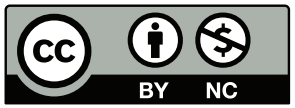
Ethics I



Ethical Categories

- Common: apply to everyone
- Project goals
- Profession-specifc knowledge

Common Ethics

- Conflict of interest
- Kickbacks, bribery, etc.
- Software licenses

Important, but we won't spend class time on these — they apply to everyone.

Project Goals

- Is the outcome ethically acceptable?
- Will the result be “good for society”?
- One way to look at it: would you still approve if you were not personally profiting?

Profession-Specific Knowledge

- Only a specialist is likely to be aware of the issue
- Only a specialist is qualified to evaluate the issue
- But everyone can be affected

Focus of Responsiblity

- Your employer
- ☞ Generally profession-specific issue
- Society as a whole
- ☞ May be either goal-specific or profession-specialized

A Look at History

- Nuclear weapons
- Recombinant DNA
- Human subjects research

Nuclear Weapons: Four Individuals

- Leo Szilard
- J. Robert Oppenheimer
- Werner Heisenberg
- Edward Teller

Which of them acted ethically?

Leo Szilard

- Invented — and patented — the nuclear fission chain reactions (patent GB630726, issued 1936, “Improvements in or Relating to the Transmutation of Chemical Elements”).
- He was well aware that a bomb was one possible use, and sought to keep the patent secret
- Instigated the famous Einstein letter to President Roosevelt calling for development of the atomic bomb
- In 1943, attempted to use his patent rights to gain a policy voice for scientists on use of the bomb
- After the war, gave up physics and became a biologist

Which of these items were ethically proper?

All of Them?

- The invention was an act of pure science — and the patent was a mechanism to keep it secret, especially from the Nazis
- (Other British scientists felt that patents were unethical because patents generally had profit, rather than knowledge, as their motive.)
- The Einstein letter had two goals: to start U.S. research towards a bomb, and to suggest the desirability of keeping uranium ore away from the Nazis
- He gave up nuclear physics because he felt it had led and would lead to too many immoral consequences

What About a Policy Voice for Scientists?

- Partly inspired by H.G. Wells' book *The Open Conspiracy*
- Wells: "It seemed to me that all over the world intelligent people were waking up to the indignity and absurdity of being endangered, restrained, and impoverished, by a mere uncritical adhesion to traditional governments, traditional ideas of economic life, and traditional forms of behaviour, and that these awaking intelligent people must constitute first a protest and then a creative resistance to the inertia that was stifling and threatening us."
- Are scientists really more qualified to rule?
- Not really — but being a scientists doesn't exempt one from public responsbility

But. . .

- In 1943, almost no one knew about the bomb's existence or potential. Who should decide policy?
- Szilard had thought harder and further ahead than most (save perhaps Bohr)
- He acted *according to his own moral view*
- Special knowledge does confer special *responsibility* — but it does not imply special *ability*
- Szilard was, arguably, the scientist of his generation most driven by ethics

J. Robert Oppenheimer

- Scientific director of the Manhattan Project; was afraid that Germany would get the bomb first
- “Now I am become Death, the destroyer of words” (Oppenheimer thinking of a line from the *Bhagavad-Gita* after seeing the first A-bomb test.)
- In 1945, when working on bomb target selection, suggested sharing the research with the world, for moral reasons
- Opposed the H-bomb initially, on both technical and moral grounds
- When a new technical approach was devised, he called it “technically sweet” and supported work on it.

Did Oppenheimer Act Ethically?

- In 1942, when he was appointed to head the Manhattan Project, it was hard to argue that any weapon against Nazi Germany was immoral
- It was far less obvious, in mid-1945, that the bomb should be used against Japan without warning. (It is also unclear if there was any chance Japan would have surrendered to anything less than what was done.)
- But why should technical changes affect the morality of using the H-bomb?

A Mixed Bag

- Oppenheimer was a tortured soul, who did agonize over moral and ethical questions
- Too often, though, he seemed to be seduced by other considerations
- Access and power?
- Technical challenges?

Werner Heisenberg

- Nobel Prize-winning physicist
- A major figure in the German A-bomb project
- Met with Bohr in Occupied Denmark — but just why is unclear (Bohr was vehemently anti-Nazi)
- Made a crucial theoretical mistake in calculations suggesting that graphite reactors weren't possible

Amoral, at Best

- He did work on fission for the Nazis
- “He had agreed to sup with the devil, and perhaps he found that there was not a long enough spoon” (expatriate German physicist (and former advisee of Heisenberg) Sir Rudolf Peierls)
- Did he sabotage the graphite calculations?
- Was he seeking help from Bohr or warning the Allies?
- He was diffident when asked directly by Armaments Minister Speer if a bomb was possible
- But he never declined to work on it
- (By contrast, another famous physicist and Nobel laureate, Frédéric Joliot-Curie, was very active in the French Resistance.)

Edward Teller

- A prima donna during the Manhattan Project; he only wanted to work on the “Super” (what later became known as the H-bomb)
- “. . . blamed at Los Alamos for leading the laboratory, and indeed the whole country, into an adventurous programme on the basis of calculations, which he himself must have known to have been very incomplete.” (Bethe)
- Helped strip Oppenheimer of his security clearance, partly because Oppenheimer opposed a (premature) crash program to develop an H-bomb
- Deceived people about the likely success of X-ray lasers in Reagan’s anti-missile system (the “Strategic Defense Initiative” (SDI), better known as “Star Wars”)

Enough said. . .

Recombinant DNA

- In 1974, biologists called for a moratorium on research on recombinant DNA until the safety of such research could be assessed, and perhaps better procedures devised
- Most scientists areound the world went along
- This sort of self-restraint — not investigating potentially interesting and useful new science — was all but unprecedented
- A meeting was held at Asilomar to come up with a consensus

The Asilomar Conference

- Match restrictions to perceived risk
- Use a combination of procedures (i.e., limited access; no mouth-pipetting), physical controls (hoods, negative pressure, air locks), and biological controls (hosts that can’t live outsid the lab)
- Concluded that soome experiments should not be done at all

Human Subject Experimentation

- Formal restrictions on experimentation on humans without prior review by an ethics board (“Institutional Review Board” (IRB))
- Immediate trigger: the Tuskegee syphillis experiment
- Applies to virtually all human subject experiments, even something as simple as questionnaires
- IRBs must include scientists and non-scientists, men and women, people familiar with especially vulnerable target populations

The Tuskegee Syphillis Experiment

- 600 African-Americans (399 with syphillis, 201 without) were studied and tracked, starting in 1932
- None were ever offered treatment for syphillis, even after penicillin became available
- Local doctors, white and African-American, were told not to treat the subjects
- The study was supposed to last six months; it lasted 40 years
- Arguably, it was ethical in 1932, since there were no effective treatments then — but it continued long after treatment was available
- Even so, the target population selection was arguably racially biased

Approaching Ethical Issues

- What are the implications of your actions?
- Who might be affected?
- Do others with no stake in the activities agree that your actions are ethical?

Making a Choice

- There is no perfect foresight
- Even honest, honorable people can disagree about what is ethical in a given situation
- That said, there are some things that are never acceptable
- Matters are more complex when dealing with technical questions — technical issues are often conflated with moral and/or political views (i.e., should the H-bomb have been developed before the Ulam-Teller design made it clearly feasible)
- But — you have to *think hard* about such questions