

**5. Responsible conduct of Research (RCR).** All entering biomedical sciences students are educated during orientation about requirements to complete human subjects and animal use and care training programs; completion of requisite training is arranged and documented by their specific graduate programs. All requisite training and annual updates must be completed in order for final Graduate School acceptance of the PhD thesis. All TMS trainees will be required take **GRD 717 Principles of Scientific Integrity-** (see **Appendix 6** also).

**Format:** The course “Principles of Scientific Integrity” (GRD 717) is offered fall and spring semester each year. This three-credit hour course provides systematic instruction on ethical issues and principles in the practice of science through reading, case discussions and lecture. The textbook is Introduction to the Responsible Conduct of Research by Nicholas H. Steneck, modified to reflect more recent changes in rules and regulations. It is available as a free download at <http://ori.hhs.gov/documents/rcrintro.pdf>. This course is being taught in a “Team Based Learning” format and modeled after a course developed by Dr. Wayne McCormack at the University of Florida School of Medicine. TBL organizes the instruction of the course so that the materials that normally would be presented in a lecture format are made available approximately one week before the class meeting. Class time is spent in teams of 6 to 7 students each who will meet each week to discuss the course material, taking quizzes to measure comprehension of the course materials, followed by discussion of case studies.

**Subject matter:** Topics covered in GRD 717 include the nature, extent, and causes of fraud in science; UAB policies on fraud; ideals of good science; the responsibilities of authorship and peer review; potential problems raised by the commercialization of research; scientists as public policy advisors; and ethical issues involved in animal experimentation and in clinical trials. Among the areas discussed are:

- Ethical Decision Making (Jeff Engler);
- UAB Policies on Research Misconduct (Charles Prince, Assistant VP for Research);
- Protection of Human Subjects in Research (Jonathan Miller, UAB IRB);
- Welfare of Laboratory Animals (J. Michael Wyss, former Chair, IACUC);
- Best Practices for Data Management (James Collawn);
- Identifying and Managing Conflicts of Interest (J. Michael Wyss, Chair, CIRB);
- Ethical Authorship and Avoiding Plagiarism (Jeffrey Engler);
- Best Practices in Collaborative Research (Bryan Noe, Dean, UAB Graduate School);
- Mentor and Trainee Responsibilities (Lisa Schwiebert);
- Expectations of the Peer Review Process (David Bedwell).

**Faculty Participation:** The course was developed and taught by Jeff Engler, PhD, Associate Dean for Academic Affairs and Professor of Biochemistry and Molecular Genetics and one of our Executive Steering committee members. In addition, other research faculty in the biomedical sciences lead discussions with graduate students and postdoctoral fellows on topics included in the responsible conduct of research.

In addition, all mentors will be advised and encouraged to include discussions regarding RCR during their one-on-one interactions with their students during mentor/student meetings., during discussions of authorship on papers, how to handle various types of data, etc. As an example, when manuscripts are written, then authorship and peer review are discussed. These recommendations will be disseminated to all TMS faculty by email on an annual basis at the time trainee applications are solicited.

**Duration of Instruction:** This course is offered in the fall and spring semester of each year. It provides 40 contact hours of instruction.

**Frequency of Instruction:** Students are expected to read the textbook, watch slide presentations and videos (when available) on the class web site, and attend all course meetings. The class meets weekly over the course of the semester for 2.5 hours at each class meeting (40 contact hours).

All trainees will be required to take RCR training in year 1. Additionally yearly refresher RCR activities **will be required** for TMS trainees that include utilizing the new training videos developed by the UAB Center for Ethics and Values in Sciences (<http://www.uab.edu/images/gradsil/rcr/index.html>). These include “Teaching

Research Integrity in Analysis and Reporting”, “Image Manipulation”, “In the Lab: Mentors and Students Behind the Scenes”, “Ethical issues in Underpowered Clinical Trials”, and “The Lab: Avoiding Research Misconduct”. UAB has also recently developed a new scholarly integrity workshop “*Ethics for Authors*”, which is organized around interactive and facilitator-led discussions and exercises ([www.uab.edu/ethicsforauthors/](http://www.uab.edu/ethicsforauthors/)).

Finally, we note that UAB is one of eight institutions recently awarded funding by the Council of Graduate Schools and the Office of Research Integrity to develop strategies to integrate RCR educational materials into the graduate curriculum, for use by faculty and graduate students in discussion of scholarly integrity. UAB’s national and international leadership in the area of ethics training was reflected by presentations at the 2010 Project for Scholarly Integrity Capstone Conference and the 2012 ORI conference “Quest for Research Excellence” and were highlighted in the book, “ Research and Scholarly Integrity in Graduate Education: A Comprehensive Approach,” published in 2012 by the Council of Graduate Schools.