Peer Review

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Overview

- Peer review
- Ethical challenges
- How to do it well?
- Concluding remarks

Peer review

The process of subjecting an author's scholarly work, research, or ideas to the scrutiny of others who are experts in the same field.

http://en.wikipedia.org/wiki/Peer_review

The basic mechanism of advancement in science

Peer review is used in:

1. **Publications**
2. **Grant applications**
3. **Patent applications**
4. **Legislation of standards**

although each of these involve slightly different practices.

Peers

Peers: People like us

In practice, informed individuals, experts in our field, people who are capable of judging our work.

The jury didn't consist of my peers... This jury believed citizens have a civic duty to obey laws.

Justification of peer review

- Even though the integrity and the intentions of an author may be good, it is hard for him/her to see all possible flaws of the work.

  ("A doctor who treats himself is treated by a fool")
- Showing the work to others increases the probability of catching these flaws at an early stage.
- The expected result is an improvement of the quality of publications and the quality of science.

History of peer review

- First recorded peer review process in 1665 by the founding editor of *Philosophical Transactions of the Royal Society*, Henry Oldenburg.
- The present-day peer review system evolved from the 18th century process applied in *Medical Essays and Observations* published by the Royal Society of Edinburgh in 1731.
- But there was also *Ethics of the Physician* written by Ishaq bin Ali al-Rahwi (854–931) of al-Raha, Syria.
- Touchstone of the modern scientific method only since the middle of the 20th century.
- Before that, typically, it was a decision of the editor to publish ("the burden of proof was generally on the opponents rather than the proponents of new ideas").

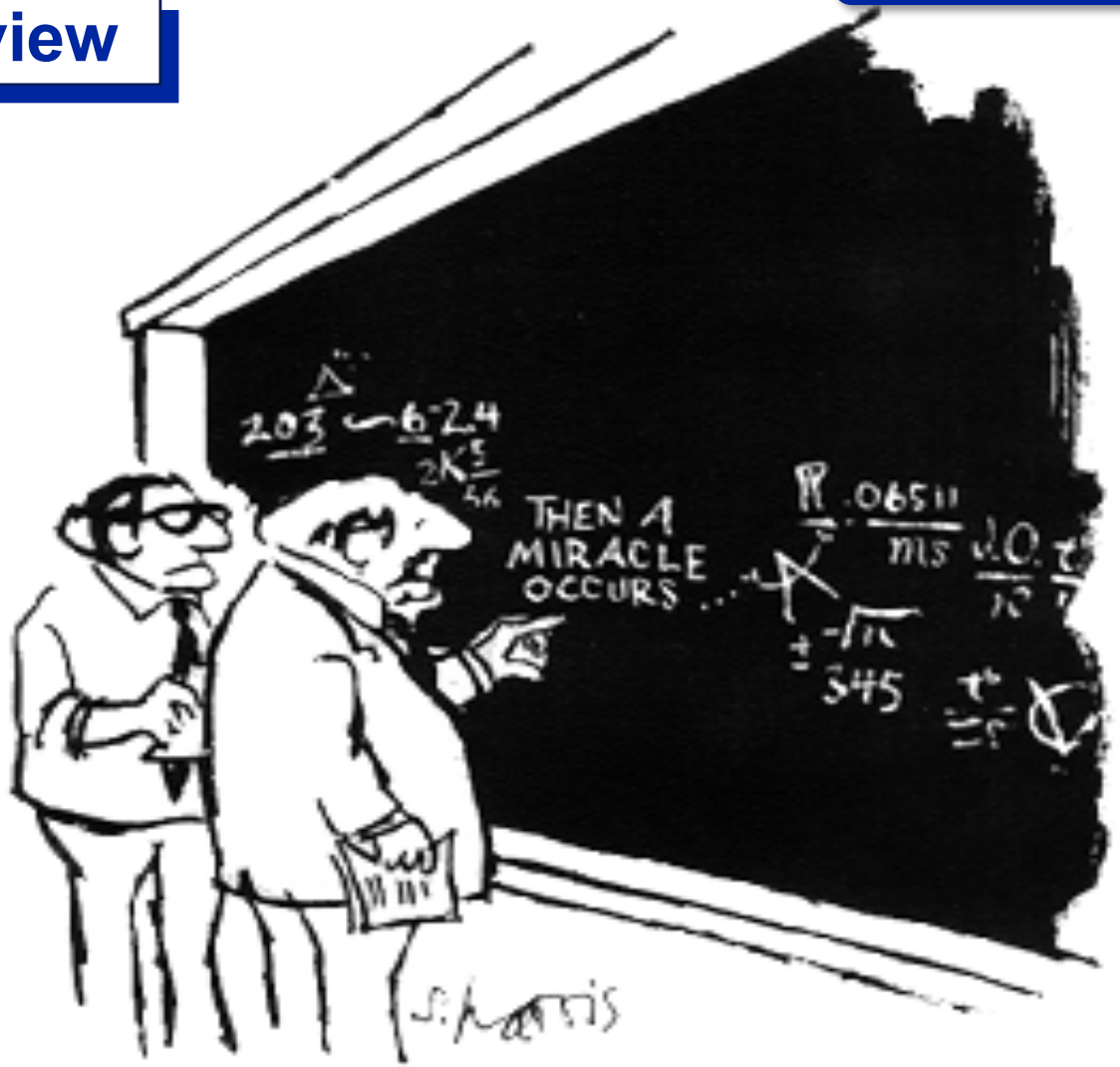
Source: http://en.wikipedia.org/wiki/Peer_review

