Responsible Conduct of Research Lecture Series

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Ethical Policy in Scientific Research

Presenter:

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Just Science Hall

Room 115

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RESPONSIBLE CONDUCT OF RESEARCH: *ETHICAL POLICY IN SCIENTIFIC RESEARCH*

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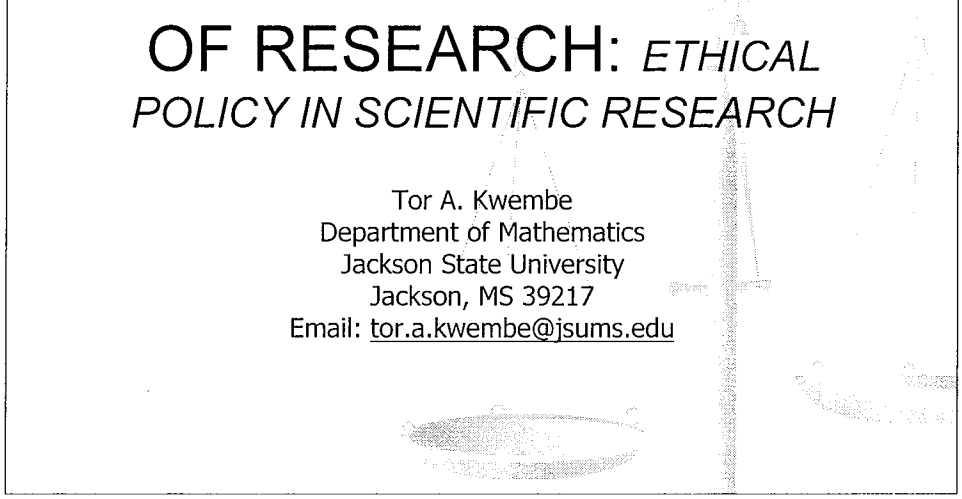
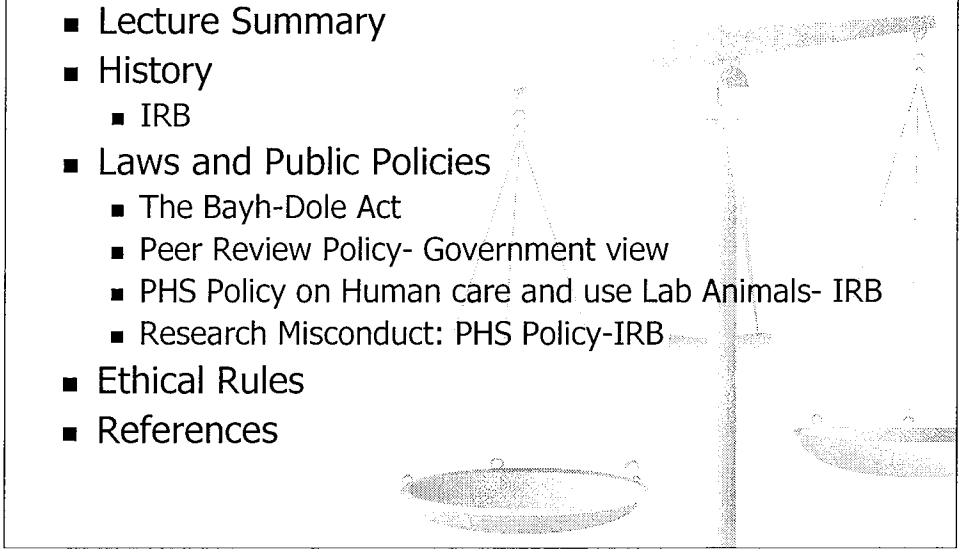


ORDER OF THE DISCUSSION

- Lecture Summary
- History
  - IRB
- Laws and Public Policies
  - The Bayh-Dole Act
  - Peer Review Policy- Government view
  - PHS Policy on Human care and use Lab Animals- IRB
  - Research Misconduct: PHS Policy-IRB
- Ethical Rules
- References



What we should know

- Define research misconduct and fabrication, falsification, and plagiarism.
- Become familiar with the history of some misconduct cases and the subsequent regulations of research misconduct.
- Develop techniques to resolve professional problems before they might lead to allegations of misconduct.
- Understand the procedures and policies for dealing with misconduct.
- Identify the issues surrounding the reporting of misconduct, including both positive and negative outcomes.
- Reflect on how one might handle reporting misconduct, or how one might be the subject of a misconduct investigation.

