

Department of Chemistry, Stony Brook University

Policy on the Responsible Conduct of Research and Scholarship

In compliance with the Stony Brook University (SBU) policy on *Responsible Conduct of Research and Scholarship* (RCRS, SBU Policy P211), the Department of Chemistry establishes the complementary policy for RCRS training described in this document.

The campus policy originates in response to National Institute of Health and National Science Foundation training requirements. The intent is to equip members of the SBU community with the tools necessary to conduct ethically sound and compliant research and scholarship and to ensure that the highest ethical standards for research and scholarship exist on the SBU campus.

All members of the SBU Chemistry community who participate in research and scholarship activities, which includes on-site visitors, are required to complete educational training on the responsible conduct of research and scholarship.

Our research and scholarship activities have four dimensions.

- 1) Creating new knowledge.
- 2) Making connections within and between disciplines, altering the contexts in which knowledge is viewed, and bringing new insights to the original research.
- 3) Bringing knowledge to bear on societal problems and issues.
- 4) Developing new pedagogies and curriculum materials that are directed at transmitting knowledge effectively to all who want to learn.

Section 1: Training Components

The training consists of two parts, in addition to training in laboratory safety.

- (1) Online training provided by *Collaborative Institutional Training Initiative* modules (CITI). Everyone completes this component, choosing the module most appropriate to their research area along with other modules that may be required for specific projects. The *Conflict of Interest* module is to be completed every four years. Documentation is provided by *Certificates of Completion*.
- (2) In person training (IPT) that may consist of retreats, workshops, seminars, courses, personal instruction and/or formal discussions as described in Section 4. The Federal guideline is for a minimum of eight hours over four years, i.e. two hours annually.

Section 2: Documentation of Compliance

The Department's documentation of compliance is provided by the *Safety and RCRS Compliance Report* form, Appendix 1 in Section 5.

When a new faculty member or staff member who directly supports research and scholarship activities joins the Department, the Department Chair notifies this person of the RCRS policy and requirements and furnishes them with the *Safety and RCRS Compliance Report* form.

When a student (includes graduate, undergraduate, high school, and visiting) or a visiting researcher/scholar (includes postdoctoral associates) joins the Chemistry community to collaborate with a Chemistry faculty member, their faculty collaborator notifies them of the RCRS policy and requirements and provides the *Safety and RCRS Compliance Report* form.

Each of the above completes the *Safety and RCRS Compliance Report* form in consultation with their collaborator/mentor/advisor/supervisor. This form and any other documentation of compliance are submitted to the designated person in the office of the *Director of Facilities and Operations*, who keeps a record of the information and provides reports to the SBU administration as required.

Section 3: Relevant Structure of the Chemistry Community

The requirements imposed on the various cohorts comprising the SBU Chemistry community are described below.

Chemistry Faculty

Faculty members complete CITI training during their initial orientation. They may conduct *Research Group RCRS Workshops* as described in Section 4 to satisfy the IPT requirements for their research students, postdoctoral associates, collaborators, and themselves. In addition, faculty can teach or contribute to *GRD 500 Responsible Conduct of Research and Scholarship*, participate in the Chemical Biology Training Program and/or the Entering Research Workshop.

Research Staff

When hired, new staff who directly support specific research and scholarship activities are provided with a check list for the required RCRS items and safety training by the Department Chair. Proof of completion must be provided before laboratory keys are issued. IPT is provided by periodic discussions with faculty supervisors, inclusion in Research Group RCR workshops or Entering Research Workshops and documented by the *Safety and RCRS Compliance Report* that they submit.

Postdoctoral Associates

Postdoctoral Associates complete CITI and, dependent on graduate RCR training, must either enroll in a GRD 500 refresher or the entire course. *GRD 500 Responsible Conduct of Research and Scholarship*, which is described in Section 4, is taught by a Chemistry faculty member. Additional IPT is provided by participation in the Entering Research Workshop and their Research Group RCRS Workshops.

Graduate Students

First-year graduate students complete CITI and enroll in a section of *GRD 500 Responsible Conduct of Research and Scholarship* taught by a Chemistry faculty member or an alternative program as approved by the Graduate Program Director. The Graduate Program Director also

has a session on academic integrity with new graduate students during orientation week. Continued IPT is provided by participation in their Research Group RCRS Workshops.

Undergraduate and High School Students

Students participating in research are required to complete the CITI requirement. IPT is provided by participation in the *Entering Research Workshop*, which is described in Section 4, their *Research Group RCRS Workshop*, or *CHE 385 Tools of Chemistry*.

