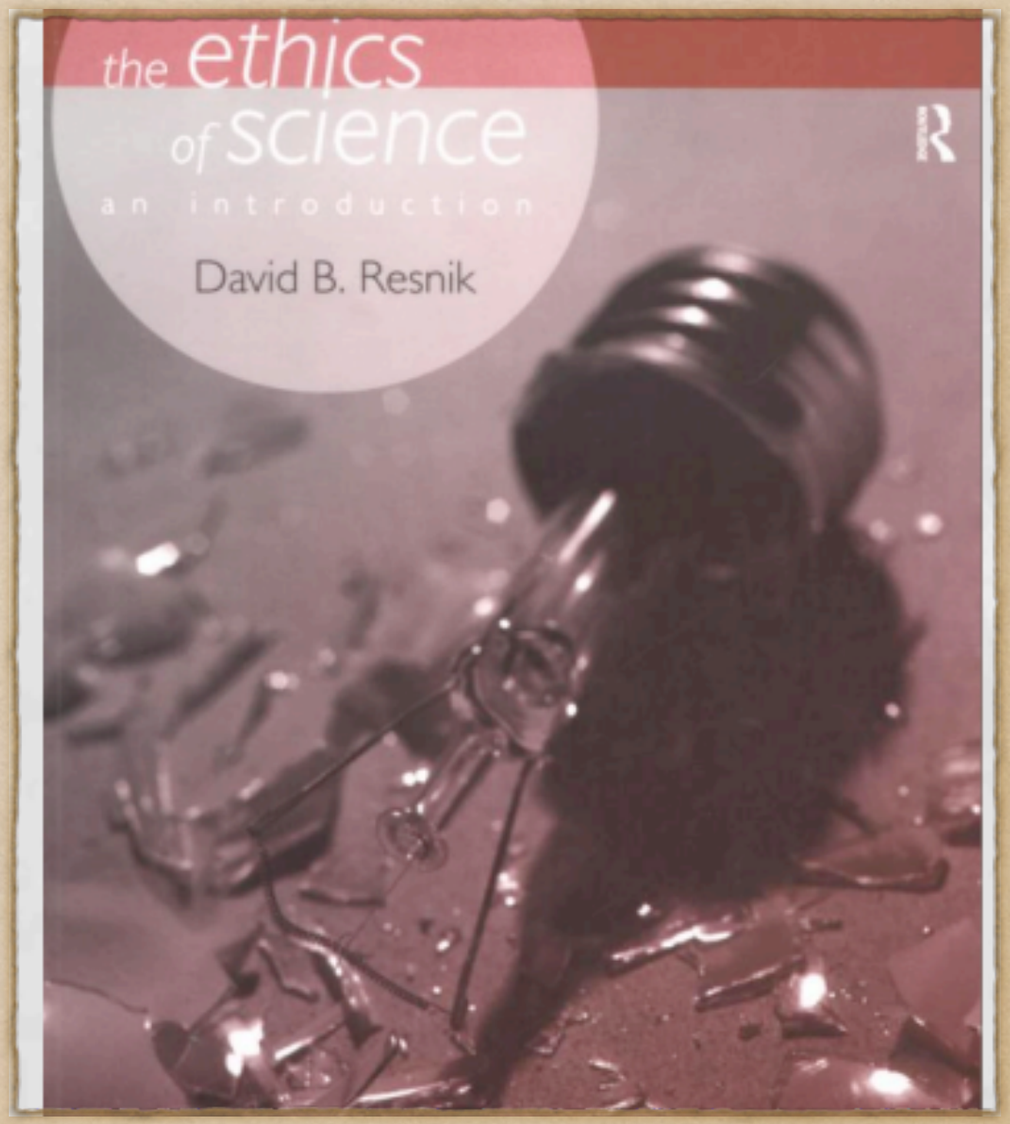
Ethics in Science — the dos and don'ts

Based on the book , "The Ethics of Science: an Introduction", David B. Resnick



and also

http://www.uio.no/studier/emner/matnat/fys/FYS-GEO4100/h07/undervisningsmateriale/Ethics%20in%20Science.pdf

I know all about "ethics", in particular, "ethics in science" — so, what is new(?)!

- The complex nature of scientific research today, makes the determination of the right thing to do very difficult.
- Consider, the questions that arise in "drug research", which often involve animals and even humans.
- Experimental drugs, who can use them? who decides? What experiments must be funded, again, who decides.

Society expects the scientific community to not only deliver a better quality of life but simultaneously do the right thing.

Ethics, morality and the law

- Ethical standards are set by different communities to ensure a common code of conduct across that community.
  For instance, the ethical standards set by
  doctors/veterinarians
  environmental scientists
  lawyers
  may have very little in common.

- The moral and legal obligations of these individuals are a completely different matter and may indeed be in conflict.

- For instance, while moral conduct also requires an understanding between the right and wrong, it is often dictated by religion. On the other hand, every individual must abide by the law of the land.
- One must keep in mind that the law is binding while an individual must choose ethical and moral standards for him or herself.
- Although, we know that we must be always truthful, often we are not except when mandated by the law.