Research ethics

- Involves the application of fundamental ethical principles to a variety of topics involving scientific research. These include the design and implementation of research involving human participants (human experimentation); animal experimentation; various aspects of , including scientific misconduct, such as fraud, fabrication (science) of data and plagiarism; whistleblowing; regulation of research (such as regulation of research on stem cells), and more.
- Research ethics is most developed as a concept in medical research. The key agreement here is the 1964 Declaration of Helsinki.
- http://en.wikipedia.org/wiki/Research_ethics

HISTORY: Documents and Reports

- Documents developed in direct response to research abuses in the early years of the twentieth century:
  - Experiments of Nazi Physicians
  - Tuskegee Syphilis Study 1932 – 1972
  - War against disease as responsibilities of medical schools and universities
- Nuremberg Code
  - Directives for human experimentation developed in the trials of war criminals following World War II. (1949)
    - http://ohsr.od.nih.gov/guidelines/nuremberg.html
- Declaration of Helsinki
  - Ethical principles for physicians and participants in medical research involving human subjects. From the World Medical Association. (1964)
    - http://www.wma.net/e/policy/b3.htm
- Belmont Report
  - This report outlines ethical principles of respect for persons, beneficence, and justice and applies them to research involving human subjects. It distinguishes between clinical practice and medical research. From the National (US) Commission for the Protection of Human Subjects. (1979)
    - http://ohsr.od.nih.gov/guidelines/belmont.html

HISTORY Continued

- Science the endless Frontier
  - This landmark report was commissioned by President Roosevelt and delivered to President Truman by Vannevar Bush. It outlined the importance of scientific research to the national interest and led to the creation of the NIH, NSF, and ONR (1945)
    - http://www1.umn.edu/scitech/assign/vb/VBush1945.html
- Institutional Research Board (IRB)
  - Required for all research activities receiving funding, directly or indirectly from HHS.
  - Regulated by the Office of Human Research Protections (OHRP) within HHS.
  - Monitor research studies involving human subject to minimize or avoid ethical problems at academic and medical institutions.

Laws and Public Policies

- Bayh-Dole Act:
  - Officially known as the Patent and Trademark Law Amendment Act of 1980, this bill sought to encourage the development of useful inventions by university scientists by enabling those scientists and their universities to profit financially from research performed using government funds.
    - http://www.cogr.edu/docs/Bayh_Dole.pdf
- Peer Review Policy (Office of Management & Budget)
  - Government' view of peer review (2004)
  - It establishes that important scientific information shall be peer reviewed by qualified specialists before it is disseminated by the federal government
  - It also establishes criteria for the selection of peer reviewers
    - http://www.whitehouse.gov/omb/inforeg/peer2004/peer_bulletin.pdf

Laws - Continued

- PHS Policy on Human care and use Lab Animals- IRB
  - This is the US Public Health Service's basic policy on the use of animal subjects in research. The enabling legislation was passed in 1985, the policy was promulgated in 1986, with more recent amendments added.
  - http://grants.nih.gov/grants/olaw/references/phspol.htm
  - http://grants.nih.gov/grants/olaw/olaw.htm

Laws- Continued

- Research Misconduct: PHS Policy
  - This is the current rule (updated in 2005) that defines "research misconduct" and specifies institutional responsibility in handling allegations of misconduct.
  - http://ori.hhs.gov/documents/42_cfr_parts_50_and_93_2005.pdf

Scientific Misconduct

- Means fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted within the scientific community for proposing, conducting, reporting research, academic scandal or Patent and Trademark policies.
- Does not include honest error or honest differences in interpretations or judgments of data.

