UNIVERSITY OF NEW MEXICO
SCIENTIFIC INTEGRITY PLAN
For research, training, and fellowship awards funded by the National Science Foundation,
National Institutes of Health, and National Institute of Food and Agriculture
Main and Branch Campuses

Note: The Scientific Integrity Plan was initially approved in May 2010. Since then there have been a number of institutional and regulatory changes that require this document be updated. This update includes more detail about the institution’s overall expectations of graduate students and other researchers. Clarification is provided about courses and course content. Detail is provided about recertification when 4-year first time RCR certifications expire. Dated information from the initial SIP is updated, such as REAC is now AIRE. Two additional areas of RCR were added – financial management and data reproducibility – as these are emerging areas of regulation directed by NIH and others. Also a department of the USDA – the National Institute of Food and Agriculture – now requires RCR instruction of all grant holders. Electronic anti-plagiarism tools (iThenticate and TurnItIn) are now available for all researchers to use in a preventative way. Letters of endorsement of this Plan are provided from the Dean of Graduate Studies, Provost, and President. This update is signed by the current Vice Provost for Research.

PURPOSE

To achieve excellence in research and maintain public trust in research outcomes, an environment that promotes and fosters the responsible conduct of research (RCR) is critical. As part of its commitment to support such an environment, in 2008, the University of New Mexico (UNM) established a Responsible and Ethical Conduct of Research (RECR) program, which served as a central resource for RCR guidance and coordination of RCR instruction on campus. To provide greater exposure and cultural adherence, the program is now located in Graduate Studies as Academic Integrity and Research Ethics (AIRE). AIRE is guided by the Academic Integrity and Research Ethics Advisory Committee (AIRE-AC), composed of faculty and community members with experience and interest in research ethics. This Scientific Integrity Plan (SIP) establishes guidelines and appropriate standards for RCR instruction, and complies with regulations of the National Science Foundation (NSF), United States Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA), and National Institutes of Health (NIH).

BACKGROUND

NSF

Section 7009 of the America COMPETES Act of 2007, 42 USC § 18620-1, requires institutions applying for NSF financial assistance, in science and engineering research or education, to certify that they have a plan to provide appropriate RCR training and oversight to undergraduates, graduate students, and postdoctoral researchers. On August 20, 2009, NSF issued regulations implementing § 7009 and set an effective date of January 4, 2010 for institutions to begin complying with the new RCR requirement <http://edocket.access.gpo.gov/2009/fr-19930.htm>.

NIH

Since July 1990, the NIH has required all National Research Service Award applications to include a description of the RCR instruction that institutions would provide to trainees. In June 1994, NIH extended

---

1 This SIP will be updated as other federal funding agencies require RCR training.
its requirement to T32 and T34 grants and strongly encouraged instruction on specific topics and requested progress reports on RCR instruction. On November 24, 2009, NIH issued new and expanded requirements for RCR instruction <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html>, which apply to all initial and renewal applications submitted on or after January 25, 2010, and to all continuation applications with deadlines on or after January 25, 2010. Under the new requirements, RCR instruction must be provided to all trainees, fellows, participants, and scholars receiving support through any NIH training, career development award (individual or institutional), research education grant, or dissertation research grant.2

NIFA

Article 1 states research ethics training is relevant to, “...all research and research-related awards (i.e., research, education, and extension) to institutions of higher education, hospitals, other non-profit organizations and for-profit organizations. The terms and conditions will apply to all awards (grants, cooperative agreements, and special projects) funded by NIFA except: 1) Formula Funded Programs; 2) the 1890 Facilities Program; and 3) the Small Business Innovation Research Program; as well as 4) awards to individuals.” Article 7 states, “The responsible and ethical conduct of research (RCR) is critical for excellence, as well as public trust, in science and engineering. Consequently, education in RCR is considered essential in the preparation of future scientists. By accepting a NIFA award the grantee assures that program directors, faculty, undergraduate students, graduate students, postdoctoral researchers, and any staff participating in the research project receive appropriate training and oversight in the responsible and ethical conduct of research and that documentation of such training will be maintained. Grantees are advised that the documentation of the training are subject to NIFA review upon request. Note that the training referred to herein may be either on-campus or off-campus training. The general content of the ethics training, at a minimum, will emphasize three key areas of research ethics: authorship and plagiarism, data and research integration and reporting misconduct. Each institution will be responsible for developing its own training system, as schools will need flexibility to develop training tailored to their specific student needs.” (from http://www.nsf.gov/pubs/policydocs/rtc/agencyspecifics/nifa_213.pdf)