Visitors: Summer Research Students

All high school and undergraduate students who have not previously completed these requirements are required to complete CITI training and attend a two-hour *Entering Research Workshop* before initiating research.

In the event that the Chemistry Department hosts an NSF-funded *Research Experiences for Undergraduates* program (REU), RCRS training, including CITI, is provided for REU students as part of a weekly Professional Development seminar series. These sessions are open to other summer research students who are not formally part of the REU program. The lectures and discussion cover data management, research ethics, data falsification, and plagiarism. Additionally, following recent science education research on strategies to retain and support STEM students, REU students complete two *values writing* exercises which relate their values to their decision to pursue science. A sample schedule is included in Appendix 2 in Section 5.

Visitors: Scholars, Researchers, and Affiliated Faculty from other Institutions

Visitors from another institution who are collaborating on-site with members of the SBU community are required to satisfy the CITI requirement. This requirement may be waived given proof of completion of RCRS training at the home institution. IPT is provided through discussions with their collaborators.

Section 4: Nature and Content of the In-Person Training

IPT involves face-to-face interactions that promote discussion and foster a climate of ethical conduct of research and scholarship. The faculty mentor is responsible for ensuring that appropriate topics covered. The following topics can be included.

- Conflict of interest (personal, professional, financial)
- Mentor/mentee responsibilities and relationships
- Collaborative research (including collaborations with industry where relevant)
- Responsible authorship, publication, and peer review
- Research/scholarship misconduct and policies for handling misconduct
- Data acquisition, research tools, data management, and sharing and ownership
- The scholar/researcher as a responsible member of society
- Contemporary ethical issues, environmental and societal impacts

Policies regarding human and animal subjects (see Appendix 1)
Safe laboratory practices

It is important to note that the Department of Chemistry sponsors additional extensive training in safe laboratory practices as identified on the attached *Safety and RCRS Compliance Report* form. Also, the Department hosts an annual Laboratory Safety Day that includes a nationally recognized colloquium speaker and engages students in sharing safe laboratory practices.

GRD 500 Responsible Conduct of Research and Scholarship

This course is designed to introduce students to the major issues in the ethics of research and scholarship. The first of seven two-hour sessions begins with a general discussion of ethical decision making and how to analyze difficult situations. After this, each session begins with an introductory lecture, followed by breakout into small groups to discuss case studies relevant to the topic. These breakout sessions have oversight of additional faculty members. Topics covered include *Introduction to Scientific Integrity, Scientific Misconduct, Mentoring, Journalism and Science, Plagiarism, Data Management, and Ownership and Authorship*. A sample syllabus is provided as Appendix 3 in Section 5.

Faculty Research Group RCRS Workshop

Ongoing in person training (IPT) is provided through faculty research group meetings. One or two of these meetings over the academic year include a RCRS Workshop component totaling two hours. A reading list and discussion questions are provided by the Department. Documentation (identifying the Research Group, facilitator, participants, and topics with the date and duration of the workshop) is submitted by the faculty member to the designated person in the office of the *Director of Facilities and Operations*. These workshops are considered to be a very effective means of providing IPT because the participants are well-known to each other and have common experiences and concerns.

Entering Research Workshop

In person training (IPT) is provided in a two-hour workshop facilitated by a faculty member or postdoctoral associate(s) supervised by a faculty member. A reading list and discussion questions are provided by the Department. Documentation (identifying the facilitator, participants, and topics with the date of the workshop) is submitted by the facilitator to the designated person in the office of the *Director of Facilities and Operations*. These workshops are offered at the beginning of each semester and at the beginning of the summer.

Section 5: Appendices

- 1) Safety and RCRS Compliance Report Form
- 2) Sample Schedule: Research Experiences for Undergraduates Program Professional Development
- 3) Sample Syllabus: GRD 500 Responsible Conduct of Research and Scholarship