Ethical Rules

- Rules and Conduct for Research Directors
- Avoiding Improprieties
- Are You Being Used? How Can You Tell

How to Avoid Ethical Dilemmas- David S. Touretzky

- Know the rules. How are researchers supposed to behave? Who says so?
- Know your rights as a scientist. Are you being treated fairly?
  - Co-authorship, priority, conflicts of interest, etc.
- Learn to recognize the most common ethical mistakes:
  - Misappropriation of text or ideas
  - Deceptive reporting of research results
  - Breach of confidentiality
- Take steps now to avoid conflicts in your research group, or resolve them quickly with minimal discomfort.
- Learn from others' mistakes. (Enjoy horrifying stories of how people ruined their careers by gross ethical violations)

Established Policies

- JSU Graduate Studies Hand Book for Faculty and Student contain policies on:
  - Plagiarism, conflict of interest, use of human subjects in research, handling allegations of misconduct in research, ownership of intellectual property, privacy, and sexual harassment.
- Professional and scientific societies often have codes of ethics.
- Ethical use of Computing Technology
- Many scientific journals impose ethical requirements on authors to comply with laws and public policies
  - Release of data to other scientists on request, NIH, NSF, ONR, etc compliance, human subject regulations, and duplicate publications.

Scientific Misconduct in Mathematics

- Pathological Science and Misconduct
- Do Mathematicians Use Human or Animal Subjects for Research?
- Is Illusion and Elegance Presentation Misconduct or Fraud?
- Are Misconceptions Misconduct?
- Conjectures

Misconceptions

- Misunderstanding of the implications of mathematical rigor.
- Attempts to circumvent the usual criteria for publication of mathematical papers in a learned journal after peer review, often in the belief that the journal is biased against the author.
- Lack of familiarity with, and therefore underestimation of, the existing literature.

Issue one: Apportioning credit

- Two types of credits: co-authorship and acknowledgements.
- Who is listed as a co-author?
  - Should the Lab director co-author all papers?
  - Do students owe advisor co-authorship on one journal paper?
- How is the ordering of authors determined?
  - First and last are usually the key locations?
- Different disciplines/cultures follow different conventions.
- Rule of thumb: a co-author should have made direct and substantial contributions- how direct/substantial?
- Co-authors share responsibility for the scientific integrity of the paper: Penalties may apply.
- The David Baltimore case: Nobel laureate was co-author of paper: primary investigator was accused of fraud.

Acknowledgements

- People who made contributions that don't merit co-authorship may (must) be acknowledged elsewhere in the paper.
  - Contributing a good idea, or coming up with a useful term.
  - Providing pointers to relevant papers for the bibliography section.
  - Help with a computer algorithm or code.
  - Help with typesetting or illustrations
  - Providing resources- workstation
- Funding agency.

What to ask your advisor

- What are the authorship conventions in our discipline?
- What are the authorship conventions in your lab?
- Are student prohibited from submitting papers, even if sole-authored, without first running them by the advisor?
- Who owns the manuscripts?

Case Example

- **Professor Smith**, an acknowledged expert in his field, is invited to write an article for an upcoming special issue of Hacker's Monthly.
- Smith asks his grad student **Jones** to help with the article. Some of the most important results in the article are the product of Jones' thesis research.
- What do you think of the following outcomes?
- 1. Smith appears as sole author of the article, since the invitation was issued to him alone. He cites the results as "work done in my lab" but makes no explicit mention of Jones.
- 2. Smith appears as sole author, but cites Jones' thesis, which is "in preparation."
- 3. The article is published jointly by Smith and Jones.
- 4. Jones says he will allow Smith to include his results in the article, but only if the order of authors is Jones & Smith.
- 5. Jones had been planning to submit his own sole-author paper to Hacker's Monthly. He declines Smith's request to collaborate, then sends the editor a title and abstract and promises a full manuscript in time for the special issue.

Issue Two: Misappropriation of Text

- Borrowing just a sentence or two without attribution is plagiarism. But easily avoided.
- Smith:
- The parrot is a remarkable bird in many respects besides its natural mimicry. In terms of intelligence, humor, and manual dexterity, it is unequalled in the avian kingdom.
- Jones, **wrong way:**
- Parrots are excellent mimics. But the parrot is a remarkable bird in many other respects. In terms of intelligence, humor, and dexterity, it is unparalleled in the avian kingdom.
- Jones, **right way**:
- Parrots are excellent mimics. But in addition, as Smith (1995) observes, "in terms of intelligence, humor, and manual dexterity, [they are] unequalled in the avian kingdom."