UNIVERSITY OF NEW MEXICO REQUIREMENTS

NSF and NIH began requiring institutions who receive funds to comply with training requirements in research ethics in January 2010. In February 2013, USDA’s NIFA issued similar training requirements. Because there are slight differences between agencies, UNM generalizes requirements to meet all current agency directives as well as those that will emerge in the near future from other agencies.

Based on Table 1 (below), UNM requires all NSF, NIH, and NIFA research personnel who are undergraduate students, graduate students, or post-doctorate employees to complete a minimum of eight hours of instruction in the responsible conduct of research where the majority of that material is presented face-to-face by a trained facilitator. These training sessions must be done within one year of the award and cover the 12 content areas outlined in this Plan. Early career faculty, research staff and some others

2 NIH’s RCR requirements apply to the following programs: D43, D71, F05, F30, F31, F32, F33, F34, F37, F38, K01, K02, K05, K07, K08, K12, K18, K22, K23, K24, K25, K26, K30, K99/R00, KL1, KL2, R25, R36, T15, T32, T34, T35, T36, T37, T90/R90, TL1, TU2, and U2R. This requirement also applies to any other NIH-funded programs supporting research training, career development, or research education for which there is an RCR instruction requirement in the funding opportunity announcements.

UNM’s Scientific Integrity Plan 2
must also complete research ethics training for certain types of NIH funding. It is the principal investigator’s responsibility to assure that his/her staff and students have fulfilled the RCR requirement and received evidence of certification from the UNM AIRE program. Maintenance of that evidence is also the responsibility of the investigator; however, AIRE maintains records of all completed training.

Table 1

<table>
<thead>
<tr>
<th>Agency</th>
<th>NSF</th>
<th>NIH</th>
<th>NIFA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who must participate?</strong></td>
<td>Undergraduate students, graduate students, and postdoctoral researchers who receive NSF support to conduct research</td>
<td>Trainees, fellows, participants, and scholars (list footnote 2 previous page)</td>
<td>Program directors, faculty, undergraduate students, graduate students, postdoctoral researchers, and staff participating in research project</td>
</tr>
</tbody>
</table>
| **Requirement** | • Institutional RCR Plan  
• Documentation and certification  
• Standard offerings | • PI states plan in proposal  
• Institution documentation  
• Standard offerings | • Institutional oversight  
• Documentation of training  
• Can be on- or off-campus |
| **Effective Date** | 4 Jan 2010 | 25 Jan 2010 | Feb 2013 |
| **Frequency** | Within 1-year of award made to UNM; recertify | Early in each career stage or every 4 years | When supported by funding |
| **Format** | Face-to-face preferred | Face-to-face, 8 hrs min | CITI-RCR with facilitator-led discussion |
| **Subject Matter** | Complete RCR as detailed by Office of Research Integrity (ORI) | Complete RCR as detailed by Office of Research Integrity (ORI) | Complete RCR including: authorship and plagiarism, data and research integration, and reporting misconduct |
| **What to Submit** | Provide standard wording in narrative assuring RCR training is in place | Provide standard wording in narrative addressing section assurance | Provide details how RCR requirement will be met in narrative |
SUBMITTING PROPOSALS FOR FUNDING

NSF
At the time of proposal submission through Sponsored Research, UNM must certify that it has a plan in place to provide RCR training and oversight to undergraduate students, graduate students, and postdoctoral researchers who will receive NSF support to conduct research. In the narrative of the proposal, the principal investigator should reference the SIP, the personnel that will fall under the training requirement, and the retention of training records. The SIP does not have to be included with the proposal submission, but must be provided to NSF upon request. In Appendix A, there is a template for the information that should be provided in an NSF proposal regarding RCR training.

