

# The Ethics of Science

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# Overview

- Ethics of Science
- Misconduct

# What is Ethics?

- *Ethics* is inquiry that lets us distinguish the good from the bad
- *Cf. Morals*, which are expressions of shared values
  - E.g., the 10 Commandments
- Terms are used interchangeably; Ethics in science and the professions are really assertions of what is good or bad in those fields/disciplines



**Untying your opponent's shoes is just the latest defensive strategy sweeping the SEC.**

Source: [http://sportsillustrated.cnn.com/multimedia/photo\\_gallery/0809/did.you.see.that.0926/content.10.html](http://sportsillustrated.cnn.com/multimedia/photo_gallery/0809/did.you.see.that.0926/content.10.html)

# Deciding What is Ethical

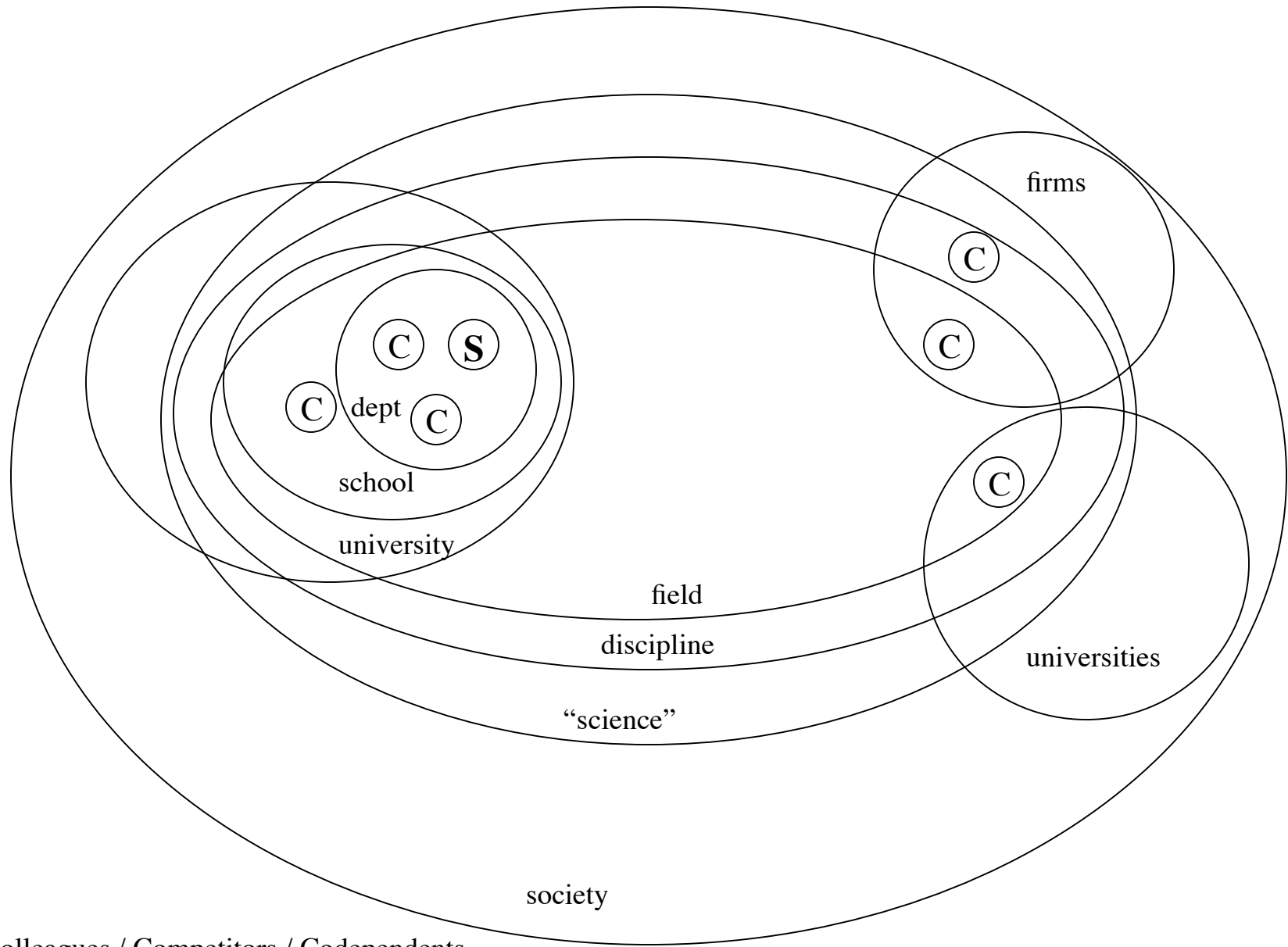
- Various approaches to ethics
  - Normative/prescriptive - what *ought to be* done
  - Descriptive - what *is* done
- Some methods of ethical decision-making
  - Deontology - duty or rule-based morality
  - Consequentialism - examination of potential outcomes
  - Casuistry - thick case analysis to deduce general rules