Consequences of review by peers

Dr. Prebish didn't always fit in with the other scientists.

The goals of peer review

- To provide a reliable, honest, and unbiased judgment of a work's importance and quality
- To offer suggestions for improving the work



"I think you should be more explicit here in step two."

Types of peer reviews

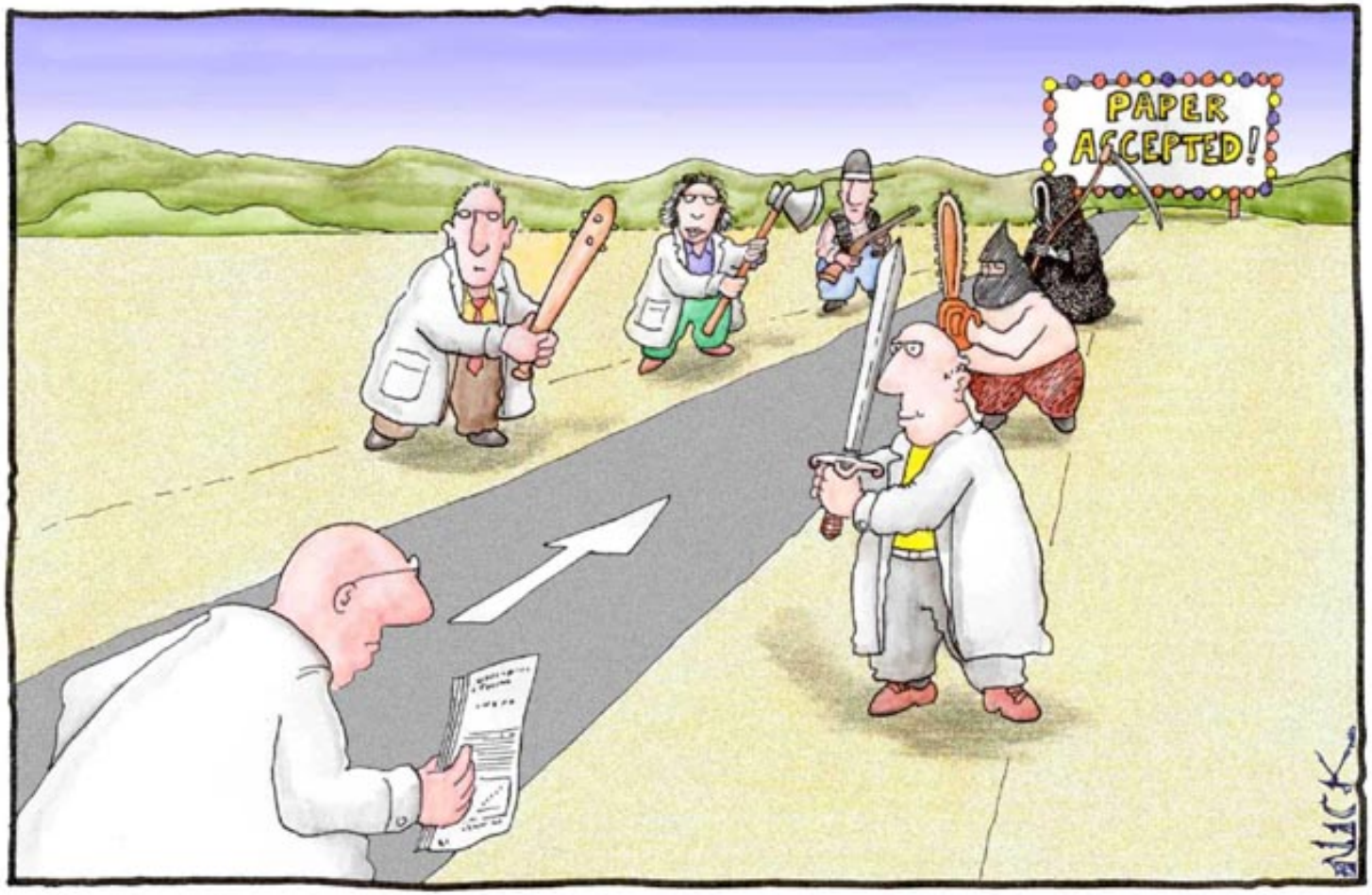
- **Open**

  Both the authors and the reviewers know who they are
- **Blinded**

  The reviewers know who the authors are, but the authors do not know who the reviewers are
- **Double-blinded**

  Neither the reviewers nor the authors know each others' identities

The process of peer review



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

The process of peer review

- Once a paper has been submitted, the editor selects a few (typically two or three) reviewers, experts in the same field with a request to evaluate the paper.
- Within a reasonable period of time (typically, within several months, although some journals these days limit the review time to one month!), the reviewers respond with their comments, which are then forwarded to the author with the editor's decision.
- The author has a chance to respond and to address reviewers' suggestions.
- It used to be all paper-based communication. Now, it is almost always electronic, hence faster. Reviewers' time is still the bottleneck.

Ethical challenges to peer review

- Peer review process relies on experts
- But experts are most likely to have conflict of interests ☹
- … and are most likely to benefit from privileged information ☹
- But, if experts withdraw from reviewing, then only non-experts will be available to review ☹

Conflict of interest (COI)

- **Definition:**

  "A conflict of interest (COI) occurs when an individual or organization is involved in multiple interests, one of which could possibly corrupt the motivation for an act in the other." (http://en.wikipedia.org/wiki/Conflict_of_interest)