NIH
In all instances, an RCR training plan must be included within the body of the proposal submission. Appendix A contains a template of boilerplate language that can be used to describe the SIP and the program of RCR instruction. The RCR plans submitted in proposals will be evaluated and rated “Acceptable” or “Unacceptable,” but they will not be a factor in determining the impact/priority score of the proposal. No proposal, however, with an unsatisfactory RCR plan will be funded. Renewal applications to NIH for institutional awards must also include: (a) any changes in the formal RCR instruction offered over the past project period; (b) plans for the future that address any weaknesses in the current RCR instruction; and (c) the names of all faculty who served as course directors, speakers, lecturers, or discussion leaders during the past project period. New applications to NIH for individual awards must include: (a) a section on RCR instruction appropriate to the career stage of the applicant (see Frequency of Instruction below); (b) documentation of prior participation or instruction in RCR during the applicant’s previous career stage; and (c) the role of the applicant’s mentor in the RCR training. Renewal applications for individual awards must describe RCR instruction undertaken during the past project period as well as future plans to meet the frequency requirements.

NIFA
National Institute of Food and Agriculture (NIFA) grants are submitted through Grants.gov. NIFA’s RCR Training Requirement became effective for awards subject to the February 2013 Research Terms and Conditions. Refer to submission instructions frequently asked questions for details on this process (http://www.nifa.usda.gov/home/faq_apply.html#coi). There are disclosures such as conflicts of interest that are required prior to submission. Responsible conduct of research instruction details should be provided in the body of the proposal; however, current proposal guidelines are not explicit about this.

STANDARD INSTRUCTIONAL COMPONENTS

Over the past two decades, best practices have been developed for RCR training, which establish standards for the format, degree of faculty participation, duration of instruction, subject matter, and frequency of instruction that have been deemed the most successful. The SIP is based on these principles, though the exact components of the instruction should be adjusted, as appropriate, for the experience level of the researcher, the field of research, and the length of the research program. The standards for the instructional components discussed below, except for frequency of instruction, apply to NSF-, NIH-, and NIFA-funded research.

1. Format

There should be substantial face-to-face discussions among participants, and a combination of didactic instruction and facilitated small-group discussions about case studies and ethical content. Though online
courses may be used to supplement face-to-face instruction, online instruction is not adequate as the sole means of instruction, except in the case of short-term training programs where participants, such as undergraduate students, are involved in research for a period of six or fewer months. Appeals can be made to the AIRE director for other unusual and well-justified circumstances. There are also opportunities to teach “Ethics Across the Curriculum,” by including RCR content in existing courses, and “Ethics in Context,” by holding routine discussions of RCR content in the context of everyday encounters such as program meetings, brown-bags, and weekly seminars. On a number of occasions, classes have been successfully delivered synchronously online using UNM’s Adobe Connect service. A wide-range of novel delivery options are possible and should be discussed with the AIRE director or with the AIRE-AC before implementation.

2. Faculty Participation

Principal investigators and other faculty involved in research are expected to have a primary role in providing RCR instruction, which should be an integral component of mentoring of students and postdoctoral researchers. Informal discussions of core RCR topics should occur in the context of laboratory interactions and other informal situations throughout the year. For more formal involvement, principal investigators and other research faculty are encouraged to serve as discussion leaders, speakers, and lecturers in RCR training sessions, such as by serving as a guest lecturer for undergraduate and graduate students (for example, in research ethics courses). Contact the AIRE office or check the website (http://grad.unm.edu/aire) for a current list of courses suitable for faculty participation or for students to enroll.

3. Duration of Instruction

In order to cover topics with sufficient depth and to synthesize subject matter within a broad conceptual framework, there generally should be eight contact hours of formal RCR instruction, or equivalent, over the course of a semester. One-credit hour, eight-week classes are offered regularly during the school year. There are a number of research ethics training opportunities throughout the academic year and summer (http://grad.unm.edu/aire).

