subjects in which RIT, its staff, or its students, are involved may be subject to the authority of the IRB, regardless of funding source or other regulatory requirements. RIT's policy on human subject research is located here: http://www.rit.edu/academicaffairs/policiesmanual/sectionC/C5.html.

D. Research Involving Animals

RIT seeks to maintain the highest standards for the care and use of animals in research. The use of animals in research is frequently necessary and provides important information that benefits both humans and animals. Nevertheless, while many uses of animals in research are ethical and important, animals do have an interest in avoiding pain and suffering. Research institutions are required to have an Institute Animal Care and Use Committee (IACUC) as a result of the Health Research Extension Act of 1985 (Public law 99-158). Both the USDA and the Public Health Service promulgate principles, regulations, policies, and standards pertaining to the use of animals in research and teaching. At RIT, proposed research with vertebrate animals (all fish, amphibians, reptiles, birds and mammals – except human) requires RIT IACUC advance notification and approval. Federally funded (NSF and NIH) research involving vertebrate animals also requires an NIH Animal Welfare Assurance that RIT currently does not possess. Further information on Research with animals at RIT and RIT's IACUC procedures are available at https://www.rit.edu/srs/about/important-updates/research-animals-rit .

E. Data Acquisition, Management, Sharing and Ownership

The integrity of research data and the usefulness of the research it supports depend on management of attention to data detail, from initial planning through final publication. While different disciplines and types of research may differ in data management practices, there are generally accepted standards that the RIT community should be aware of and adhere to relative to data ownership, data collection, data protection and data sharing. Key considerations for data collection include using the appropriate collection method, providing attention to details of data integrity, obtaining the appropriate permissions for use of certain categories of data and the accurate and secure recording of data. Data should be

maintained and secured in such a way as allow it to confirm research findings, establish priority, and be reanalyzed by other researchers. Data should be stored in such a way as to protect confidentiality, be consistent with any contract or program requirements, be secure from physical and electronic damage and destruction and be maintained for the appropriate time frame dictated by sponsor and University policies. More detailed information on data management issues specific to your discipline may be available from the professional association or organization that oversees your field of research.

Additional information may be found at https://www.rit.edu/security/information-security-policy

F. Publication Practices and Responsible Authorship

Research involves the dissemination of knowledge gained by means of publication which in today's research environment often includes the contributions of many individuals. As collaboration grows in all areas of academia, questions concerning who should be named as an author for a journal article, conference presentation, or grant proposal become more complex. The basic principle that authors should make meaningful intellectual contributions to a project is sound, but it can be difficult to apply, because of the many different possible roles in a project. Because authorship entails rights and responsibilities, contributors should not be named as authors without their knowledge or unless they review manuscripts.

The appropriate reporting of research results entails a full and fair description of the work undertaken, an accurate report of the results, and an honest and open assessment of the findings. Key ethical issues involving the submission and review of manuscripts and grant proposals include:

- how to appropriately acknowledge contributions on joint projects
- what is expected of authors
- what is expected of reviewers.

Many scientific journals have begun listing the areas of contribution of different authors and require a signed document verifying various contributions. More detailed information on publication issues specific to your discipline may be available from the professional association or organization that oversees your field of research.

G. Mentor/Trainee Responsibilities

Mentor-trainee relationships begin when an experienced and an inexperienced researcher agree to work together. The experienced researcher (or faculty member) has knowledge and skills that the inexperienced researcher (or student) needs to learn. When mentors accept trainees, they assume responsibility for assuring that the persons under their supervision are appropriately and properly trained. Generally, the expectations of mentoring are that:

At least one faculty member should supervise (with mutual assent) all individuals in a laboratory who are not acknowledged independent investigators.

Mentors should commit themselves to spend the time required for adequate supervision.

The ratio of trainees to available mentors should be small enough to encourage close and frequent interactions concerning all aspects of research undertaken by a trainee or junior investigator, including the planning and design, data interpretation and preparation of reports.

Trainees have both the right and responsibility to be certain that they are adequately supervised during their research training and that the research itself is performed in a manner which reflects high standards for the responsible conduct of research. If Trainees are not satisfied with their Mentor/Trainee relationship, they may contact the Dean of their college or the Dean of Graduate Studies.

Guidance and a template are available here - https://www.rit.edu/srs/proposal-preparation-resources

H. Peer Review

Peer review refers to the evaluation of your work by colleagues with similar knowledge and experience. This is an essential component of academia and research and all scientific journals subject the submitted papers to such reviews. At times, it can mean the ability for peers to replicate your research in order to offer their opinions.

The integrity of the peer review process depends on analysis that is: constructive, free from personal bias or conflict of interest, and respectful of any confidentiality concerns in the research.

If you are asked by your colleagues, journals and external sponsors to judge manuscripts and sponsored project applications, you must make sure that your opinions are proficient, fair and unbiased. External sponsors like NIH have specific policies and guidance on the peer review process. http://grants.nih.gov/Grants/peer_review_process.htm

I. Collaborative Science

Today's research environment increasingly includes collaboration with colleagues both across the University and external to the University. Collaborations have the potential for dilemmas such as complex roles and relationships, divergent interests, dissimilar management styles and differing disciplinary and cultural interpretations. Collaboration responsibilities may also affect deliverables needed for the research sponsor.

Collaborative projects should have effective management plans in place via contract or otherwise, with the team meeting and reaching agreement on key areas prior to commencement of a project. The agreement should cover areas such as:

- Financial issues if applicable; Authorship;
- Intellectual property; Training and supervision; and
- Compliance with all regulatory matters relevant to the project.

RIT's Office of Sponsored Research Services can assist in drafting such agreements. It is important for the effective conduct of the research that each team member in a collaborative effort clearly understand what are the terms and scope of the collaboration.