Citation Etiquette

Cite other people's work freely and often:

- Avoid antagonizing your reviewers by failing to properly acknowledge their contributions to the field.
- Demonstrate your mastery of the literature.
- Make new friends. (Researchers love to be cited.)
- Encourage others to cite your work in return.
- Citations are good, but stealing citations is not.

Issue Three: Reviewer's responsibilities

- From "Ethical Guidelines to Publication of Chemical Research", *Accounts of Chemical Re*search **18**(12):355-357, Dec. 1985.
- 1. Do your fair share of reviewing.
- 2. Promptly return the manuscript if not qualified to review it.
- 3. Judge quality objectively, with due regard to scientific standards but also with respect for the intellectual independence of the authors.
- 4. Avoid potential conflicts of interest.
- Either decline to review the manuscript, or fully disclose the potential conflict to the editor.
- In some cases it may be appropriate to submit a signed review, to prevent any accusations of bias.

Reviewer responsibilities (cont.)

- 5. Do not review manuscripts where you have a personal or professional connection to the author (e.g., your girlfriend/ boyfriend, your colleague down the hall.)
- 6. Treat manuscripts as confidential.

- Don't turn the manuscript you just reviewed into a course handout, even if it is wonderfully relevant to the course.

- 7. Provide adequate support for your judgments, *including citations.*
- **Wrong way:** The author's results must be wrong, since they conflict with those of Bovik, who invented the field.
- **Right way:** The authors should explain the discrepancies between their results and the seminal work of Bovik ("Short Messages Over Long Distances", *Journal of Hyperspace Zephyrgrams,* vol. 1, no. 1, pp. 1-22, January, 1998.)

Reviewer responsibilities (cont.)

- 8. Know the literature. Point out missing citations.

  Call the editor's attention to any substantial similarity between this manuscript and one already published or currently submitted to another journal.

- 9. Turn in all reviews promptly.
  Someone's tenure case may hang on your decision.

- 10. Do not use the ideas or results in a manuscript except with permission of the author.
  If the paper indicates that an approach you were planning to pursue won't work, you can drop that approach.

  But if it reveals a new technique that you would like to try out before the paper is published, you must obtain the author's permission.

  It's a good idea to let the editor know what you're doing, perhaps before contacting the author.

Contracting an Author

scientist A submits a paper to a leading journal. Editor B assigns the paper to scientist C to review.

C thinks the data are interesting, but the computer model is naive and the results unimpressive. Since the model is the focus of the paper, C recommends the paper be rejected, and explains why.

C is an experienced computer modeler in his own right.

C believes that an approach he developed two years ago would be much better suited to modeling A's data, if extended in a certain direction.

C would like access to A's data, but could do the experiment with simulated data (or data from someone else's lab) if necessary.

C is very concerned about the appearance of impropriety, and wants to act in a responsible and professional manner.

What should C do?

Bad Reviews

At some point in your career, a sharp-tongued reviewer is going to cut you to ribbons.

At some later point, you will review a paper by some person in desperate need of a clue, and will be presented with the perfect opportunity to cut *them* to ribbons:

- *The most impressive feature of this paper is the author's obvious ignorance of the basic rudiments of antimatter reactor design. I am genuinely surprised that he managed to perform the ridiculous experiments reported here (if he did in fact perform them) without blowing himself and his entire lab to bits. This paper is not just garbage; it's dangerous garbage.*
- ***Resist the urge to trash people.*** Remember how it felt when someone did it to you. Try to set a compassionate example for others to follow.
- Alternative strategy: trash them thoroughly.

Then write a second review with a more professional tone, which you turn in.

Issue 4: Research Fraud

Painting mice with a magic marker to fake the results of a genetic experiment.

Fabricating some missing data points in order to complete a study in time for a deadline.