Appendix 1

Safety and RCRS Compliance Report Form

_____	_____	_____	Y	N						
Researcher Name	Researcher SOLAR ID#	Room number(s)	Building access							
<p>1. Indicate when you have completed or scheduled your RCRS In Person Training. See Sections 3 and 4 of the Department's RCRS policy statement for requirements and options.</p> <p><input type="radio"/> Method of fulfillment: _____</p> <p><input type="radio"/> Date completed or to be completed: _____</p>										
<p>2. The following courses are required of every researcher in the Chemistry Department.</p> <p><input type="radio"/> Hazardous Waste Management training - ENV001 (1x)</p> <p><input type="radio"/> Laboratory Safety - Chemical Hazards, ELS 002 (1x)</p> <p><input type="radio"/> Fire Safety EFS 001 – Offered during August orientation, early fall, early spring, and early summer. Should be completed as soon as possible. Indicate date to be completed: _____ Supervisor initials: _____</p> <p><input type="radio"/> CITI Programming – Conflict of Interest module (every 4 years) and Physical Sciences, Engineering and/or Biomedical modules (1x). http://research.stonybrook.edu/citi-training</p>										
<p>3. The following course is required of all graduate students and biological researchers</p> <p><input type="radio"/> Laboratory Safety - Biohazards course, ELS 003 (1x)</p>										
<p>4. Discuss with your laboratory supervisor which of the following training courses listed below are required for working in the laboratory and complete them.</p> <table><tbody><tr><td><input type="radio"/> Nitric Acid Safety and Security - ELS 024 annually)</td><td><input type="radio"/> Blood Borne Pathogens – E0S 004 (annually)</td></tr><tr><td><input type="radio"/> Regulated Medical Waste – ENV 005 (1x)</td><td><input type="radio"/> Biological Hazards Annual Refresher – ELS 020 (annually)</td></tr><tr><td><input type="radio"/> Laser Safety Training – ERS 003 (1x)</td><td></td></tr></tbody></table>					<input type="radio"/> Nitric Acid Safety and Security - ELS 024 annually)	<input type="radio"/> Blood Borne Pathogens – E0S 004 (annually)	<input type="radio"/> Regulated Medical Waste – ENV 005 (1x)	<input type="radio"/> Biological Hazards Annual Refresher – ELS 020 (annually)	<input type="radio"/> Laser Safety Training – ERS 003 (1x)	
<input type="radio"/> Nitric Acid Safety and Security - ELS 024 annually)	<input type="radio"/> Blood Borne Pathogens – E0S 004 (annually)									
<input type="radio"/> Regulated Medical Waste – ENV 005 (1x)	<input type="radio"/> Biological Hazards Annual Refresher – ELS 020 (annually)									
<input type="radio"/> Laser Safety Training – ERS 003 (1x)										
<p>5. Date laboratory specific training completed. _____</p>										
<p>6. In addition, discuss with your laboratory supervisor which of the following training courses listed below are required for your research and make a plan for obtaining the training.</p> <table><tbody><tr><td><input type="radio"/> Fire Extinguisher Training EFS 003</td><td><input type="radio"/> Radioactivity Training</td></tr><tr><td><input type="radio"/> Human Subjects Training</td><td><input type="radio"/> Animal Subjects Training</td></tr><tr><td><input type="radio"/> Stem Cell Research Training</td><td></td></tr></tbody></table>					<input type="radio"/> Fire Extinguisher Training EFS 003	<input type="radio"/> Radioactivity Training	<input type="radio"/> Human Subjects Training	<input type="radio"/> Animal Subjects Training	<input type="radio"/> Stem Cell Research Training	
<input type="radio"/> Fire Extinguisher Training EFS 003	<input type="radio"/> Radioactivity Training									
<input type="radio"/> Human Subjects Training	<input type="radio"/> Animal Subjects Training									
<input type="radio"/> Stem Cell Research Training										

I have reviewed required training courses with my supervisee, approve the above training plan, and certify that training items #2-#5 are complete.

_____	_____	_____
Supervisor – Print Name	Supervisor – Signature	Date

Resources for Additional Training

- CITI (<https://research.stonybrook.edu/citi-training/overview-citi-training>) has training modules available for:
 - The responsible conduct of research
 - Human Subjects Protection
 - Laboratory Animal Welfare
 - Human Stem Cell Research
 - Conflict of Interest
 - Good Clinical Practice
 - Clinical Research Coordinator
 - Export Compliance
- If you will work with animals:
 - Animal training course - Call DLAR at x4-6956 for the next scheduled training course.
 - Occupational Safety Health History and Risk Assessment Form
<https://www.prevmed.sunysb.edu/NDLAR/Default.aspx>
 - Tetanus shot - Must have one within 10 years. Send documentation from doctor to Preventive Medicine, fax 444-1122
- Human Subjects Training
 - <http://research.stonybrook.edu/citi-training#human-subject-training>
- Stem Cells
 - <http://research.stonybrook.edu/citi-training#stem-cell-training>

Go to the Environmental Health and Safety Training main website for registration for EH&S courses

<http://www.stonybrook.edu/facilities.ehs/training/http://www.stonybrook.edu/ehs/training/courses.shtml>

Appendix 2

Research Experiences for Undergraduates Program Professional Development Schedule