Let us point out some obvious conflicts between these.

Speeding breaks the law but *you* might be driving someone critically ill to the hospital.

There may not be a law that requires *you* to report a crime but not doing so would not meet the ethical standards, or even moral ones, imposed by the society.

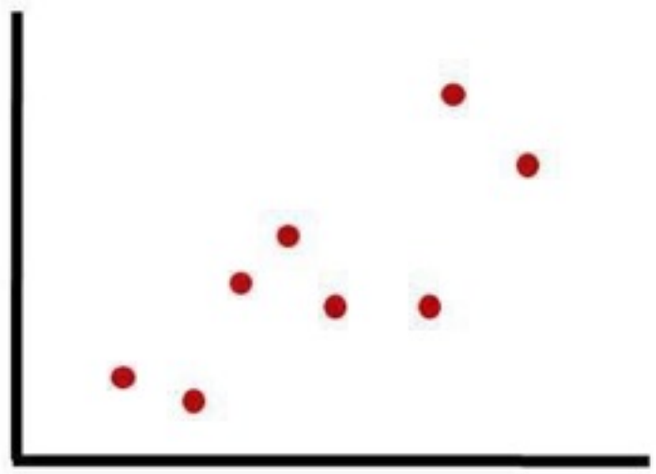
What is science, what is ethics in science?

Science is our attempt to understand the natural world around us. The scientific method consists of organization of our knowledge in the form of explanations that can be tested, repeated and culminate in predictions about the universe.

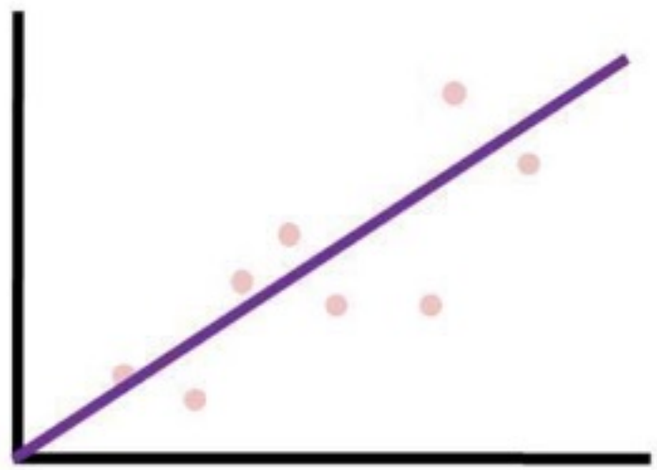
The ethical standards in science are then clearly dictated by goals of science. Making up or falsification of data violates the minimum of ethical standards that one may wish to set.

PhD tips # 22

Actual data



How you saw it:
Perfectly linear, as expected



How your supervisor saw it:
Perfectly exponential, amazing new stuff

How the referee saw it:
Pure noise

Where is science done?

Universities (provide education, advancement of knowledge)

Government Labs (address national issues like weather forecast)

Defence establishments (to develop military technology)

Industrial Labs (to serve the market needs)

The goal of the scientific research in each of these situation is determined by the funding mechanism — conflicts are natural.