*“How am I supposed to think about consequences before they happen?”*

# Who Decides?

- Scientific “community”
  - Science is a community of those who are skilled in and practice methods accepted by others, as assessed by mentors/peer reviewers
  - May be defined quite narrowly
  - Codes of ethics are promulgated by scientific societies



C = Colleagues / Competitors / Codependents

No Scientist is an island. . .

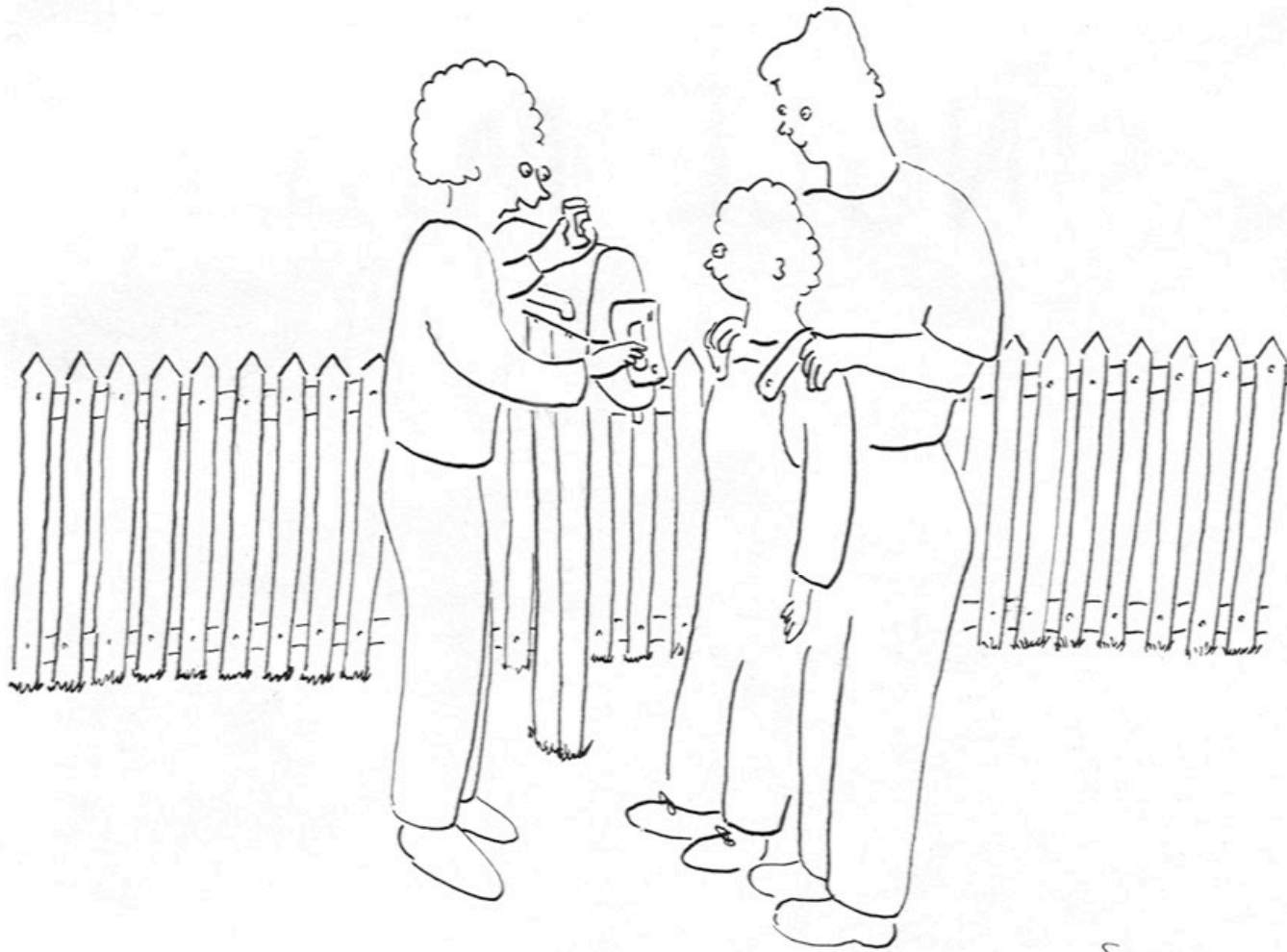




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- Society
  - Social regulation of science is highly reactive to revealed problems in self-regulation:
    - Protections of humans, animals
    - Scientific integrity
    - Conflicts of interest
    - Restricting “forbidden science”
      - Nuclear technology; stem cells and reproductive cloning