	Professional Development (PD) Seminar and Research Cluster (RC) Activity*	Research Seminar or Additional Activity**
Week 1	Orientation, "Preflection" survey, Lab safety training Welcome lunch with faculty and graduate student mentors	
Week 2	Career paths in chemistry research Applying to graduate school and graduate fellowships Values Writing Exercise I: Reflection of self-defining values <u>RC Activity</u> : Small-group discussion of self-defining values	Wong group
Week 3***	Research ethics, data falsification, and plagiarism <u>RC Activity</u> : Small-group discussion of ethics case studies	Bhatia group
Week 4	Writing abstracts and scientific papers <u>RC Activity</u> : Small-group discussion of research objectives <u>Task</u> : One-page abstract for faculty and peer feedback	Aubrecht group
Week 5	Communicating with non-academic audiences <u>RC Activity</u> : Peer feedback on abstracts <u>Task</u> : One-slide research highlight for short oral presentation	Boon group
Week 6	Seeking out mentors and working in an interdisciplinary team <u>RC Activity</u> : Peer feedback on research highlight slides	Khalifah group
Week 7†	Short oral presentations of research highlights <u>RC Activity</u> : Discuss and respond to research highlight presentations	
Week 8†	Diversity in the STEM workplace Maintaining collegial relationships and workplace communication <u>RC Activity</u> : Role-playing workplace communication cases <u>Task</u> : Begin working on final poster.	Rudick group
Week 9†	Values Writing Exercise II: Relationship to you as a scientist <u>RC Activity</u> : Discussion of values exercise II <u>Task</u> : Finalize poster and submit it for printing.	Simmerling group
Friday, Week 9	UNDERGRADUATE RESEARCH POSTER SESSION DAY Morning poster presentation with other UG researchers Afternoon meeting to celebrate and complete exit survey (SURE-III)	

*PD on Mondays from 9:30 am-10:15 am, taught by Professor Bhatia. RC Activities on Mondays from 10:15 am-11:00 am, facilitated by Professor Aubrecht.

**Mondays from 11:00 am-noon, with lunch. Specific seminars will vary depending upon faculty availability.

***RET teachers begin this week. Safety training for RETs will take place in the afternoon. †BNL trips typically take place on Sundays in late July/early August.

Appendix 3

Sample Syllabus: GRD 500 Responsible Conduct of Research and Scholarship

This course is designed to introduce students to the major contemporary issues in the ethics of science and scientific research. The emphasis of this course is not just *doing science* by the rules but also *being a scientist*, which involves much more than work in the lab or office.

Why this course?

- » First and foremost, attention to the values of science is extremely important. Traditionally this aspect of the culture of science was taught - like most others - through apprenticeship, mentoring, and role modeling. You learned how to behave as a scientist by observing and adopting the behaviors and values of your mentors. This still is the most important way.
- » Second, the realities of modern scientific practice have become so complex that training scientists to identify and work through ethical problems has become a survival skill. Attention to funding, ownership, relationships with colleagues, and the other foci of this course now is essential to your professional success. Scientists who don't pay attention to the morality of science lose their grants, their jobs, and even their academic degrees.
- » Finally, the National Institutes of Health have mandated since 1989 that every institutional recipient of National Institutes of Health funding offer a course in responsible conduct of research. Since 1989 the federal government has steadily expanded oversight of research and now scrutinizes research conducted by the federal agencies, conducted or managed by contractors, or supported by the federal government.

Each class will begin with a short (~30 minute) introductory lecture (on video) followed by group discussions led by assigned students with additional input and oversight by faculty members

Participation each week in both activities is required. Attendance is taken. The course is graded S/U. An excused absence (example, illness) may be compensated by a three-page (single-spaced) essay on the missed topic. If possible, the course instructor should be informed of any expected absence *before* the class meeting time. Unexcused or uncompensated absences will result in an unsatisfactory grade for the course and the student will need to repeat the course next year.

Class Topics include Introduction to Scientific Integrity, Scientific Misconduct, Mentoring, Ownership and Authorship, Plagiarism, Data Management, and Journalism and Science.

The goals of the course are

- To increase knowledge of
 - Ethical theory as it relates to science
 - The history and nature of science as a profession with professional norms
 - Legal & professional guidelines, standards, regulations and mores
 - Resources and strategies available for addressing ethical problems
- To enhance the skills in
 - Identifying and articulating moral problems
 - Moral analysis and reasoning – Solving moral problems involving research
 - Behaving morally
- To strengthen attitudes related to moral integrity by
 - Increasing appreciation of and respect for guidelines, standards, and professional norms
 - Enhancing collegiality with peers and mentors
 - Sensitizing students to moral risks and dilemmas