Training in the Responsible Conduct of Research (RCR).

The RCR training requirement will be met by successful completion of one of two responsible conduct of research courses offered by VCU (OVPR601 or OVPR602). Each of these one credit courses covers contemporary issues relating to scientific integrity and responsible conduct in research (RCR). OVPR602 is offered annually in both the spring and the summer semesters and OVPR601 is offered annually in the fall semester. Both of these courses are fully compliant with all aspects of NIH RCR Instruction Guidelines found at : (<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html>

*Course Format:* The courses are taught using in-class sessions as well as some online reading and discussion. Classroom sessions are comprised of didactic presentations which are linked to small group discussions of case studies (these activities comprise 8 in-person contact hours). Didactic presentations are made to the class in a plenary session. Learning-centered approaches are used to engage students in the classroom during these presentations. Examples of strategies and techniques to accomplish this include: 1) completion of survey instruments prior to or during class to probe attitudes and knowledge about relevant topics followed by student-led interpretation and discussion of results; 2) student-led discussion of general questions found at the end of each chapter in the text (see below); and 3) student-led discussion of relevant current events covered in the print media. Following every didactic presentation, break-out groups convene to discuss assigned short cases that reflect the content of the presentation. Maximum group size for case discussion sessions is 8-10 students, and a faculty member (see below) is always present to serve as a facilitator as the students discuss cases and propose solutions to the dilemmas presented in these 200-300 word scenarios.

The course grade is determined based on attendance, assignments as case leaders, and class participation, or a writing assignment (examples include online written responses to case studies using the above-described blog-type platform that allows student-student and student-instructor interactions, writing a solution to a complex case scenario, composing new cases and proposing solutions, or writing a short position paper on a relevant topic). Attendance at in-class sessions is mandatory; excused absences are permitted (e.g., for illness, emergencies) but must be offset with an acceptable makeup writing assignment, prescribed by the course director.

*Subject Matter:* The course uses *Scientific Integrity: Text and Cases in Responsible Conduct of Research 4th Edition* (ASM Press, Washington, DC.) as its textbook. The fourth edition of this text was published in July 2014. Based on 2012 data collected by ASM Press, the third edition of this text has been adopted for use at over 80 institutions making it one of the most widely used teaching resources in the field. This text was authored by Francis L. Macrina, who is the course director of both OVPR601 and OVPR602.

The course content covers the nine commonly accepted NIH instructional topics taught in RCR courses. These are reflected in the required reading in the 4th edition of the *Scientific Integrity* text as illustrated in the following table.

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| **NIH Accepted Content Areas**  [**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) | **Corresponding Content in *Scientific Integrity (4th edition)*** |
|  | |
| conflict of interest – personal, professional, and financial | Chapter 7 Managing Competing Interests |
| policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory practices | Chapter 5 Use of Humans in Biomedical Experimentation  Chapter 6 Use of Animals in Biomedical Experimentation  Appendix IV Sample Protocols for Human and Animal Experimentation  Appendix VII Safe Laboratory Practices Resources |
| mentor/mentee responsibilities and relationships | Chapter 3 Mentoring |
| collaborative research including collaborations with industry | Chapter 8 Collaborative Research |
| peer review | Chapter 4 Authorship and Peer Review |
| data acquisition and laboratory tools; management, sharing and ownership | Chapter 9 Research Data and Intellectual Property  Chapter 10 Scientific Record Keeping  Appendix V Example of of U.S. Patent Specification  Appendix VI Laboratory Notebook Instructions |
| research misconduct and policies for handling misconduct | Chapter 1 Methods, Manners, and the Responsible Conduct of Research  Chapter 2 Ethics and the Scientist  Appendix III Standards of Conduct |
| responsible authorship and publication | Chapter 4 Authorship and Peer Review |
| the scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research | Chapter 11 Science, Technology and Society |

Ten short case studies for discussion are found at the end of all chapters except for Chapter 1 and Chapter 11. Chapters also contain a minimum of 4 relevant discussion questions that may be used as writing or makeup assignments.

Each of the RCR courses are catalogue-listed courses that carry1 hour of academic credit. They have all been approved by the VCU Graduate School and meet the university requirements for hybrid course delivery.

The Office of the Vice President for Research and Innovation (OVPRI) also coordinates a lecture series that provides a platform for augmenting education in RCR . Taking advantage of OVPRI resources and grants from the VCU Sanger Fund for Ethics, we have aimed to sponsor at least 1 outside speaker per semester who presents a university-wide lecture on a topic related to the responsible conduct of research. Past speakers have included Michael Kalichman (Director of the Research Ethics Program at Univ. California, San Diego) who spoke on authorship, Michelle Bennett (Deputy Scientific Director of the National Heart, Lung, and Blood Institute) who spoke on collaboration and team science, and Ross McKinney (Director of the Trent Center for Bioethics, Humanities, and History of Medicine at Duke University) who spoke on conflict of interest in research. In 2014, we brought four speakers to campus: John Wilbanks from Sage Bionetworks spoke on the Politics of Personal Research Data; John Willinsky from Stanford University spoke on The Intellectual Properties of Learning, and also conducted a forum on open access publication in the scholarly literature; Lawrence Tabak, principal deputy director of the National Institutes of Health, spoke on data reproducibility; and Bruce Alberts, Univ. California, San Francisco , former President of the National Academy of Sciences, and former Editor-in-Chief of Science, spoke on science and the world’s future.

*Faculty Participation*: OVPR601and 602 topic instructors are faculty experts. Dr. Macrina lectures in areas that reflect his scholarly and published interests (mentoring, authorship/peer review, research data and collaboration) as well as those that fall under his responsibility and expertise as the senior research officer of the institution ( conflict of interest, intellectual property, misconduct policies, and research compliance issues). Topics related to research subject protection are taught variously by experts such as the Executive Director of the VCU Office of Subjects Protection, the principal investigator of VCU’s NIH CTSA award and the chair of the VCU IACUC, who is a funded investigator. Faculty case study facilitators are recruited from across the university. All case facilitators must complete a 1 hour training session conducted by Dr. Macrina prior to their initial course participation. Faculty mentors of record on NIH K-, F-, R-, T- or U- mechanism grants are recruited to be facilitators.

*Duration and Frequency of Instruction:* OVPR601 and 602 are catalogue-listed courses that carry 1 hour of academic credit. Training in RCR at VCU is mandated to occur at least once during each career stage (e.g., pre- or postdoctoral tenure) but no less than once every four years. Predoctoral trainees are required to complete instruction within the first 2 years of their program and postdoctoral trainees must complete the instructional requirement within 12 months of their start date. In the event that refresher training is needed to meet the four year cycle requirement, trainees are required to re-take either OVPR601 or 602. The dynamic content of RCR topics and the uses of different case studies in each iteration of these courses, provides appropriate refreshing of knowledge and principles in RCR .