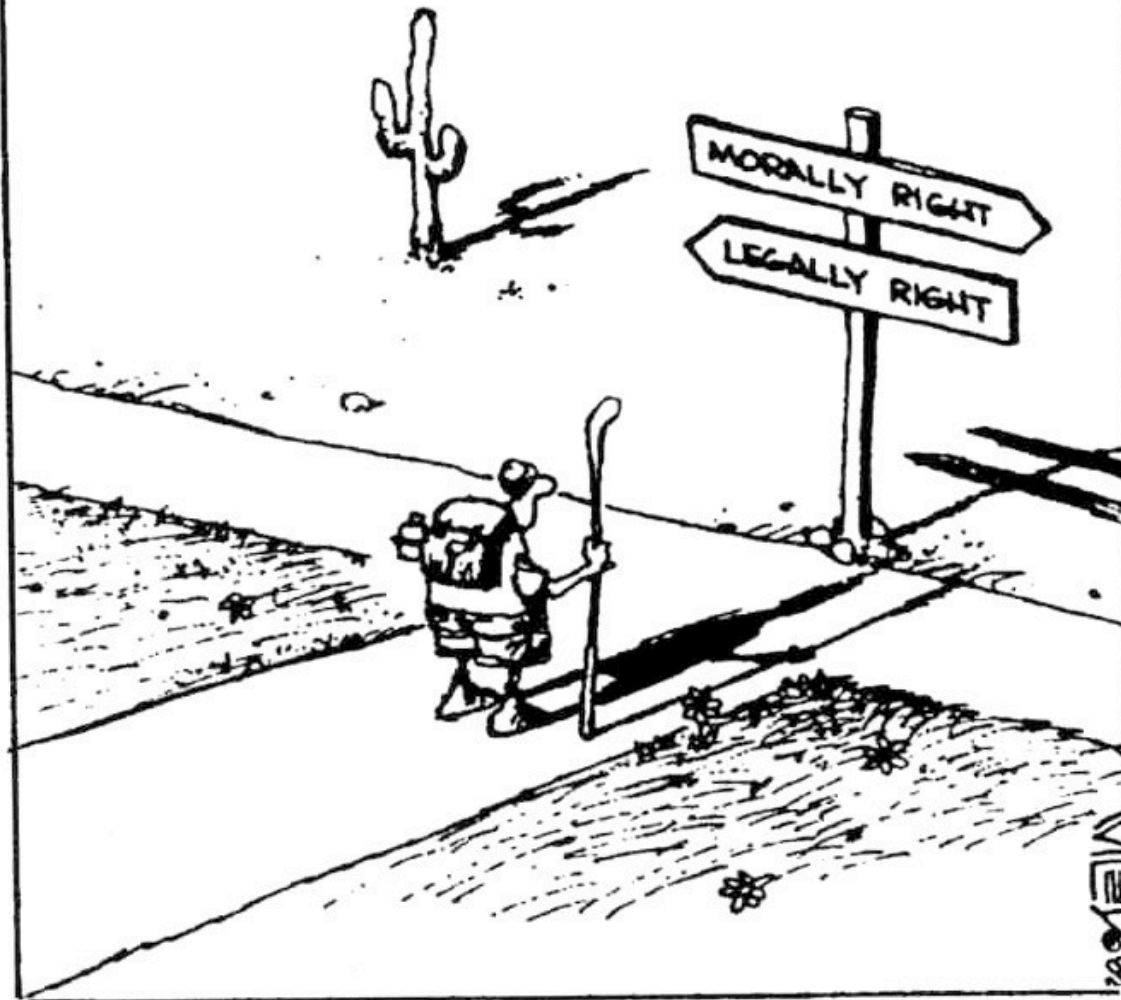
} tied to public funding



SLP

*“Look! Stem cells and Lipitor from Uncle Henri in Quebec.”*

INEVITABLE INTERSECTION  
ON THE ROAD OF LIFE...



# What are the Ethics of Science?

- Merton (1942) described a generalized norm of science:
  - Universalism – quality judged by scientific standards alone
  - Commun(al)ism – sharing/communicating with the community
  - Disinterestedness – primary concern is advancement of knowledge
  - Organized skepticism – scrutiny, repetition, validation before acceptance
    - Merton RK. The Normative Structure of Science (full cite on request)
- Cournand (1977) extended this with an overlapping set:
  - Integrity and objectivity – truth telling and avoiding “undisciplined introduction of subjective elements into their observations”
  - Tolerance – for good faith efforts of others; common enterprise
  - Doubt of certitude – a questioning attitude
  - Recognition of error – duty to recognize, acknowledge and admit error
  - Unselfish engagement – primary purpose should be extending knowledge
  - Communal spirit – appreciate and respect codependence

Cournand A. Science 1977; 198:699.





"Behind one door is tenure - behind the other  
is flipping burgers at McDonald's."

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# What are the Ethics of Science?

- Other norms are more concrete:
  - Intellectual integrity/honesty; truth-telling; trustworthiness
  - Collegiality, sharing ideas, data
  - Duty to publish/disseminate
  - Duty to educate, mentor, train
  - Defend freedom of inquiry, academic freedom
  - Duty to give credit where due
  - Duty to perform peer review / refereeing activities
  - Duty to engage in public discourse
  - Duty to comply with the law
  - Duty to blow the whistle?

See, e.g., Glass B. Science 1965; 150:1254; Cournand, *above*.

**BIZARRO** by Dan Piraro

Statistically speaking, there is an 85% chance that 4 out of 5 statisticians alter their data by at least 26%.



# Are Ethics Enforced?

- Misconduct is directed to those ‘wrongs’ that undermine the veracity of the scientific record:
  - Intellectual integrity/honesty; truth-telling; trustworthiness
  - Collegiality, sharing ideas/data
  - Duty to publish/disseminate
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  - Duty to comply with the law
  - Duty to blow the whistle?
- Others are “enforced” by informal sanctions





