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HUMAN ELEMENT

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First Do No Harm

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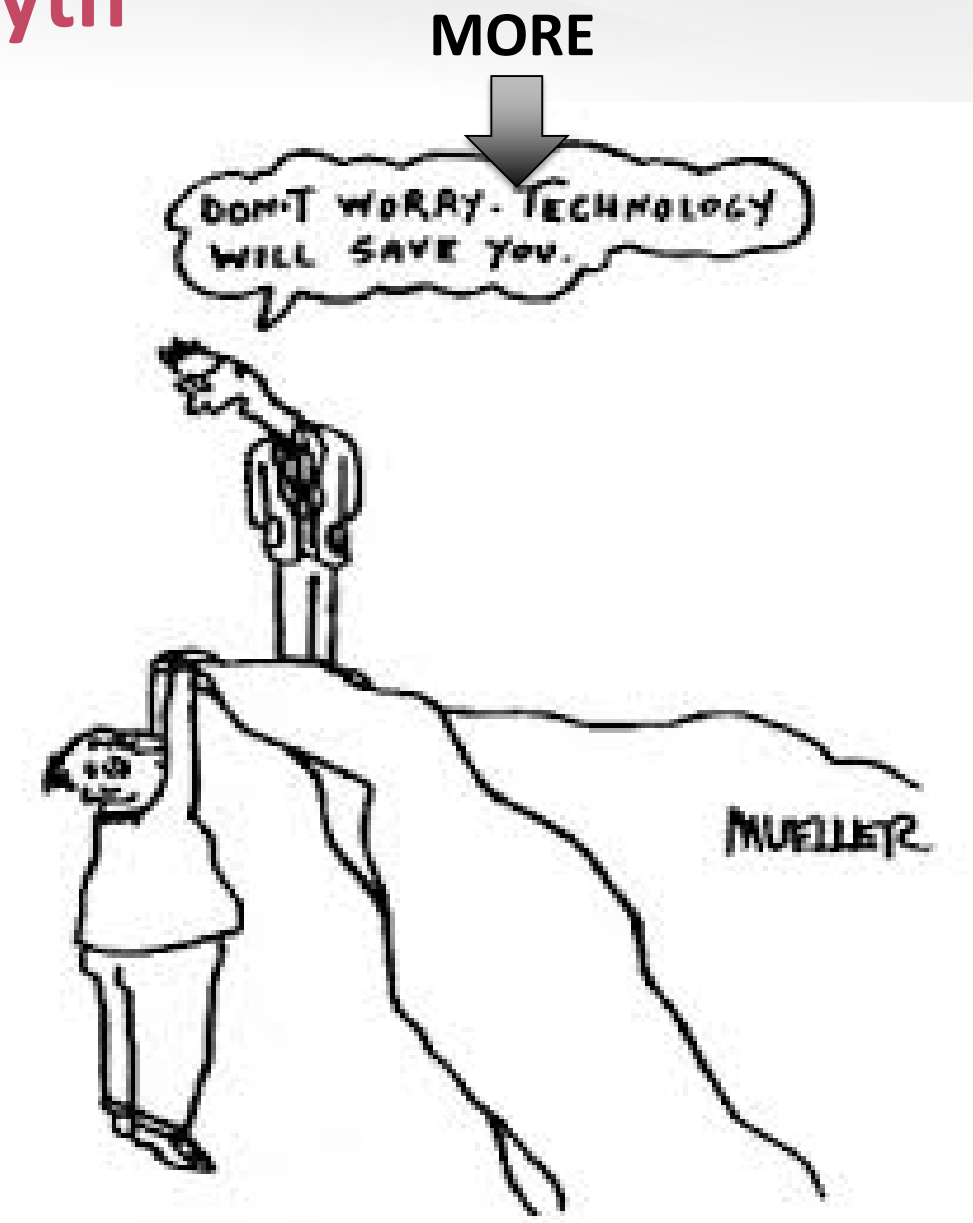
Agenda

