


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>

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Today we'll look at a framework for addressing any ethical considerations you might face as a scientist.

The image on this slide is intended to illustrate a concept that every American school child earnestly believes, namely that if you “cross your fingers” behind your back as you tell a lie, the lie magically doesn't “count.” It never worked with *my* parents.



Science rests on six fundamental principles. That's the first part of your ethical "framework."

Science requires its practitioners to be:

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

Careful—apply rigorous standards and protect and preserve research data.

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

Open—allow others to see your work; accept constructive criticism.

Generous—give credit to others; share data, methods, theories, equipment; help others.

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*?



Part of your obligation as a professional is to be informed about laws, regulations, and institutional policies that govern the conduct of your research. Ignorance is no excuse, and claiming “I didn’t know” will not save you from criminal, civil, or institutional penalties. You must take responsibility to inform yourself of relevant issues.

What are the issues and points of conflict?

- **data ownership and access**
- **plagiarism, cheating, or other academic misconduct**
- **authorship**
- **data selection or manipulation**
- **human relationships**
- **skepticism or objectivity**
- **conflicts of interest or commitment**
- **safety, health, environmental protection—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, and other professional activities.

What rules and regulations apply?

- intellectual property
- industrial espionage
- environmental protection
- use of human subjects
- hazardous or radioactive materials
- biohazards
- recombinant DNA
- occupational health and safety
- classified research
- “deemed export”



What questions do you need to ask?

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**
- **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, q.v. <http://www.nsf.gov/pubs/2014/oig14001/oig14001.pdf>.

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.

What are your options?

**Think through the 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.

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



It's not all about you. Think broadly about everybody that will be affected by your conduct or your decision to do nothing.

What are you going to DO?

**Think not only 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



**The second part of the framework is
your own values and understanding**



**Today, we'll look at the values and attributes
that are important to you and that you
think a physicist should hold**