Conflicts

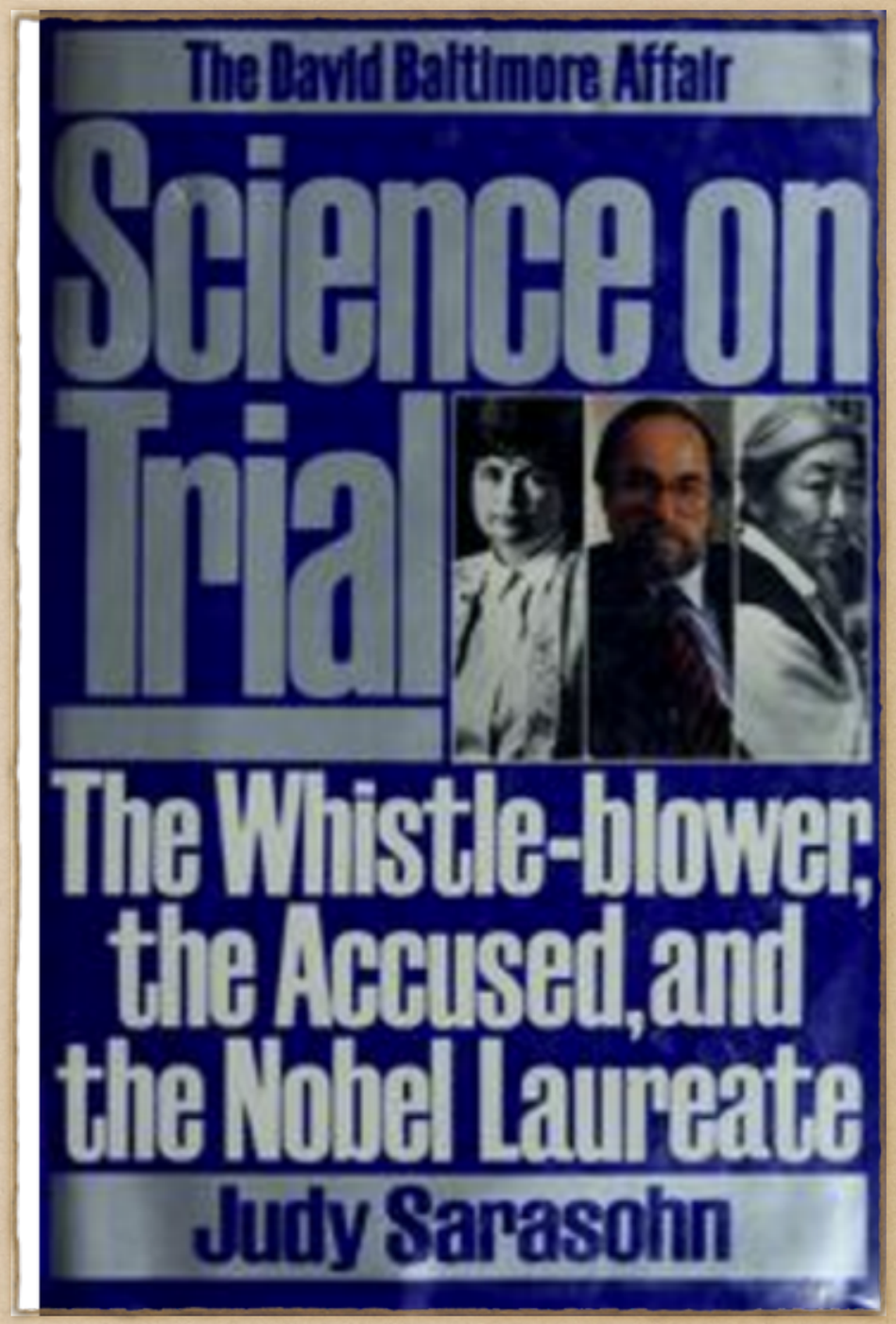
- openness versus secrecy
- openness versus competitiveness
- needs of the employer versus that of the society
- truth versus desired outcome
- conflict of interest

Carefulness, Openness, etc.

- One must be careful to see that every step has been taken to ensure new discoveries are free from errors. All attempts must be made to quantify any residual error that may remain. In theoretical sciences, the correctness of the proofs must be ensured before announcing the results in public.
- The practice announcing results before making sure all the pieces of the puzzle fit is not good ethical practice. You may get away with it but it doesn't make it right!
- Scientists must share data, methods, ideas and results.

The Baltimore Affair

define detect and sanction abuse



- a paper co-authored by Nobel Prize winning scientists David Baltimore was suspected of containing fraudulent data.

- Margot O'Toole, a postdoctoral student working under the supervision of one of the paper's authors, Thereza Imanishi-Kari. She grew suspicious of this research when she found seventeen pages of Imanishi-Kari's notes that contradicted the findings of the paper. She failed in an attempt to repeat some of the experiments.

- When O'Toole's one year term as a postdoctoral student expired, she had difficulty finding work for quite some time and she became known as a troublemaker.

- Imanishi-Kari maintained her innocence throughout this whole episode. Baltimore has always defended Imanishi-Kari.

- Should Baltimore have paid closer attention to the research that was being done under his supervision?
- If he could not adequately supervise the research, should he have been listed as an author?
- Should O'Toole have been given more protection for her whistle blowing?

quid prof quo

Prof. Jones, there's a conference in Hawaii coming up and ... I can't say "no" now. Can I? I wouldn't say that.

Authorship issues

- An author of a paper must have contributed significantly to the research. By the same token, no one should be invited to be an author unless he or she has made a significant contribution. Of course, the question here is who must finally decide.
- On the rare occasion that either during the review process or in the published work, a result is found to be erroneous or misleading, all the authors must be held accountable.
- joint authorship by students in research projects
- Bourbaki

Plagiarism

- Plagiarism is defined by the US Office of Research Integrity as "the appropriation of another person's ideas, processes, results or words without giving appropriate credit". It is a form of scientific misconduct.
- The ease with which one can locate "written text" on any topic in the internet has made such misconduct very common. Compared to earlier generations, training of students today seems to have become slack in the sense of not conveying a clear understanding of what is right and what is not in such matters.
- In the end, plagiarising from someone else hampers your own understanding!

- In the context of scientific research, it may involve (deliberate or unintentional) incorporate of some ideas or results of other researchers, without proper attribution, within one's own research publication.

- Taking your own published results and reproducing them in another piece of work as if they were new is "self-plagiarism".

- Submitting the same results to two or more journals and treating them as separate publication is a serious violation of scientific ethics.

Matters of policy …

- climate change — is there a deception, is it already too late to save the planet?
- environmental safeguards — are we giving up too much for our own good?
- genetically modified vegetables and other life forms — where are we heading, really?
- perpetual life — who wants it anyway?