

A plan for the instruction of undergraduates in the Responsible Conduct of Research

Wheaton College, Norton MA

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Preamble

Wheaton is a small, highly selective liberal arts college with no graduate students and only a small number of research projects funded by federal grants. In fact, the summer of 2011 saw the first time that the college submitted to a Research and Development Audit for having gone over the \$300,000 mark in federal research monies spent in a single year. When the present plan was first drawn up, there were only two NSF grants in preparation that would trigger the requirement for undergraduate RCR training: in each grant, two students will be doing laboratory research on campus for a year, beginning in the summer, a different pair of students each year for three consecutive years, beginning in the summer of 2012. Because the numbers are small (no more than twelve total in three years), and because different pairs of students will need to be trained each year, Wheaton has the excellent opportunity to begin with a personalized trial program that can be gradually phased in, refined by practice and experience, and expanded over time to include broader categories of students and laboratory instruction.

Consequently, this document will itself be revised from time to time, and the date of the latest revision will be part of its title.

Institutional Responsibilities

NSF establishes four institutional responsibilities:

- a. An institution must have a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students, and postdoctoral researchers who will be supported by NSF to conduct research. . . . institutional certification to this effect is required for each proposal.
- b. While training plans are not required to be included in proposals submitted to NSF, institutions are advised that they are subject to review, upon request.
- c. An institution must designate one or more persons to oversee compliance with the RCR training requirement.

d. Institutions are responsible for verifying that undergraduate students, graduate students, and postdoctoral researchers supported by NSF to conduct research have received training in the responsible and ethical conduct of research.

What follows is the required plan, available for review upon request. The Research Integrity Officer is charged with the oversight of RCR training compliance, and will verify that the undergraduate students involved in NSF-funded research on the Wheaton campus receive the necessary practical and ethical training.

A Culture of Compliance

1. The Honor Code

Wheaton is an Honor Code campus. Each student affirms the following on each submitted assignment:

As members of the Wheaton community, we commit ourselves to act honestly, responsibly, and above all, with honor and integrity in all areas of campus life. We are accountable for all that we say and write. We are responsible for the academic integrity of our work. We pledge that we will not misrepresent our work nor give or receive unauthorized aid. We commit ourselves to behave in a manner which demonstrates concern for the personal dignity, rights and freedoms of all members of the community. We are respectful of college property and the property of others. We will not tolerate a lack of respect for these values.

Part of the orientation process for entering freshmen is discussion of the Honor Code, including case studies and discussion; it is not until the students sign the Honor Code book that they count as matriculated students. Responsible Conduct of Research is mentioned during the Matriculation Ceremony. It should be noted that when it was suggested that an enlarged copy of the Singapore Statement on Research Integrity be suitably displayed in the new Science Center, it was strongly opposed by the science faculty, for the very reason that we have a campus-wide Honor Code, and it was not appropriate to single out one group of students as more in need of reminding of its basic principles than any other group. Further, materials made available on the Provost's web site, describing the components that go into turning a syllabus into a compact between instructor and student, stress the need for the instructor to describe within particular disciplinary confines just what plagiarism means and to explain it not just in theory but in practice.

2. General Laboratory Course Instruction

Wheaton has a one-course requirement in the Natural Sciences, and (almost) all science courses taken by beginning students are lab courses. Consequently, each instructor has taken upon herself or himself to instruct students not only in lab

safety and procedure but also in the ethics of data collection: FFP (the injunctions against falsification, fabrication, and plagiarism) is part of basic instruction in all lab science courses. In other words, every science student, already a signatory to Wheaton's Honor Code, receives further initial instruction in the Responsible Conduct of Research within a classroom and laboratory setting. And it is from this body of students that student assistants in funded research will come.

Wheaton's RCR Training Plan

Wheaton acknowledges the desirability of having the instruction described here become universal instruction: what is true for ethical research for a science student being trained to take a place in the international community of researchers is also true for the thesis student in history, the creative artist, the sociologist doing fieldwork, the journalist pursuing a story, the entrepreneur forging a business plan. But Wheaton also acknowledges that PI's in projects funded by the NIH must provide their own explicit, project-specific description of their own plans for instruction in RCR. Consequently, in what is given below, Wheaton describes what will be in effect for NSF grants specifically, but in the expectation that, as the number of funded research projects grows, and as our experience of RCR training is honed by practical experience, this model can be drawn on both by NIH researchers on campus and by the campus as a whole beginning with students in all disciplines writing a thesis for Departmental Honors.

1. The Research Integrity Officer (RIO) will work with each PI individually to create a plan that touches on instruction in the nine traditional areas of Responsible Conduct of Research:

- Research Misconduct
- Data Management
- Conflict of Interest
- Collaborative Science
- Responsible Authorship
- Mentoring
- Peer Review
- Lab Animals
- Human Subjects

It must be stressed that this is a minimum requirement. The plan will be kept on file with the RIO, and may be modified by mutual consent, provided that the nine areas are covered.

2. As it is clear that some of these areas will be of greater relevance than others, some areas can be adequately covered by directing the student to appropriate online training modules and other resources. The RIO will make certain that PI's and their students have access to such resources, either open-access or, if necessary, proprietary. A student in a physics lab may find Lab Animals very tangential to the

immediate goals of the laboratory. But this must be stressed: the PI is not training a temporary assistant but a colleague, and as the nature of scientific research is increasingly collaborative and cross-disciplinary, even the physics student cannot pretend that his or her future physics research would never involve experiments involving animals or humans.

3. Instruction in the Responsible Conduct of Research cannot be conducted entirely on-line. Each PI is responsible for face-to-face instruction in areas most directly related to the actual research: this is to be carried out, in part, through the RCR materials created within the PI's disciplinary field. For example: the *Physics Research Mentor Training Seminar* materials and case studies; or the *Professional Ethics and Moral Responsibility in Chemistry* materials and case studies created by the American Chemical Society. The RIO will be a regular, if not constant, participant in these case-study discussions.

4. Three further specific items will be used in RCR instruction: the book *On Being a Scientist: A Guide to Responsible Conduct in Research* (the third edition is freely available online), which is to be read in its entirety as the first step; Nicholas H. Steneck, *Introduction to the Responsible Conduct of Research*, a publication of Office of Research Integrity and also available online; and the DVD created by the Office of Research Integrity, *The Lab*.

5. The RIO will see to it that on-campus resources are brought to bear as much as possible: presentations by the Chairs of the Wheaton Institutional Review Board (IRB) and the Institutional Animal Care and Use Committee (IACUC), for example, and discussions with faculty whose specialties are in ethics, as well as with other members of the science faculty.

6. It is not a requirement that student researchers take exams, or receive certifications for on-line modules, any more than it is necessary for them to have graded assignments as part of the laboratory research work.

7. Instruction in RCR is a continuous process, and each student working in NSF-funded projects will be expected to have received training in all areas by the time that his or her time within the lab is finished. In practical terms, this means that instruction will be spaced over the course of a year. It cannot happen all at once, neither at the beginning nor, worst of all, at the end of a year in the lab. As it will be the responsibility of each PI to work with the RIO to create a plan that spans the year, so it will be the responsibility of the RIO to monitor the progress of each student, maintaining records on each one, documenting CITI work, discussions, case studies, etc. These records will be made available upon request.