4. Subject Matter

The following topics, which are discussed in more detail in Appendix B, constitute the 12 core subject areas that should be covered in RCR instruction:

- Conflict of interest
- Ethical use of human and other animal subjects in research
- Authorship and publication
- Data acquisition, management, ownership, and sharing
- Data reproducibility
- Peer review
- Mentorship
- Research misconduct policies
- Whistleblower ethics
- Financial management of research award
- Collaborative research, including with industry
- The scientist as a responsible member of society
5. Frequency of Instruction and Re-certification

Research personnel should become RCR certified soon after falling under the support of an active NSF, NIH, or NIFA grant. This requirement must be fulfilled no later than one year after the funding is received by UNM. Certification is valid for four years and then expires. Re-certification in RCR can be completed by contacting the AIRE office and registering for a refresher course. The RCR re-certification course consists of an online learning module followed by a one-hour face-to-face brown bag discussion. During this discussion, participants will discuss cases, share any issues or circumstances that they may have encountered as researchers where their ethics training was useful, and provide feedback on the usefulness of their RCR instruction as well as improvements for future training. This will serve as a process improvement exercise for the AIRE program to modify course content and process.

NSF Statement on Instructional Frequency

Postdoctoral researchers and students should complete RCR training as soon as they are invited to join or become associated with an NSF-sponsored project. Undergraduate and graduate students involved in long-term NSF-funded projects should plan on taking RCR refresher courses every four years. For summer research experience and other short-term awards, training should be done in the first two weeks of the project or program.

NIH Statement on Instructional Frequency

At minimum, RCR instruction should be undertaken at least once every four years and during each stage of a scientist’s career: undergraduate, post-baccalaureate, predoctoral, and postdoctoral levels, with predoctoral training beginning as early as possible in graduate school. After initial RCR instruction, senior fellows and career award recipients may fulfill their RCR requirements by offering RCR instruction themselves. To meet RCR requirements, the instruction may take place in a year when there is no NIH support.

NIFA Statement on Instructional Frequency

The NIFA training requirements can be met by following the same guidelines as for NSF, which are stated above.

6. Anti-plagiarism Software

Two online tools are available for UNM users to check a document prior to submitting it to a funding agency or a peer-reviewed journal. Enhanced capability to scan figures and other media will be available soon, which is beneficial since most funding agencies and journals perform scans during review.

iThenticate is web-based and can be accessed by UNM users at http://www.ithenticate.com/. This product allows an individual to submit any electronic document for checking against its databases. A report is generated providing the text, sources, and even word counts of questionable writing. More features are available than just text similarities. There is no cost for users.

Turnitin is available to UNM instructors through UNM LEARN (a LMS) and provides multiple functions for managing and grading written class assignments including: originality checking, online commenting and grading, grammar checking, and peer review. Turnitin can be accessed as a stand-alone web-based service or as a tool embedded in UNM LEARN. Visit http://turnitin.unm.edu to learn more and to register for a Turnitin account. Departments are charged $100 per faculty user.
COMPLIANCE

Principal investigators are responsible for ensuring that individuals supported by NSF, NIH, and NIFA funding have satisfactorily completed RCR instruction. This responsibility includes keeping a written record of the instruction provided and submitting information electronically to Academic Integrity & Research Ethics at AIRE@unm.edu when a research participant has completed the training requirement (whether through a course, seminar, or other format approved by AIRE). The university maintains a database that documents the fulfillment of RCR training requirements by investigators.

There are a number of ways to meet the RCR requirement, including:

1. Taking one of the established RCR courses found online at http://grad.unm.edu/aire. Courses may be offered by departments, colleges, centers, or other UNM programs, but must meet or exceed content standards described in this SIP.

2. Creating and completing specially designed hybrid training that involves both web training and an instructor led program. This program must receive prior approval from the AIRE director in order to qualify.

3. Courses taken at other institutions may meet UNM RCR requirements as reviewed by the AIRE director or advisory committee. Evidence of completion and course materials such as a syllabus, certificate, and academic transcript should be submitted to AIRE for consideration.

