Engineering Ethics

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- What do engineers do?
  - Use science and technology to solve problems to benefit society
  - Creates a "triangle" between science, technology, and society
- Perspective
  - Understanding the relationship between technology and society
- Analysis
  - Understanding the role of values in engineering practice
- Application
  - Understanding the core ethical concepts and theories as well as applying them
- Professional Responsibility
  - Understanding and embodying the professional standards and codes of your respective disciplines
- Trolley Problem
- Incorporating Ethics is a Skill
  - Choosing a project
    * Social/ecological vs. technical problems
    * Framing factors: resources, expertise, institutional context
    * Opportunity costs (priorities) as value expressions
    * Prevention vs. treatment (eliminating causes vs. dealing with effects)
    * Non-technical alternatives

- Defining success
- Understanding means and byproducts
  - Unacceptable means
    - The ends do not always justify the means (Tuskegee; animal experimentation)
  - Unintended byproducts/Secondary effects
    - Privacy and RFID/Nano IT
    - Ecological effects and Life Cycle Assessment
    - Silver nanoparticles (antimicrobial) in washing machines affect water treatment which rely on microbials
    - Synthetic artemisinin, malarial resistance, and wormwood farmers
    - Synthetic genomics and biosecurity/biosafety