The Responsible Conduct of Research: Research Misconduct

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Objectives

• Why study the Responsible Conduct of Research?
• Define “Research Misconduct” & “Questionable Research Practices (QRPs)”
• Review Rutgers Academic Integrity Policy
• Identify issues surrounding research misconduct
• Techniques to resolve problems
• Breakout groups & discussion of case studies
Why study RCR?

1. Mandated
   - 1989: Office of Scientific Integrity (ORI) established for policy, oversight, investigation
   - 2000: protection of research subjects
   - 2007: America COMPETES Act
   - Aug. 2009: NSF Regulations: “each institution...provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduate students, graduate students, and postdoctoral researchers participating in the proposed research project.”
Why, continued

2. New structural forces - an ethically challenging environment for young scientists and engineers (Hollander, 09)
   - Increasing *complexity and competitiveness* in research environments
   - the prevalence of *interdisciplinary and international* involvement in research projects
   - close coupling of *commerce and academia*

3. Maintain public support for research & trust in results
   - Recent prominent cases: falsifying stem cell data; withholding data on cell phone driving risks; ghostwriting pharmaceutical studies by academics; vaccines and autism
“the right thing”

“The scientific enterprise is built on a foundation of trust. Society trusts that scientific research results are an honest and accurate reflection of a researcher’s work. Researchers equally trust that their colleagues have gathered data carefully, have used appropriate analytic and statistical techniques, have reported their results accurately, and have treated the work of other researchers with respect.

When this trust is misplaced and the professional standards of science are violated, researchers are not just personally affronted—they feel that the base of their profession has been undermined. This would impact the relationship between science and society.” (National Academy of Science, 2009)
However…

“…research is not an organized profession in the same way as law or medicine. Researchers learn best practices in a number of ways and in different settings. The norms for responsible conduct can vary from field to field. Add to this the growing body of local, state, and Federal regulations and you have a situation that can test the professional savvy of any researcher.” (Steneck, 2007)
Federal Definition

*Research misconduct* is defined as “fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.”

- **Fabrication**: making up data or results and recording or reporting them.
- **Falsification**: 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**: appropriation of another person’s ideas, processes, results, or words without giving appropriate credit.

From: http://www.ostp.gov/cs/federal_policy_on_research_misconduct
Federal definition continued

• To be considered research misconduct, actions must:
  – represent a “significant departure from accepted practices”
  – have been “committed intentionally, or knowingly, or recklessly”
  – be “proven by a preponderance of evidence”

• Research misconduct does not include honest error or difference of opinion

• Official misconduct (FFP) not common, approx. 1 in 10,000 researchers confirmed cases annually; but…
Questionable Research Practices (QRP)

- Violation of standards (accepted, discipline, lab… standards) beyond the official (FFP) definition of research misconduct
- Self-reports of misconduct or QRP (Nature, 2005):
  - FFP violations: under 2%
  - QRP: 33% researchers engaged in at least one behavior judged (by university compliance officers) to be “sanctionable” offenses (probably an underestimate)
- Much recent attention paid in articles, conference presentations, blogs to QRPs
  - More common; more impact than FFP (De Vries, et al)
Table 1 | Percentage of scientists who say that they engaged in the behaviour listed within the previous three years (n = 3,247)

<table>
<thead>
<tr>
<th>Top ten behaviours</th>
<th>All</th>
<th>Mid-career</th>
<th>Early-career</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Falsifying or 'cooking' research data</td>
<td>0.3</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>2. Ignoring major aspects of human-subject requirements</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>3. Not properly disclosing involvement in firms whose products are based on one's own research</td>
<td>0.3</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>4. Relationships with students, research subjects or clients that may be interpreted as questionable</td>
<td>1.4</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>5. Using another's ideas without obtaining permission or giving due credit</td>
<td>1.4</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>6. Unauthorized use of confidential information in connection with one's own research</td>
<td>1.7</td>
<td>2.4</td>
<td>0.8 ***</td>
</tr>
<tr>
<td>7. Failing to present data that contradict one's own previous research</td>
<td>6.0</td>
<td>6.5</td>
<td>5.3</td>
</tr>
<tr>
<td>8. Circumventing certain minor aspects of human-subject requirements</td>
<td>7.6</td>
<td>9.0</td>
<td>6.0 **</td>
</tr>
<tr>
<td>9. Overlooking others' use of flawed data or questionable interpretation of data</td>
<td>12.5</td>
<td>12.2</td>
<td>12.8</td>
</tr>
<tr>
<td>10. Changing the design, methodology or results of a study in response to pressure from a funding source</td>
<td>15.5</td>
<td>20.6</td>
<td>9.5 ***</td>
</tr>
</tbody>
</table>