4. Certification of attendance at symposia or workshops can be considered to meet minimal UNM RCR standards. The Graduate Resource Center (GRC) hosts an RCR series as part of their regular services each semester. Contact AIRE for more information on this option.

5. Adopting the highly recommended “Ethics across the Curriculum” and/or “Ethics in Context” training strategies, which are discussed in depth on the AIRE website.

6. AIRE has been working with instructors of more than 120 research methods or professional development courses across campus. In nearly two dozen courses already, the instructors have blended research ethics content into their course syllabus and provide research ethics training to enrolled students. If a participant has completed such a course, please provide transcript evidence of completion. A certificate will be issued if that course is one of those recognized by AIRE as an RCR training course.

RESOURCES

Through its website and outreach activities, Academic Integrity & Research Ethics provides a number of resources. On-line RCR instruction is available through the Collaborative Institutional Training Initiative (“CITI”) and through the National Ethics Core at (https://nationalethicscenter.org/nsf-rcr-requirement ). Except for short-term sponsored programs, and other exceptions pre-approved by the AIRE director, CITI and National Ethics Center on-line instruction alone do not meet the RCR requirements. AIRE staff members are available to help principal investigators and other faculty mentors develop training plans. Please feel free to contact AIRE by phone (505) 277-3488, in person at “The Den”, Graduate Studies Collaborative, Suite 69, Building 85, University Advisement and Enrichment Center, or the Graduate Studies Main Office, Humanities 107, University of New Mexico, Albuquerque, NM 87131.
UNIVERSITY OF NEW MEXICO APPROVALS
This Scientific Integrity Plan is approved by the Vice Provost for Research on the 17 of April 2014.

Michael Dougher, Ph.D.
Vice Provost for Research
University of New Mexico

APPENDICES

Appendix A: Templates for Proposals and Related Information
Appendix B: RCR Pedagogy and Course Descriptions

APPENDIX A: TEMPLATES FOR PROPOSALS AND RELATED INFORMATION

Template for National Science Foundation Proposals

Description of Research Ethics Activities

In accordance with UNM’s Scientific Integrity Plan (http://grad.unm.edu/aire/sip.html), participants in <grant title> will complete either a formal course that teaches content on the responsible conduct of research (RCR) or the equivalent as approved by UNM’s Academic Integrity and Research Ethics faculty Advisory Committee in Graduate Studies operated in collaboration with the Vice Provost for Research. Participants will receive a certificate of completion and their certification will become part of UNM’s compliance record management system. Acceptable RCR content includes, but is not limited to: Conflict of interest; ethical use of human and other animal subjects in research; authorship and publication; data acquisition, management, ownership, and sharing; data reproducibility; peer review; mentorship; financial management of research awards; research misconduct policies; whistleblower ethics; collaborative research (including with industry); and the scientist as a responsible member of society.

Template for National Institutes of Health Proposals

RCR Boilerplate for NIH Training Grant, Career, or National Service Research Award Applications

The University of New Mexico requires that all researchers complete training modules for all compliance units (such as Institutional Animal Care and Use Committee, Institutional Review Board, Export Control, HIPAA). In addition to these baseline compliance requirements, I have created a plan for ongoing ethics instruction in the responsible conduct of research (RCR) for my research program. Through the course of this [state type of grant], I will meet NIH’s RCR requirements in the following ways.

[This is the part that shows how your plan is tailored to you. Include the title of the course, subject matter covered in the course, format (discussion, lecture, etc.), name and experience of the faculty member or members who participate, how often the course meets and number of contact hours and credits, and who the target audience is or the time point at which you are taking or have taken the course. Also, explain how the course will meet your training needs with respect to the subject matter suggestions from NIH (e.g. mentoring, authorship, being a responsible member of society).

