A Framework for Ethical Decisions

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Each physicist is a citizen of the community of science. Each shares responsibility for the welfare of this community.

—Statement by the APS

http://www.aps.org/statements/02.2.html

With thanks to David Hertzog, Lance Cooper, Alan Nathan, and Brian DeMarco, who contributed ideas and insights

You are now "scientists."

Science requires its practitioners to be:

Honest—do not fabricate, misrepresent, manipulate, or destroy data.

Careful—apply rigorous standards.

Skeptical—don't want to believe so much in some result that you lose your objectivity and critical thinking.

Open—share data, methods, theories, equipment; allow others to see your work; be open to criticism.

Generous—give credit to others; do not plagiarize others' work; help others; share resources .

Socially responsible—anticipate the consequences of research; prevent harm to the public and promote social welfare.

A simple analytical method can help you work through ethical questions

- What are the issues and points of conflict?
- What rules and regulations apply? What are your obligations as a scientist? As a citizen?
- What questions do you need to ask? Of whom?
- What resources are available to you (including your own values)?
- What are your options?
- Who will be affected by the outcome?
- What are you going to *do*?

What are the issues and points of conflict?

- data ownership and access
- plagiarism, cheating, fabrication, falsification
- authorship
- data selection or manipulation
- collegial interactions
- skepticism or objectivity
- conflict of interest
- social responsibility

A variety of ethical issues and conflicts can arise in science.

We usually think of “conflicts of interest” as being financial, but in science they can also arise in reviewing, hiring and promoting, nominating students and colleagues for awards, and other professional activities.

What rules and regulations apply?

- intellectual property
- industrial espionage
- environmental protection
- use of human subjects or vertebrate animals
- hazardous or radioactive materials
- biohazards
- recombinant DNA or stem cell research
- occupational health and safety
- classified research
- "deemed export"

What questions do you need to ask? Who has the answers?

As a scientist, you must keep yourself informed of laws and regulations that govern the conduct of your research. "I didn't know I couldn't/shouldn't do that" is not a viable defense.

Violations—even unintentional—can have profoundly adverse consequences:

1. Criminal penalties, including fines and jail
2. Civil penalties, including fines and awards of damages
3. Dismissal from an academic institution or an employer
4. Debarment from federal funding
5. Censure from professional colleagues

You must also understand funding agency policies and rules.
NSF: "Research Misconduct" (http://www.nsf.gov/oig/resmisreg.pdf)

Since 2010, every NSF-funded investigator must promise not only to be honest him- or herself, but must specifically state in all grant applications that students and postdocs working on a project will be trained in ethical and responsible conduct of research.

NIH: "NIH Policies and Procedures for Promoting Scientific Integrity" (November 2012); http://ethics.od.nih.gov/

What are your obligations as a scientist?

- honesty
- diligence
- objectivity
- openness
- collegiality and collaboration
- giving credit
- mentoring younger scientists
- social responsibility

Every profession has a code of conduct that it expects its practitioners to follow.

The APS has written guidelines for professional conduct (q.v. http://www.aps.org/policy/statements/02_2.cfm) and specific statements on responsibilities of coauthors and collaborators, responsibilities of collaborations to archive and verify research records, responsibilities of authors to properly cite others' work, and responsibilities for the ethical treatment of subordinates.

Other professional societies have similar codes:
American Chemical Society (http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_ARTICLEMAIN&node_id=1095&content_id=CNBP_023290&use_sec=true&sec_url_var=region1&__uuid=31581f15-9ea8-4ee7-a7b9-14f84f9ca6fe)
American Mathematical Society (http://www.ams.org/about-us/governance/policy-statements/sec-ethics)
Association for Computing Machinery (http://www.acm.org/about/code-of-ethics)
Institute for Electrical and Electronic Engineers (http://www.ieee.org/about/corporate/governance/p7-8.html)
Materials Research Society (http://www.mrs.org/publication-ethics/)

Funding agencies also have specific ethical standards, and they investigate and prosecute offenders.

What questions do you need to ask?

- What are the "facts" of the issue?
- What additional facts do I need to consider? Where could I get those answers?
- Who else will be affected by my decision?
- Who can advise me on the legalities of the situation?
- What is the worst thing that could happen?
- What happens if I do nothing?

Make sure you are fully informed of all the relevant circumstances before you take action or make a decision. Don't jump to conclusions.

What resources are available to you?

- trusted senior colleagues
- a senior administrator (dept head, dean)
- the institution's ethics office
- the institution's office of research
- the Graduate College
- a lawyer
- Office of the Inspector General at the funding agency
- online ethics resources
- your own values

You do not have to face ethical issues alone; it is every scientist's obligation to help you if you ask for it. Seek help from people you trust who have more experience than you do.

Who will be affected by the outcome?

- you
- your supervisor
- others involved in the group
- the department
- a journal
- the university
- the funding agency
- the progress of science
- society

It's not all about you. Think broadly about everybody that will be affected by your conduct.

What are your options?

Think through the logical outcomes and consequences of each of your options

Consider the consequences of doing nothing

For you

For everybody else who has a stake in the outcome

Think about as many possible outcomes as you can imagine. Analyze the problem the same way you would analyze any other problem. Ask yourself, "What is the worst thing that could happen?"

Write down your options. What are the benefits and consequences of each scenario?

If the option is "do nothing," you should still consider the worst-case scenario of taking no action.

What are you going to DO?

Don't just think about what you're going to *do*—*practice* what you're going to *say*

Out loud

Write the words down

Practice on a friend you trust

Assign the following roles in your teams:

- One person who will summarize your case for the class and moderate class discussion
- One person who will present the issues, points of conflict, and interested parties
- One person who will present the worst-case scenario
- One person who will present your advice to subject of your case study

In your case study, decide:

What are the issues and points of conflict?

Who will be affected by the outcome?

What are the consequences?

What are your obligations as a scientist? as a human?

As you read the problem, think of the issues involved:
data ownership and access
plagiarism
authorship
data selection or manipulation
collegial interactions
skepticism
conflict of interest
social responsibility

Identify the interested parties; who has a stake in the outcome?
the project ‘s principal investigator (PI)
others involved in the group
the university
the funding agency
the progress of science