Other behaviours

<table>
<thead>
<tr>
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<th>All</th>
<th>Mid-career</th>
<th>Early-career</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Publishing the same data or results in two or more publications</td>
<td>4.7</td>
<td>5.9</td>
<td>3.4 **</td>
</tr>
<tr>
<td>12. Inappropriately assigning authorship credit</td>
<td>10.0</td>
<td>12.3</td>
<td>7.4 ***</td>
</tr>
<tr>
<td>13. Withholding details of methodology or results in papers or proposals</td>
<td>10.8</td>
<td>12.4</td>
<td>8.9 **</td>
</tr>
<tr>
<td>14. Using inadequate or inappropriate research designs</td>
<td>13.5</td>
<td>14.6</td>
<td>12.2</td>
</tr>
<tr>
<td>15. Dropping observations or data points from analyses based on a gut feeling that they were inaccurate</td>
<td>15.3</td>
<td>14.3</td>
<td>16.5</td>
</tr>
<tr>
<td>16. Inadequate record keeping related to research projects</td>
<td>27.5</td>
<td>27.7</td>
<td>27.3</td>
</tr>
</tbody>
</table>

Note: significance of $\chi^2$ tests of differences between mid- and early-career scientists are noted by ** ($P < 0.01$) and *** ($P < 0.001$).
GSNB Academic Integrity: Issues for Grad Students

“As a Researcher: Data must be accurate and complete. Appropriate credit should be given to all who contribute to a project. The following actions would...constitute a violation of the researcher’s ethical code:

- Falsify/fabricate data or results
- Selectively withhold data that contradicts your research
- Misuse the data of others
- Present data in a sloppy or deceptive manner
- Fail to maintain accurate laboratory notebooks
- Fail to credit authors appropriately. All contributors should be acknowledged
- Sabotage/appropriate the research of another
- Misuse research funds or university resources for personal use
- Develop inappropriate research/industry relationships for personal gain
- Fail to comply with federal and/or Rutgers guidelines for the treatment of human or animal subjects
GSNB Academic Integrity continued

If you have questions about academic integrity, get them answered before jeopardizing your career. Speak to your faculty adviser, your graduate program director, or one of the Deans of the Graduate School-New Brunswick, e.g., Barbara Bender

If you’re a TA:

• Rutgers Academic Integrity Policy also has guidelines for handling cheating or plagiarism in your classes.
• Resources for Instructors: http://academicintegrity.rutgers.edu/instructors.shtml
• Or consult faculty
Suspicions of Misconduct

“The circumstances surrounding potential violations of scientific standards are so varied that it is impossible to lay out a checklist of what should be done.”*

• Examine your own biases and motivations; remain objective
• Understand the standard you believe is being violated
• Be clear on the evidence
• Think about the interests/perspectives of everyone involved
• Think about the possible responses of those involved
• Consider if you can ask the person you suspect for clarification, or otherwise express your concern
• Talk to a trusted advisor or friend
• Consider alternative courses of action and their likely outcomes

*National Academies
CASE STUDIES: Issues to consider

- Who has a stake in the situation?

- What are the interests and perspectives of each of the parties?

- Where do their interests conflict?

- What are the duties and obligations of the parties?
  - What professional norms and values give rise to these?

- What are the alternative courses of action?
  - And what are the likely consequences of each?

(Bebeau et al., 1995)
Break-out groups

(a) Pick someone to report to the whole group
(b) Read and discuss case

REPORT:
(a) Read the case to whole group
(b) Review group discussion, consensus or majority & minority opinions, and especially reasoning processes

Full group: comments/questions/discussion

(4 case studies from National Academies, “On Being a Scientist)
Case # 1: Is it plagiarism

Professor Lee is writing a proposal for a research grant, and the deadline for the proposal submission is two days from now. To complete the background section of the proposal, Lee copies a few isolated sentences of a journal paper written by another author. The copied sentences consist of brief, factual, one-sentence summaries of earlier articles closely related to the proposal, descriptions of basic concepts from textbooks, and definitions of standard mathematical notations. None of these ideas is due to the other author. Lee adds a one-sentence summary of the journal paper and cites it.