UNM’s Scientific Integrity Plan
Example: BioMed 555, BioEthics – Fall 2014. This course is designed to provide an introduction to basic principles of scientific conduct and practice for graduate students pursuing careers in biomedical research. Course subject matter includes responsible authorship, impact of conflicts of interest on research integrity, handling of scientific misconduct, proper data management, policies that guide the use of humans and animals in biomedical experimentation, and legal hurdles required to assure protection of intellectual property. These topic areas are studied using specific cases and student-centered learning approaches. In this class, students are invited to be active participants in a problem-based learning or case-based bioethics course. This one-credit hour mini-course is designed to stimulate thinking and discussion among participants about salient topics in Bioethics. Each topic is introduced by a resident expert in the field during a 20-30 minute overview. Following each overview, relevant case studies are assigned. Each case serves as the springboard for defining a set of learning issues and exploring solutions by those assigned the cases over the course of the week between in-class sessions. The learning issues form the basis for written discourses and, at the beginning of the next in-class session, small round-table discussions.

Although formal instruction will lay the basis for meeting the requirements for my students, I will also take part in ongoing informal instruction through [weekly or biweekly or monthly] lab meetings, journal club, and one-on-one conversations with my students. I have an open door policy and encourage trainees to speak with me to discuss issues as they arise, including but not limited to conflict of interest, research misconduct, data management, records, intellectual property, issues of social responsibility, and responsible authorship and publication.

Internal RCR Training Resources

- AALAS on-line tutorial available through the Office of Animal Care and Compliance (http://hsc.unm.edu/som/research/acc/). Additional species-specific training is required prior to use of animals in the laboratory.
- Training in the protection of human subjects is found through the Office of the Institutional Review Board (OIRB) (http://irb.unm.edu/?q=irbnet), which currently uses CITI training (http://hsc.unm.edu/som/research/hrrc/CITI.shtm).
- Training with respect to biosafety and blood borne pathogens is available at UNM Safety and Risk Services, http://risk.unm.edu/training/biosafety.php.

External RCR Resources

- AAAS and NAS: Online Resource on Research Integrity and Scientific Misconduct
- NIH: NIH Requirement for Instruction in the Responsible Conduct of Research in NRSA Training Grants
- HHS Office of Research Integrity: Introduction to the Responsible Conduct of Research
- HHS Office of Research Integrity: RCR Educational Resources
- NIH: Training in the Responsible Conduct of Research Resources
- NIH: Sharing Biomedical Research Resources
- National Postdoctoral Association: NSF RCR Toolkit
APPENDIX B: RCR PEDAGOGY AND EDUCATIONAL MATERIALS

The National Institutes of Health defines the responsible conduct of research 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.”

Subject Matter: Detail of Mandatory RCR Content Elements

- **Authorship and Publication**
  Although researchers can disseminate their findings through many different avenues, results are most likely to be published in a scholarly journal. Accurate and honest reporting of research methods and results are basic to all scientific publications. Researchers should avoid dividing a project into "least publishable units," which misinforms the public on the importance and value of the research, and wastes time and money. Researchers should also avoid publishing duplicate studies, a practice that also unfairly represents the importance of the research. Authorship credit should be based on the individual's contribution to the study. An author is considered anyone involved with initial research design, data collection and analysis, manuscript drafting, and final approval. However, the following do not necessarily qualify for authorship: providing funding or resources, mentorship, or contributing research but not helping with the publication itself. The primary author assumes responsibility for the publication, making sure that the data are accurate, that all deserving authors have been credited, and that all authors have given their approval to the final draft, and also handles responses to inquiries after the manuscript is published.

- **Collaborative Research, Including with Industry**
  Research collaborations occur more frequently today than they did in the past due to a growing likelihood of research funding for interdisciplinary projects and advances in communication technologies. Collaborations take place in a variety of forms, including the borrowing and lending of supplies, resources, and equipment among researchers; seeking input from an expert in a different discipline; and partnering with colleagues who have a similar background or field of knowledge for fresh ideas and abilities. It is essential for collaborating researchers to establish a clear management plan at the beginning of the endeavor in order to avoid the potential difficulties that they might otherwise encounter. This plan should include the goals and direction of the study, responsibilities of each contributor, research credit and ownership details, and publication techniques. Team members must be open with one another, keeping colleagues informed of developments, changes, and problems.