- Caveats
- Impact of Technology
- Scenarios
- Medical Profession vs. Technology Profession
- What to Do?
- Conclusions
- Apply What You Have Learned

Some Caveats …

- Technology can be an incredible power for good
  - …but with great power comes great responsibility
- Perfect isn't achievable
  - …but "better" almost always is
- The only constant in life is change
  - …and that happens whether we like it or not
- Never underestimate the power of one person to change the world

The Great Myth



Impact of Technology

- Positive and negatives to almost everything
- Connectedness
- Shortened attention spans
- Far more information, and the ability to harness information
- Greatly reduced privacy
- Risks many of us don’t see and can’t understand
- Have *many* of us ever considered the pluses **and** minuses of technology?

Scenario 1: Connected Cars

- Connected cars have already been hacked
  - "All code has defects; some are significant"
  - No, ML and AI won't make this all work
- Testing mechanical devices is straightforward
  - …testing code is far more complex
- Inability to maintain code for the life of the vehicle
  - …means far more mechanical waste
- The appeal of "break once; hack many"
- Confluence of technologies may empower precise targeting
  - Or massive disruption

Scenario 2: The Internet-Enabled Refrigerator

- What actual problem does this solve?
- Who *else* can see if you are out of eggs?
- Why does my kitchen need a firewall?
- Why is my refrigerator now part of a botnet?
- Can the software be maintained for the life of the refrigerator?
- In general, many mechanical devices do not need Internet connectivity and do not profit by them

Scenario 3: The Nuclear Reactor

- Traditionally, access limited to selected, well-vetted people
  - Enforced by guns, gates, guards
  - Physical access required to control reactor
  - Result: limited, well understood, controlled risk
- "Connected access" may *exponentially* increase risk
  - Result: If you get it wrong, risk cannot be acceptably mitigated

Is ‘More Technology’ Necessarily The Answer?

Consider the Medical Profession

- The Hippocratic Oath: First Do No Harm
- Informed consent, including for clinical trials
- Extensive drug and device testing
- Understanding of side effects of treatments and medication
- Risk vs. reward calculation

Consider the Technology "Profession"

- "More technology will solve technology-induced problems"
- Insufficient/uninformed consent
- Inconsistent testing
- Insufficient understanding of side effects
- Reward often trumps risk; systemic risk ignored

"A Prophet Is Without Honor in His Own Country"

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What Should We Do?

Question the Potential Impact of Technology

- Does this (technology) solve a problem people care about?
  - "OMG, like, we need, like, an app to share TPPs with BFFs!"
- Does this potential technology solve a problem better, cheaper or faster than current options?
  - If not, why are we using it?
- Does this technology create externalities?
- Is the long-term total cost greater than the benefits?
- Does this technology create systemic risk?

Broader Mechanisms for Change

- Improve educational systems (especially STEM programs)
  - Ethical considerations of technology must become part of curricula
  - Technology is ephemeral; ethical norms much less so
  - Example: Humanities division within the University of Virginia School of Engineering and Applied Science
- Industry and professional associations should develop a professional code of ethics
- Industry conferences should incorporate “ethics” tracks
- If we don’t start talking about ethical/acceptable uses of technology, *nothing will ever change*

What Can One Person Do?

- "Let Your 'Yes' be 'Yes' and Your 'No' be 'No'"
- Learn to explain technological concerns in layman's language
  - Incorporate economics, analogies, humor, popular cultural references…*whatever works* to make your point
  - My favorite: The Little Dutch Boy
- Enlist allies
  - Legal, human resources, privacy mavens, ethics and compliance hotlines…
- Build a community of ethically-aware technologists…and technology-aware ethicists

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Summary

Don’t Be This Guy

“First, admit no harm.”

Conclusions

- Technology-induced problems cannot (necessarily) be solved by more technology
  - By definition, systemic risk must be **avoided**
- We can only successfully use technology if we are honest about potential risks and “pernicious uses”
- Discussions of ethics in technology *must* become the norm
- Each of us can and should be a force for good in the universe
- “First, Do No Harm”

Questions?