- **The best way of dealing with COI is avoidance.**
- **This gives us the comfort of not needing to think whether somebody will behave ethically.**

Managing conflict of interest in peer review

Three fundamental ways of managing conflict of interest:

1. **Disclosure**
2. **Management**
3. **Avoidance**

(Shamoo & Resnick, 2003)

Managing the conflict of interest: Disclosure

Disclose the potential conflict of interest to an objective and interested, but independent, third party such as the journal editor, the grant manager, or the article's readers.

Used widely in disciplines such as medicine.

Managing the conflict of interest: Management

Have independent but interested third party establish rules and policies to control the conflicting interests through oversight, safeguards, or added vigilance such as:

- Study design reviewed by uninvolved individuals
- Article or grant reviewed more closely or by additional reviewers

Managing the conflict of interest: Avoidance

- Remove researcher from a particular review
- It is unethical to use *conflict of interest* as an excuse to avoid professional service review responsibilities (of course, if there is no real conflict of interest)

Peer review: Flaws

Peer review does not do well at:

- **detecting innovative research**
- **filtering out fraudulent, plagiarized, and redundant publications**

"There seems to be no study too fragmented, no hypothesis too trivial, no literature too biased or too egotistical, no design too warped, no methodology too bungled, no presentation of results too inaccurate, too obscure, and too contradictory, no analysis too self-serving, no argument too circular, no conclusions too trifling or too unjustified, and no grammar and syntax too offensive for a paper to end up in print."