- **Conflicts of Interest**
  Researchers are often faced with competing demands on time, effort, and responsibilities. A conflict of interest occurs when a researcher has to contend with two or more competing concerns, such as honestly reporting research results versus making a profit, achieving publication, or retaining outside funding. There are other COIs as well such as a conflict of commitment, which occurs when a researcher engages in competing obligations, such as collaboration on another project, preparing a new grant application, teaching, or peer review. A conflict of conscience may prevent a reviewer from not biasing an outcome or a review of a proposal or paper. In other words the reviewer may simply not agree with the research because they think it is wrong or inappropriate. Conflicts of interests, commitments, or conscience are not inherently negative; rather, once disclosed, the way in which the conflict is handled makes the difference. Researchers are encouraged to be honest about any interest that may cause potential
conflicts and to inform others so that a disinterested entity can monitor progress to verify continued researcher objectivity. Researchers should also schedule their time judiciously and accept additional responsibilities only when they are certain that they will be able to honor all commitments.

- **Data Management (Ownership, Sharing, Intellectual Property, and Records)**
  There are a number of sites regarding data sharing policies and guidance, including the following important ones.

- **Data Reproducibility**
  Scientists, including those at the federal funding agencies, believe that the current systems to ensure that research outcomes can be reproduced are insufficient and not dependable. Problems with data reproducibility are exemplified by a significant number of biomedical and other research publications whose results are irreproducible when subsequent investigators have attempted to replicate their methods to generate similar outcomes. The ability to replicate an experiment is one of the main drivers behind the idea that science can police itself and is self-correcting. Because NIH is concerned that this ability is failing, it has taken a number of strong actions both within NIH and with a number of partners to curtail this trend. Already NIH has developed a training module on "enhancing reproducibility and transparency of research findings with an emphasis on good experimental design," (Collins and Tabak, 2014, Nature 505-613-614). Beginning in Fall 2014, UNM will provide a similar service to our researchers. [http://grants.nih.gov/grants/guide/notice-files/NOT-GM-14-003.html](http://grants.nih.gov/grants/guide/notice-files/NOT-GM-14-003.html) and [http://www.nature.com/news/policy-nih-plans-to-enhance-reproducibility-1.14586](http://www.nature.com/news/policy-nih-plans-to-enhance-reproducibility-1.14586)

- **Dispute Resolution**
  Are there practices within disciplines that would help facilitate the resolution of disputes? Are there laboratory or institutional policies that could prevent disputes from occurring? UNM has an office dedicated to the resolution of disputes: [http://grad.unm.edu/resources/ombuds/index.html](http://grad.unm.edu/resources/ombuds/index.html) and [http://www.unm.edu/~askdrc/](http://www.unm.edu/~askdrc/).

- **Financial Management**
  Grants are awarded to an institution on behalf of the principal investigator – usually a faculty member or graduate student. Administrators and PIs need to be aware of the relevant policies and regulations of both the institution and the sponsor governing the administration of sponsored projects. Moreover, grants, once they hit the PI's department, are managed financially by departmental staff. Orders are placed, students are hired, and equipment and even space must be acquired. Sometimes the investigator "bends" their procurements, making them different from what is outlined in approved budgets. Staff must be aware of regulatory and institutional policy which sometimes leads to confrontation and even outright fraud. Appropriate communication and knowledge will not only enable administrators, staff, and PIs to make appropriate decisions, it will enable them to ask the right questions when difficult situations arise. Although the institution is responsible for providing the proper stewardship in managing sponsored project funding, staff, together with the PI, have the responsibility to make proper stewardship of awards a top priority.
• *Human Subjects Protections and Use*
Research involving human subjects is challenging to the scientific community. Studying people, their tissues, and their data raises ethical complexities in research, including responsibility for the safety and privacy of study participants. Both international and domestic research requires sensitivity to the cultural background and preferences of participants. Unlike molecular/cellular studies, human subjects require fairness in participation, respect for their autonomy, and protection from harm (see the Office of Research Integrity’s "Teaching the Responsible Conduct of Research In Humans"). The Office for Human Research Protections (OHRP) provides leadership in protection of rights, welfare, & wellbeing of subjects involved in research (http://www.hhs.gov/ohrp/about/ohrpfactsheet.htm). OHRP provides clarification and guidance, develops educational programs, maintains regulatory oversight, and provides advice on ethical and regulatory issues in biomedical/behavioral research.