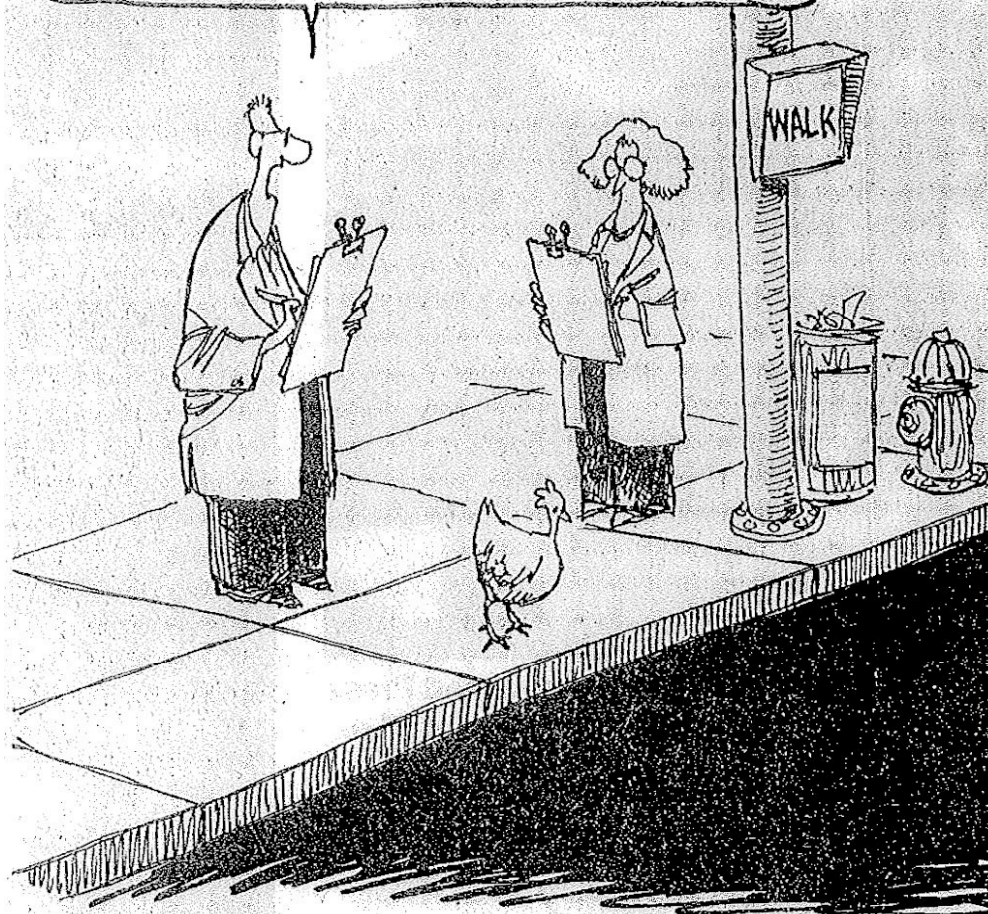


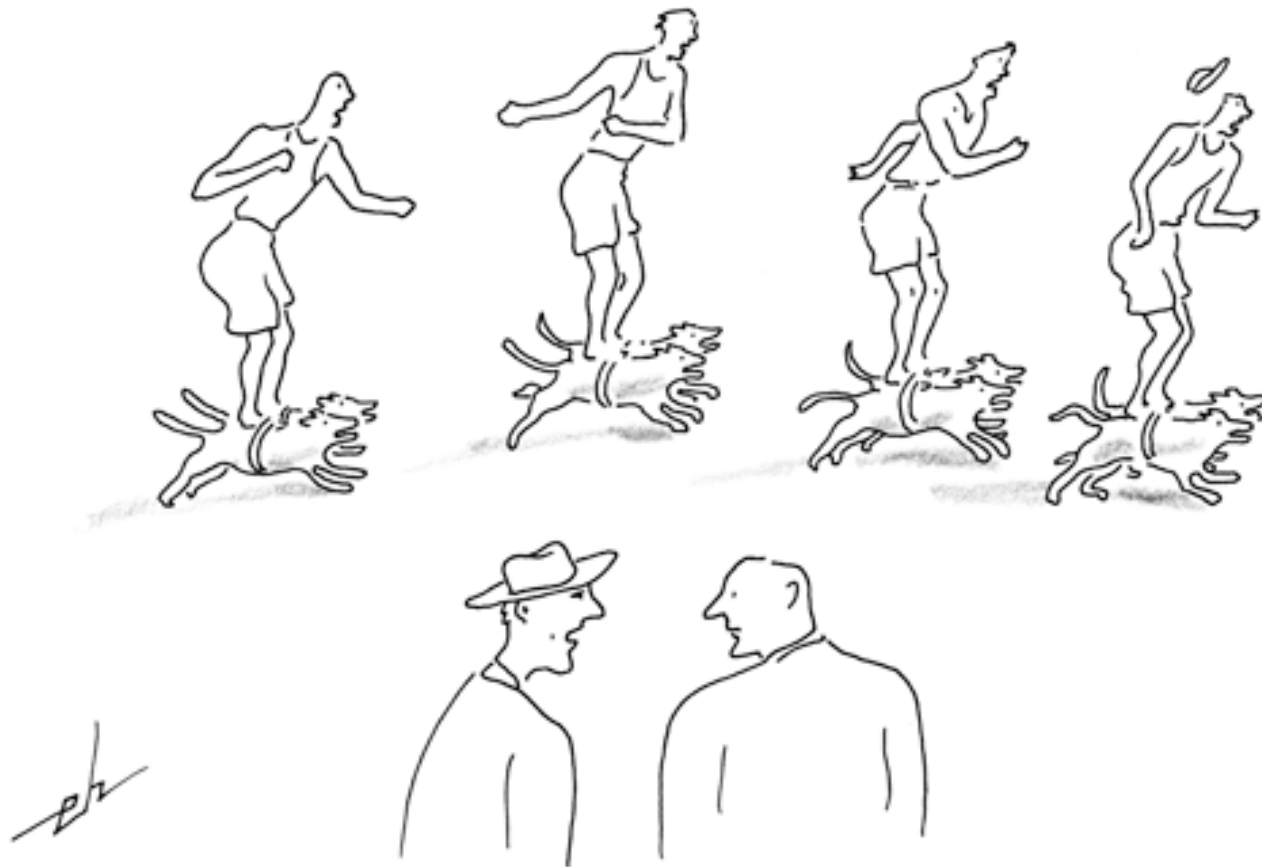
# Misconduct

- Standard is defined by the federal government
    - Falsification
    - Fabrication
    - Plagiarism
- } **FFP**
- “in proposing, performing, or reviewing research, or in reporting research results”
- Before 2005, included a catchall: FFP *and* other practices that seriously deviate from those commonly accepted by the scientific community
  - Since 2005, the federal standard is now FFP that is *additionally* a significant departure from accepted practices

# Non Sequitur

IT'S NOT OUR JOB TO ASK WHY WE GOT A GRANT TO RESEARCH WHY IT CROSSED THE ROAD... IT'S OUR JOB TO PRETEND WE'RE EARNING IT





*"It's not cheating if everybody does it."*

# Enforcement

- Academic and other institutions have primary responsibility for enforcing misconduct
- The federal Office of Research Integrity (ORI) will investigate and add sanctions, iff the research is federally funded
  - Sanctions typically include exclusion from federal grants, advisory roles, peer review for modal 2-3 year periods (range 1-10 years) as well as requiring training and oversight by employer
- FDA may also sanction investigators by pulling their license to perform studies that may be submitted to the agency
  - Not limited to misconduct; may also result from violation of human and animal regs

# What do we know?

- Do not know the real incidence of FFP
  - Recent surveys show F&F is admitted by less than 1% (Martinson et al. Nature 2005; 435:737) and observed by a reported 3% of scientists (Titus et al. Nature 2008; 453:980)
  - Older survey of Int'l Soc. Clin. Biostat. Members (37% resp. rate) suggested many had observed (51% in 10 years) or been asked to “support” (13%) fraud (Ranstam et al. Contr. Clin. Trials 2000; 21:415)
- No data on enforcement activity by research institutions