Drummond Rennie, deputy editor of *Journal of the American Medical Association*

Peer review: Flaws

Reviewers are often:

- **biased in favor of well-known researchers**
- **biased in favor of researchers at prestigious institutions**
- **negatively predisposed towards the work of their competitors**
- **unqualified to provide authoritative review**
- **tempted to take advantage of ideas in unpublished manuscripts and grant proposals that they review**

Peer review: Flaws

Famous papers that were published and did NOT get peer reviewed:

- Einstein's revolutionary "Annus Mirabilis" papers in the 1905 issue of *Annalen der Physik*
- Watson & Crick's 1951 paper on the structure of DNA in *Nature*
- Abdus Salam's paper "Weak and electromagnetic interactions" (1968). Led to Nobel Prize
- Alan Sokal's purposefully nonsensical paper "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity" was a hoax. Now known as the Sokal Affair (http://en.wikipedia.org/wiki/Sokal_affair).

Source: Peggy Dominy & Jay Bhatt
"Peer Review in the Google Age"

Peer review: Flaws

Famous papers that were published and passed peer review, but later proved to be fraudulent:

- **Jan Hendrik Schon's (Bell Labs) 15 papers passed peer review and were published in *Science* and *Nature* (1998-2001), later found to be fraudulent.**
- **Woo Suk Hwang, a cloning pioneer (famous after announcing in 2004 that he cloned a human embryo, the work published in 2005 in *Science*), was sentenced to two years in prison at the Seoul Central District Court in 2009, after being found guilty of embezzlement and bioethical violations.**
- **Igor and Grichka Bogdanov published papers in theoretical physics in 1999 & 2002 that are believed by many to be jargon-rich nonsense.**

Peer review: Flaws

Famous papers that got rejected that later turned out to be seminal works:

- **Krebs & Johnson's 1937 paper on the role of citric acid on metabolism was rejected by *Nature* as being of "insufficient importance", was eventually published in the Dutch journal *Enzymologia*. This discovery, now known as the Krebs Cycle, was recognized with a Nobel prize in 1953.**
- **Black & Scholes 1973 paper on "the pricing of options and corporate liabilities," rejected many times, was eventually published at the intersession of Merton Miller by the *Journal of Political Economy*. This work also led to the Nobel Prize.**

Peer review: Flaws

The process is imperfect, but still good things will eventually get out to the world.

Six rules of peer review

1. **Competence**

   Decline to review a work if you are not expert

2. **Control of possible biases**

   Bring any real or apparent, potential, or real conflicts of interest or biases to the attention of the editor or funder

3. **Promptness**

   Perform a prompt review

(Magnus & Kalichman, 2002)

Six Rules of Peer Review (cont.)

4. **Confidentiality**

   Keep all aspects of the review confidential. Do not even disclose that you have performed a review on a specific topic

5. **Security**

   Do not use a reviewed work as a private source of information

6. **Constructive criticism**

   Suggest ways to improve the work

(Magnus & Kalichman, 2002)

How to do reviews well?

- Treat others the way you would like to be treated.
- If you criticize somebody's work, you should be able to show a superior approach.
- When reviewing papers (but also when listening to oral presentations), do not automatically suspect that not understanding something is your fault. Ask simple questions, do not be afraid to look silly. (Remember "The king is naked" fable?)
- Watch out conflicts of interest.

Training on Peer Reviews

- **Peer reviewing can be improved by training**
  - Research found that trained reviewers perform better, but not remarkably better
  - Short training provide only a small quality increase
  - Even with trained reviewers the quality of outcome is not guaranteed
  - You should practice and improve over your research life
  - Best approach – see all reviews after the paper is processed
- **We will practice Peer Reviewing in an important case: your project paper**
  - Review project papers using form-based approach
  - Compare your reviews, discuss results

How to receive reviews well?

- When you are sure that your work is of good quality, do not get discouraged by bad reviews. Believe in yourself! Correct the obvious mistakes, improve the paper, work on its readability, and send it out again!
- Treat the reviews seriously! Even if the reviewers are wrong, it is possibly your fault that you did not communicate your ideas clearly. Work on the presentation in this case.
- Never just submit your paper to another venue without addressing the reviewers' criticism.

Concluding remarks

- Be very careful about conflicts of interest and of ethics of reviewing.
- Do not submit too much “noise” and “junk” papers – do take care of your reputation.
- Aim always high!
- Sometimes, in case your work is repeatedly rejected, it may be a good idea to go for a journal rather than conference publication: You can argue with reviewers there.
- Get into reviewing soon: In you are not yet in the circle, suggest your advisor that you can help with reviewing and do it well.

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