

Research Tools and Methods for the Mathematical Science

Lecture 7: Ethics and Responsible Research (in the Mathematical Sciences)

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Proof by illegibility: scribble, scribble, QED

Only scientific intellectual dishonesty and misappropriation of scientific results could rouse his [John Von Neuman's] indignation and ire – but these did – and did almost equally whether he himself, or someone else, was wronged.

“John von Neumann (1903 - 1957)”

Eugene Wigner, 1958

Ethics

Definition:

- 1 a system of moral principles: the ethics of a culture.
- 2 the rules of conduct recognised in respect to a particular class of human actions or a particular group, culture, etc.: medical ethics; Christian ethics.
- 3 moral principles, as of an individual: His ethics forbade betrayal of a confidence.
- 4 that branch of philosophy dealing with values relating to human conduct, with respect to the rightness and wrongness of certain actions and to the goodness and badness of the motives and ends of such actions.

<http://dictionary.reference.com/browse/ethics>

Roughly

Systems that help you decide what is right and wrong

- 1 Some imposed from outside: you need to learn them;
 - 1 the University has an Ethics Committee. If you are doing human or animal experiments, they must be passed through this committee for approval.
<http://www.adelaide.edu.au/ethics/human/guidelines/>
<http://www.adelaide.edu.au/ethics/animal/>
 - 2 Various profession bodies have defined standards of ethical behaviour (IEEE and ACM for me).
ACM <http://www.acm.org/about/code-of-ethics>
AMS <http://www.ams.org/about-us/governance/policy-statements/sec-ethics>
- 2 Some created by the individual, for their own use.
 - 1 The “just following orders” excuse doesn’t cut it. Ethics and legality are different, but often related. You might not get arrested for breaching professional ethics, but bad things can happen. And on the other hand, breaking the law can be considered ethical in some circumstances.

Scientific Ethics

- Ethics committees often concerned with high-visibility issues: e.g., animal cruelty.
 - ▶ We (maths and stats) don't usually work with animals or humans (there are some exceptions), but ethics is part of everything you do. There are policies you MUST be aware of, but also every human being should IMHO think about ethics from time to time.
- In Science and Math, other important issues:
 - ▶ honesty about results
 - ▶ attribution of ideas
 - ▶ willingness to be subject to scrutiny
 - ▶ sharing of data and results (where legal/ethical, e.g., privacy issues)
 - ▶ following legal and contractual restrictions (e.g. NDAs)
- More important today
 - ▶ traditionally we explained phenomena
 - ▶ now its being used to predict
 - ★ that can induce actual behaviour
 - ★ e.g., Black-Scholes and the GFC

<http://www.guardian.co.uk/science/2012/feb/12/black-scholes-equation-credit-crunch>

<http://www.bbc.co.uk/news/magazine-17866646>

Question 1

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- If you tell them to wait, how long is OK?

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 - ▶ how different do they have to be?
 - ▶ journal versions of conference papers, e.g.,
[www.mssanz.org.au/documents/](http://www.mssanz.org.au/documents/MODSIMPapersToJournalPapers-MSSANZGuidelines.pdf)
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www.mssanz.org.au/documents/MODSIMPapersToJournalPapers-MSSANZGuidelines.pdf
- BTW: you should all be VERY clear on the University's policies
<http://www.adelaide.edu.au/writingcentre/plagiarism/>
and most of the world's policy regarding plagiarism, e.g.,
http://www.acm.org/publications/policies/plagiarism_policy

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- Sometimes if you absented all reviewers with a Col, no-one expert in the field can review a paper
 - ▶ disclosure is key
 - ▶ editors, chairs, ... can make a decision then
 - ▶ sometimes results in exclusion

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- Do laws define ethics, or ethics define laws?
 - ▶ why does copy “right” exist?
- Just to be clear, I am not saying you should break the law. I am saying that you, as an individual, must make your own decisions about ethics.

Some other questions

- What if you discover errors in your own work even if no one else does?
- How should one deal with authorship on publications when contributions are vastly unequal?
- My study had a negative result, should it be published?

Scientific misconduct: FFP [Goo10]

In science/maths official misconduct centres around deliberate

- **Fabrication:** making up data
- **Falsification:** manipulating research materials (e.g. changing or omitting data) such that the research is not accurately represented
- **Plagiarisation:** appropriation of another person's ideas, results or words without appropriate credit

Honest errors and differences of opinion aren't misconduct.

Some ideas

- Does it “smell” bad?
- How would you feel if your actions were
 - ▶ told to your mum
 - ▶ put on TV
 - ▶ done to you – Golden Rule again
- Mostly, just think about it.
 - ▶ be aware of policies and WHY they exist
 - ▶ don't listen to “shushers”

Laws

Ethics and the law are not the same thing, and there are some particular cases you may run into in science/math:

- Intellectual Property (IP): who owns an idea?
 - ▶ author/originator?
 - ▶ employer?
- Copyright: how are you allowed to use, for instance, 3rd party material when teaching?
 - ▶ what is “fair use” ?
 - ▶ what is “plagiarism” ?
 - ▶ what is not plagiarism, but is copyright infringement?

I'm not a lawyer, and won't try to answer these questions. They certainly can vary from country to country, but most Universities these days have organisations that deal with copyright compliance and IP. Find out what they offer/require.

Local policies

- [Adelaide Uni's Research Integrity Information](#)
- The ARC and NHMRC's "[Australian Code for the Responsible Conduct of Research](#)", has various guides for conduct of research.
- [University of Adelaide Intellectual Property Policy](#)
- [University of Adelaide Plagiarism Information for Students](#)

You need to understand the University's policies, in particular how they relate to mathematics.

Other information

- Author rights
<http://www.ams.org/notices/201203/rtx120300436p.pdf>
- Ethics in Publishing from Elsevier <http://www.elsevier.com/authors/author-rights-and-responsibilities>
- “Vancouver protocol” and (URM) Uniform Requirements for Manuscripts (Submitted to Biomedical Journals)
http://www.icmje.org/faq_urm.html
- The Meno by Plato <http://classics.mit.edu/Plato/meno.html>
- Questions motivated by [AW12]
- Example cases: [MM10, Chapter 18], [KG96]

Summary

- We all must make ethical decisions, all the time
 - ▶ doing it well is part of being a good human being
 - ▶ important decisions are rarely easy
- Scientists and mathematicians have some unique decisions
 - ▶ be aware, and think things through
 - ▶ your reputation and career are at stake
- Read and understand the University's policies

Assignments

Write a half page discussion of whether religious views should ever have an impact on scientific investigation.

or

Write half a page about ethical issues that might arise in your project.

Further reading I



Mike Axtell and Chad Westphal, *Ethics for undergraduate researchers*, Notices of the AMS **59** (2012), no. 3, 434–436.



David Goodstein, *On fact and fraud: Cautionary tales from the front lines of science*, Princeton University Press, 2010.



Ernest A. Kallman and John P. Grillo, *Ethical decision making and information technology*, McGraw-Hill, 1996.



L.L. McCabe and E.R.B. McCabe, *How to succeed in academics*, University of California Press, 2010, Good points about many aspects, but oriented towards the health sciences, so must be read critically.