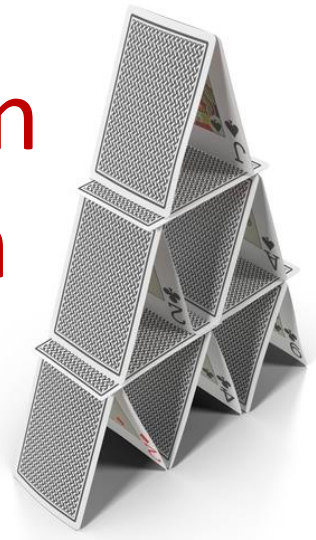


Falsification
Fabrication
Plagiarism



The Unholy Trinity: Research Ethics

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Overview

- Why do good scientists do bad things?
- Research policy in unethical behavior
- All-stars of ethical failure

Do any of these seem familiar?

- My supervisor wants that result **today!**
- I already know the outcome that will result from that experiment.
- My data don't match what that famous lab published. I'll just correct mine.
- If this paper had a "big name" on it, I am sure it would get a favorable review.
- I need this paper **now** to get that grant.

The “unholy trinity”

- **Fabrication** is making up data or results and recording or reporting them.
- **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
- **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit. Research misconduct does *not* include honest error or differences of opinion.

Effort is required of authors

“Authorship credit should be based on

- substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data
- drafting the article or revising it critically for important intellectual content
- and final approval of the version to be published. Authors should meet all the above conditions.”

Is everybody an author?

- “Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.”
- “An administrative relationship to the investigation does not of itself qualify a person for co-authorship.”
- “The submitting author should send each co-author a draft copy of the manuscript and should make a reasonable attempt to obtain consent to co-authorship, including the order of names.”

Copyright and “Fair Use”

- Did the use “transform” the material taken from the copyrighted work by using it for a broadly beneficial purpose different from that of the original, or did it just repeat the work for the same intent and value as the original?
- Was the material taken appropriate in kind and amount, considering the nature of the copyrighted work and of the use?

Quoted from Association of Research Libraries (2012)

“Code of Best Practices in Fair Use for Academic and Research Libraries”

We all bear responsibility

“Researchers should report to the appropriate authorities any suspected research misconduct, including fabrication, falsification or plagiarism, and other irresponsible research practices that undermine the trustworthiness of research, such as carelessness, improperly listing authors, failing to report conflicting data, or the use of misleading analytical methods.”

Principles from Singapore

- Honesty in all aspects of research
- Accountability in the conduct of research
- Professional courtesy and fairness in working with others
- Good stewardship of research on behalf of others

Ethical challenges in the lives of all researchers

- Meaning of data
 - PI in touch with data?
 - Results reproducible?
 - Is cleaning data okay?
- Rules of science
 - A reagent bought from grant is used for others
 - IRB and other regulators make work even harder
 - Materials-handling policy violations
- Life with colleagues
 - Notebooks out-of-date
 - PIs hold back careers of workers to retain them
 - Politics complicate work
- Pressures of production
 - Quantity or quality?
 - Improper review
 - Authorship impropriety
 - Exploiting junior workers

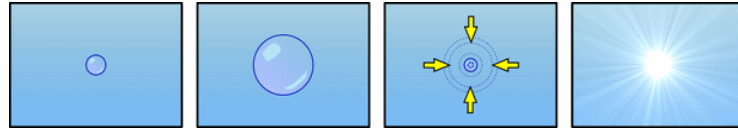
What does unethical research cost?

- Slows scientific progress
- Undermines trust in research process
- Wastes public funds
- Increases external regulation of science

Nature reports

- Improper behavior is widespread
 - Martinson et al (2005) *Nature* 435: 737-738.
- Frequency of duplicate publication increases
 - Errami and Garner (2008) *Nature* 451: 397-399.
- Improper behavior does not get reported
 - Titus et al (2008) *Nature* 453: 980-982.
- Peer intervention is effective
 - Koocher (2010) *Nature* 466: 438-440.
- Funding should be tied to integrity
 - Titus and Bosch (2010) *Nature* 466: 436-437.

Taleyarkhan's sonofusion



- His 2002 *Science* article announced fusion by collapsing bubbles in deuterated acetone.
- Purdue (his new employer) judged misconduct at his 2006 claim of independent confirmation and his abuse of gift authorship in 2005.

“From small beginnings there developed a tangled web of wishful thinking, scientific misjudgment, institutional lapses, and human failings.”

Hwang Woo-Suk and human cloning

- In 2004, Hwang claimed to clone a stem cell.
- In 2005, he cloned “Snuppy” (below).
- In 2005, he claimed to establish 11 patient-specific stem cell lines via nuclear transfer.
- Both his stem cell claims were discovered to be false, relying on fabricated evidence.
- Hwang was forced to resign and was imprisoned for embezzlement.



Robert A. Slutsky, publication “king”

- During 1983-1984, Slutsky averaged one published paper every ten days.
- “Often, it seems, the changes were designed to make results statistically significant, to squeeze several publications out of the same batch of data, or to satisfy criticisms by journal editors who were reluctant to publish the work in its original form.”

Anil Potti: a very bad name in biomarkers



Duke Photography

- Falsely claimed in grants to be Rhodes Scholar
- Publications in *NEJM* and *Nature Medicine* were unfavorably audited after publication.
- NCI halted 3 clinical trials of genomic signature in response to errors in its development.
- Duke suspended Potti and retracted many of his papers. The NIH ORI found he had falsified and fabricated data in grant applications.

Some challenges for you

- Of five data sets you've tried, only one shows your algorithm to out-perform existing tools. Is it okay to publish only the “good” set?
- In comparing your algorithm to a published one, you tried ten different configurations of your tool and only one for the other. Is it okay to give only your best result against the other?

More challenges

- Another researcher asked your evaluation of her data with your tools. Does this grant you the right to publish your tools with her data?
- If a senior researcher is listed as an author, your paper might get a more favorable review. Is it okay to slip them in as an author since they saw your seminar on your tools?

Conclusions

- No matter your role in research, you are subject to ethical scrutiny.
- Acknowledge others' contributions by taking care in authorship and respecting their work.
- Apply the same skepticism to your own work that you would apply to others' work.
- Your credibility is vital to your career. Don't blow it by faking data.