• *Mentorship*
The relationships between mentors and mentees are integral to RCR instruction. Everyone involved in research-related activities should be responsible for conducting research responsibly. In particular though, senior researchers who train and supervise novice researchers should take a proactive approach by increasing the novice researchers’ awareness of issues that can compromise the responsible conduct of research. See http://ori.hhs.gov/education/products/niu_mentorship/.

• *Other Animal Subject Use and Protections in Research*
The Office of Laboratory Animal Welfare (OLAW) provides guidance and interpretation of the Public Health Service (“PHS”) Policy on Humane Care and Use of Laboratory Animals, supports educational programs, and monitors compliance with the Policy by assured institutions and PHS funding components to ensure the humane care and use of animals in PHS-supported research, testing, and training. See http://ori.hhs.gov/education/products/rcr_animals.shtml. Another site, http://ori.hhs.gov/education/products/nestate/index.htm, developed at North Carolina State University, is sponsored by the Office of Research Integrity and serves as both a learning tutorial and a clearinghouse of information on the ethics and the use of animals in research.

• *Peer Review*
Peer review is the recognized process to help ensure that research proposals and manuscripts meet established standards of excellence. Feedback from colleagues with similar backgrounds, expertise, and knowledge can be a valuable asset. Positive peer reviews contribute to increased funding opportunities, academic advancement, and a good reputation. On the other hand, peer reviewers can fall prey to bias, both positive and negative, which can affect the prospects of the research being reviewed, independent of its quality. Peer reviewers are expected to meet strict deadlines, which is a challenge when one has numerous responsibilities. Reviewers are also expected to remain impartial during the review, which can be difficult if the research being reviewed is, for example, submitted by a rival researcher. During the review process, the reviewer must knowledgeably assess the quality of the research, honestly judge the importance of the research, and must preserve confidentiality. It is essential that researchers are aware of the expectations and commitments required of a peer reviewer prior to becoming one. Although participating in peer review is a way to provide professional service, those who cannot meet the expected requirements for providing this service should seriously consider whether being a peer reviewer is right for them. Resource materials are available at http://ori.hhs.gov/education/products/rcr_peer_review.shtml.
• Raising Questions and Addressing Problems
Institutions should have a mechanism and an outlet for researchers to raise questions and ask questions. AIRE has a consulting service available for questions regarding issues of research integrity. Although it does not provide specific answers, AIRE can provide guidance on ways to think about an issue or a problem.

• Research Misconduct Policies
Research misconduct means 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. Research misconduct does not include honest error or differences of opinion. See http://handbook.unm.edu/section-e/e40.html for UNM’s research misconduct policy. The federal policy can be accessed at http://ori.hhs.gov/education/products/rcr_misconduct.shtml. Researchers found guilty of misconduct can lose federal funding, be restricted to supervised research, or lose their jobs, so thorough investigation of an allegation is vital.

• The Scientist as a Responsible Member of Society
Researchers have a professional obligation to perform research and present the results of that research as objectively and as accurately as possible. When they become advocates for an issue, they may be perceived by their colleagues and by members of the public as biased; however, researchers have the right to express their convictions and work for social change. These activities need not undercut a rigorous commitment to objectivity in research. The values on which science is based, including honesty, fairness, collegiality, and openness, serve as guides to action in everyday life as well as in research. These values have helped produce a scientific enterprise of unparalleled usefulness, productivity, and creativity. So long as these values are honored, science—and the society it serves—will prosper. (From the National Academy of Sciences’s On Being a Scientist)

• Whistleblower Ethics and Consequences
Whistleblowers, or individuals who report research misconduct, are obligated to act, yet sometimes they face serious consequences for their actions, such as a reduction in research support, ostracism, lawsuits, or termination. Such retaliation against whistleblowers is strictly forbidden at federal, state, and institutional levels.