RESPONSIBLE CONDUCT OF RESEARCH (RCR)

BIOMEDICAL GRADUATE STUDIES

Steve DiNardo
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WHAT IS YOUR PRIMARY GOAL?

• DO GOOD SCIENCE —,

• IDENTIFY GOOD SCIENCE —,

• HELP OTHERS IDENTIFY AND DO GOOD SCIENCE —

• ESTABLISH YOUR ‘PROFESSIONAL SELF’—.
WHAT IS YOUR PRIMARY GOAL?

• DO GOOD SCIENCE —,
  Standing on the shoulders of others who came before:

  IDENTIFY GOOD SCIENCE —,
  How to pick the right shoulders to stand on!

ESTABLISH YOUR ‘PROFESSIONAL SELF’—.
You become the best shoulders to stand on!

You are Here*
WHAT ARE THE ESSENTIAL QUALITIES TO STRIVE FOR?

- **HONESTY** — conveying information truthfully and honoring commitments,

- **ACCURACY** — reporting findings precisely and taking care to avoid errors,

- **EFFICIENCY** — using resources wisely and avoiding waste, and

- **OBJECTIVITY** — letting the facts speak for themselves and avoiding improper bias.
THOSE ARE THE QUALITIES NEEDED TO:

RESPONSIBLY CONDUCT RESEARCH (RCR)

THE IDEAS ARE NOT DIFFICULT TO FATHOM; BUT THEY NEED TO BE MADE **EXPLICIT**
SUBJECT AREAS THAT REQUIRE ‘RESPONSIBLE CONDUCT’

- Acquisition and Management of Data
- Collaborative Science
- Conflicts of Interest and Time
- Mentoring
- Peer Review
- Research Misconduct
- Responsible Authorship and Publication
- Scientists as Responsible Members of Society
- Use of Animals in Research
- Use of Humans in Research

ETHICAL QUESTIONS CAN WILL ARISE IN THESE SUBJECT AREAS
TRAINING IN RCR

- **On-line instruction** in Years 1–4 (‘Knowledgelink’)
- **Workshops based on Case studies** in Years 2–4
  - Year 2: Research misconduct and data management
  - Year 3: Mentor/mentee relationships, collaborative science, animal and human subjects
  - Year 4: Conflict of interest, responsible authorship/publication, peer review
- **RCR-focused lab meetings** in Years 3–5

NIH requires training in RCR

(BGS exceeds NIH requirements for RCR training)
CASE STUDIES

• You will read Case Studies often

• Such cases are a source for discussion

• Discussion will be in a small group
  • To promote ease of discussion

• With a ‘facilitator’
  • Who guides, not lectures
  • (for some topics) there will be no perfect answer
EXAMPLE CASE STUDY
Keep those Essential Qualities in mind:
Honesty, Accuracy, Efficiency, Objectivity

Mike is a 4th-year student. His work is progressing well, however some data aren’t falling into place. Specifically a few control experiments he knows should work are not working.

He doesn’t want to bother his thesis advisor or thesis committee with what he thinks is a minor detail, so he has not asked for advice or help.

(continued)
Perhaps because he expects them to work soon, or because he does not want to ruin what’s really a pretty nice story, Mike, when asked about the controls at a lab meeting says, “...not to worry, I’ve done them; they were as expected”.

Where are we now?
Honesty, Accuracy, Efficiency, Objectivity
His advisor is happy that everything is in place, and asks that the experiments be part of a poster Mike is preparing for a meeting in two weeks. Mike does so (without the nonexistent controls).

At the meeting, Mike intentionally steers interested investigators away from any requests to see the controls.

And, now? Honesty, Accuracy, Efficiency, Objectivity
When Mike returns to lab, he finds that his advisor has incorporated his data into a manuscript just submitted to a journal, with the controls mentioned in the text.
WHICH AREA(S) DOES THE EXAMPLE IMPINGE UPON’

• Acquisition and Management of Data
• Collaborative Science
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• Mentoring
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ETHICAL QUESTIONS CAN WILL ARISE IN THESE SUBJECT AREAS
RESEARCH MISCONDUCT

A definition:

Fabrication, falsification, plagiarism, or other serious deviation from accepted practices in...