- Varieties of data fraud (from *Honor in Science)*:
- **Trimming**: smoothing irregularities to make the data appear extremely accurate and precise.
- **Cooking:** retaining only those results that fit the theory and discarding others.
- **Forging:** inventing some or all of the research data that are reported, and even reporting experiments that were never performed.
- Favorite excuses for cooking and trimming: "those outlier points must be measurement error" "they would only confuse the reader" "everybody cleans up their data before publication"

Famous Fabricators-David S. Touretzky

- Mendel: "cleaned up" his genetics data.
- Kepler fabricated data on planetary observations to support his controversial claim that the planets follow elliptical orbits.
- Pasteur: gave a public demonstration of what was supposed to be his new oxygen-attenuation approach to vaccine production.

  In reality he was using a chemically treated vaccine, an idea he stole from Henri Toussaint (who suffered a nervous breakdown and died.)

Issue 5: Conflicts of Interest-D. S. Touretzky

Professor Smith does NSF-funded research on hyperspace zephyrgrams.

Smith also has a company, HyperZeph, that is developing a commercial product related to hyperspace zephyrgrams.

Smith's graduate student, Jones, is doing his doctoral thesis on hyperspace zephyrgram routing schemes.

1. Smith obtains Jones' permission to incorporate Jones' new algorithm into HyperZeph. *Consent obtained under duress?*

2. Smith asks Jones to delay publication of a journal article, because it will provide valuable data to ZephScape, his company's chief competitor.

3. Jones is also working part time for HyperZeph. Smith pressures him to spend more hours doing HyperZeph development, which takes time away from thesis research.

4. Jones discovers that programmers spending 50% time at HyperZeph are being paid 100% out of the NSF grant.

Failure to Disclose

- Disclosure of potential conflicts of interest is always a good idea. *It's insurance against accusations of misconduct.*
- Failure to disclose may, at the least, lead to an appearance of impropriety.
- At worst: jail time (e.g., for violating disclosure requirements in a stock offering for a startup company.)
- An example of inadequate disclosure: endorsement on the back of a book jacket (MIT Press):

  "This wonderfully lucid book describes what history may judge to be the second state in the evolution of *<stuff>*... It may take generations to unfold the implications of this new species of *<artifact>* -- but *<author>* and his colleagues have already made an impressive beginning."
- What's left out? The endorser is the author's thesis advisor, and hence one of the "colleagues" lauded above.
- The endorser has a financial interest in the company that is commercializing the artifact described in the book.

Announcing to the Public

In general, scientists should not announce discoveries to the public before they have undergone peer review. *That is how Fleischman and Pons got into trouble.*

- Deliberately avoiding peer review for personal gain may constitute professional misconduct.
- Although technical issues sometimes have to be simplified when explaining research to the public, the following guidelines should be followed:
  - Don't oversell your results.
  - Don't permit unsupported claims to go unchallenged. (Reporters may try to "hype" the story, or companies may misrepresent your results.)
  - Make sure that the technical details are available at the time of any public announcement, so that facts can be checked by any scientist who cares to do so.
- Don't refer in print to a shoddy and over-hyped undergrad research project as "JSU Study" unless the VP gives permission to attach JSU's name to it.

The Web and Copyright

- Legal issues with copyright assignment forms:
  - Who holds the copyright to your article?
  - What rights must you give to the publisher? What rights can you retain?
  - The right to re-use your material in "other works".
- Is it okay to put copies of your papers on your web page...
  - Before the journal publishes them?
  - After they're published?
- Can authors be sued for violating copyright on their own articles?

Conclusion

- Get your advisor's advice.
- If you have a problem with your advisor, discuss it with him or her before seeking outside opinions.
- If necessary, speak confidentially with some other senior scientist whose opinions you respect.
- Sometimes misunderstandings or unhappy situations can be cleared up through mediation by a third party.
- In the event of serious misconduct, charges may be filed with the OAA
- Handle allegations of misconduct with as much confidentiality as possible. People's careers are at stake. Remember that there are two sides to every story.
- Don't be pushed around. Know the rules, your rights, and your responsibilities.
- Most basic rule of all: don't do anything that would embarrass you if people found out about it.