- ORI disposes of several dozen cases per year
  - No reason to think this is anything but the tip of the iceberg
- Scientists (other than trainees) who are convicted by ORI of F or F typically leave academia to practice profession or go to industry
  - Those guilty of P are significantly more likely to survive in the academy  
(Redman & Merz, Science 2008; 321:775)

# What do we know? (continued)

- No systematic way to discover misconduct
  - Audit is common in FDA research, but is far from universal
  - Rely on peer review; surprising results may raise flags (Bezwoda; Schön)
  - Rely on whistleblowers
- Growing evidence that standards across much of the developing world are not up to par
  - Recent high-profile misconduct cases in Korea (Hwang) and China (Lancet 2010; 375:94) and India (Science 2008; 319:1170) suggest detection/enforcement mechanisms (and perhaps an ethos) are not in place
- In response to Hwang falsification, *Science* now audits a random sample of submitted papers
  - journals reserve this right but historically never exercised it



# Whistleblowing

- Is there a duty to whistleblow?
  - No *science* ethics codes impose a duty (contra: engineers)
  - ORI study showed that 29% of institutional misconduct policies explicitly require employees to report suspected misconduct
  - A Research Triangle Inst. study found that 2/3 of whistleblowers reported at least 1 negative consequence
- Whistleblowing presents a conflict between one's obligations of loyalty to one's colleagues/institution and those owed to a higher 'authority,' be it science or society
  - Inherently evokes distrust; Sissela Bok notes that it is “the disappointed, the incompetent, the malicious, and the paranoid” “publicity-hungry” “cranks” who tend to blow whistles in public [source upon request]
- Need to protect rights of both parties, provide objective assessment of purported impropriety