- Proposing
- Performing
- Reviewing
- Reporting

...research or research results.
RESPONSIBLE CONDUCT OF RESEARCH: SOME IMPORTANT AREAS

- Acquisition and Management of Data
- Collaborative Science
- Conflicts of Interest and Time
- Mentoring
- Peer Review
- **Research Misconduct**
- Responsible Authorship and Publication
- Scientists as Responsible Members of Society
- Use of Animals in Research
- Use of Humans in Research

Provide you with tools to anticipate matters arising in these areas
THIS WHY YOU WILL HAVE CONTINUAL AND ORGANIZED TRAINING IN RCR

• **On-line instruction** in Years 1–4 (‘Knowledgelink’)

• **Workshops based on Case studies** in Years 2–4
  • Year 2: Research misconduct and data management
  • Year 3: Mentor/mentee relationships, collaborative science, animal and human subjects
  • Year 4: Conflict of interest, responsible authorship/publication, peer review

• **RCR-focused lab meetings** in Years 3–5

Dave Manning developed a phenomenal BGS Resource --
Biomedical Graduate Studies

Responsible Conduct of Research (RCR) and Scientific Rigor and Reproducibility (SRR)

Overview

BGS requires all of its predoctoral students to be trained in i) Responsible Conduct of Research (RCR), and ii) Scientific Rigor and Reproducibility (SRR).

Training in RCR is achieved through lecture, web-based programs, small group workshops, and RCR-focused lab meetings. Training places an emphasis on the involvement of faculty and satisfies requirements set by the NIH for individual fellowships and training grants.

Training in SRR is achieved through lecture and SRR-focused lab meetings. Training similarly places an emphasis on the involvement of faculty and satisfies requirements set by the NIH for individual fellowships and training grants.

Students and faculty share responsibility in complying with required training. It is imperative to understand that failure to comply with training puts funding for training, and consequently research in general, at serious risk at Penn. BGS requires and actively monitors compliance.
Responsible Conduct of Research Training

Is Formal Instruction in the Responsible Conduct of Research Important?
The scientific community and the community at large rightly expect adherence to exemplary standards of intellectual honesty in the formulation, conduct, and reporting of scientific research. In spite of teaching RCR at NIH for over 15 years, the incidence of reported cases of Research Misconduct has been increasing. This is not unique to NIH but seems to be a general tendency seen in academic settings across the country.

To improve communication of the importance of research ethics, training at NIH is moving away from a focus on classroom lectures discouraging research misconduct and questionable research practices, and moving toward framing ethics as the foundation for doing good science. In other words, we’re moving conversations about ethics and science from classrooms and into the research environment. We feel the example of our scientists should serve as a model for ethical science and research ethics as an inherent and critical aspect of the NIH culture and critical to training the next generation of independent researchers.

It is imperative to:

- increase knowledge of, and sensitivity to, issues surrounding the responsible conduct of research
- improve the ability to make ethical and legal choices in the face of conflicts involving scientific research
- develop an appreciation for the range of accepted scientific practices for conducting research
- learn about the regulations, policies, statutes, and guidelines that govern the conduct of PHS-funded research
- adopt a life-long positive attitude involving research ethics and the responsible conduct of research
SRR is related to the ethical conduct of research we just discussed (RCR).

Your training in SRR will:
- Be continuous
- Use complementary mechanisms:
  - BGS Courses (Year 1 & beyond): integrated within courses
  - Workshop (Year 2): ‘Resource & Reagent Authentication’
  - Candidacy exam (Year 2); expected throughout your proposal
  - Experimental design-focused lab meetings (Years 3-5)
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  IDENTIFY GOOD SCIENCE —,
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SRR: EXPERIMENTAL DESIGN

Ready, Set, Experiment!!

Kurt Engleka, PhD
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