1. Does the copying of a few isolated sentences in this case constitute plagiarism?
2. By citing the journal paper, has Lee given proper credit to the other author?
Case #2: Discovering an error

Two young faculty members—Marie, an epidemiologist in the medical school, and Yuan, a statistician in the mathematics department—have published two well-received papers about the spread of infections in populations. As Yuan is working on the simulation he has created to model infections, he realizes that a coding error has led to incorrect results that were published in the two papers. He sees, with great relief, that correcting the error does not change the average time it takes for an infection to spread. But the correct model exhibits greater uncertainty in its results, making predictions about the spread of an infection less definite. When he discusses the problem with Marie, she argues against sending corrections to the journals where the two earlier articles were published. “Both papers will be seen as suspect if we do that, and the changes don’t affect the main conclusions in the papers anyway,” she says. Their next paper will contain results based on the corrected model, and Yuan can post the corrected model on his Web page.

1. What obligations do the authors owe their professional colleagues to correct the published record?
2. How should their decisions be affected by how the model is being used by others?
3. What other options exist beyond publishing a formal correction?
Case # 3: Fabrication in a grant proposal

Vijay, who has just finished his first year of graduate school, is applying to the National Science Foundation for a predoctoral fellowship. His work in a lab where he did a rotation project was later carried on successfully by others, and it appears that a manuscript will be prepared for publication by the end of the summer. However, the fellowship application deadline is June 1, and Vijay decides it would be advantageous to list a publication as “submitted” rather than “in progress.” Without consulting the faculty member or other colleagues involved, Vijay makes up a title and author list for a “submitted” paper and cites it in his application.

After the application has been mailed, a lab member sees it and goes to the faculty member to ask about the “submitted” manuscript. Vijay admits to fabricating the submission of the paper but explains his actions by saying that he thought the practice was not uncommon in science. The faculty members in Vijay’s department demand that he withdraw his grant proposal and dismiss him from the graduate program.

1. Do you think that researchers often exaggerate the publication status of their work in written materials?
2. Do you think the department acted too harshly in dismissing Vijay?
3. If Vijay later applied to a graduate program at another institution, does that institution have the right to know what happened?
4. What were Vijay’s adviser’s responsibilities in reviewing the application before it was submitted?
Case #4: A career in the balance

Peter was just months away from finishing his Ph.D. dissertation when he realized that something was seriously amiss with the work of a fellow graduate student, Jimmy. Peter was convinced that Jimmy was not actually making the measurements he claimed to be making. They shared the same lab, but Jimmy rarely seemed to be there. Sometimes Peter saw research materials thrown away unopened. The results Jimmy was turning in to their common thesis adviser seemed too clean to be real. Peter knew that he would soon need to ask his thesis adviser for a letter of recommendation for faculty and postdoctoral positions. If he raised the issue with his adviser now, he was sure that it would affect the letter of recommendation. Jimmy was a favorite of his adviser, who had often helped Jimmy before when his project ran into problems. Yet Peter also knew that if he waited to raise the issue, the question would inevitably arise as to when he first suspected problems. Both Peter and his thesis adviser were using Jimmy’s results in their own research. If Jimmy’s data were inaccurate, they both needed to know as soon as possible.

1. What kind of evidence should Peter have to be able to go to his adviser?
2. Should Peter first try to talk with Jimmy, with his adviser, or with someone else entirely?
3. What other resources can Peter turn to for information that could help him decide what to do?
Contact & Rutgers Links

• Presenter contact: Claudia Farber, Graduate School- New Brunswick, 25 Bishop Place, cfarber@rci.rutgers.edu

• Academic Integrity Facilitator: Barbara Bender, GSNB, 25 Bishop Place, bbender@rci.rutgers.edu, (732) 932-7747

• Academic Integrity Policy (9/2/08)
  http://academicintegrity.rutgers.edu/
  http://policies.rutgers.edu/PDF/Section10/10.2.13-current.pdf

• Graduate School – New Brunswick: Academic Issues for Graduate Students
  http://gsnb.rutgers.edu/publications/academic_integrity.pdf

• University Policies for Dealing with Allegations of Misconduct in Research (1990)
  http://orsp.rutgers.edu/policies_misconduct.php

• Ethics at Rutgers: http://uhr.rutgers.edu/ethics/