LOUISIANA TECH UNIVERSITY®

Research & Engineering Ethics

Dr. Erica P. Murray
June 17, 2021

The material presented was developed with Dr. Jamie Newman

Outline

- What are Codes of Ethics?
  - Definition, Purpose and Examples
- How do ethics relate to Research & Engineering?
  - Micro, Meso & Macro Ethics
- Why should anyone care about Research & Engineering Ethics?
  - Recent cases of research ethics violations
- Resources
- Acknowledgements

What is an Ethical Code?

- An Ethical Code is a collection of guidelines intended to define behavior that is expected and acceptable in a given field, profession or organization.
- An Ethical Code may be called:
  - Code of Ethics
  - Code of Conduct
  - Responsible Conduct of Research
- What organizations have Ethical Codes?
  - Code of Ethics for Engineers
  - Various research societies
  - Publishing organizations
  - Grant/Funding institutions

Research & Engineering Ethics

- ***Research & Engineering Ethics*** are ethical practices that impact science and engineering.
- The fundamental purpose of science and engineering is:
  - To gain understanding of the world around us; and,
  - To apply what we understand in a way that enhances quality of life
- ***Ethical behavior*** is behavior that facilitates the process of acquiring knowledge, truth, and avoiding error.
- ***Ethical conduct*** is important for establishing standards that promote: trust, honesty, accountability, mutual respect, and fairness.
- ***Ethical practices*** impact individuals, organizations, and society.

Micro, Meso, and Macro Ethics

Level of inquiry	Focus	Key ethics questions for researchers to ask themselves
Micro	Individual	Does my research impinge on the individual's right to privacy?
		Could my research offend subjects in any way?
		Could my research cause emotional distress to any of my subjects?
		Has my own conduct been ethical throughout the research process?
Meso	Group	Does my research follow the ethical guidelines of my profession and discipline?
		Have I met my duty to those who funded my research?
Macro	Society	Does my research meet societal expectations of social research?
		Have I met my social responsibilities as a researcher?

Principles of Sociological Inquiry: Qualitative and Quantitative Methods, v. 1.0 *by Amy Blackstone*
3.3 Ethics at Micro, Meso, and Macro Levels
http://catalog.flatworldknowledge.com/bookhub/reader/3585?e=blackstone_1.0-ch03_s03

Case Study #1: P-value hacking

- Brian Wansink, was Director of the Food and Brand Laboratory at Cornell University and a “world-renowned eating behavior expert”.

- Dr. Wansink’s research on consumer behavior and food has been sited over 20,000 times, and has impacted the US government’s public policies on dietary guidelines, as well as major food companies making smaller snack portions (such as the 100 calorie portion snack packs). So, what happened?

Case Study #1 continued

- In 2016, Dr. Wansink published a blog that caused people to question his data collection and record keeping methods.
  - The P-value basically indicates how statistically significant a value is.
  - It appeared that Dr. Wansink was encouraging students and others working in his lab to select the more favorable data, as well as apply methods to achieve more favorable statistical results that yielded “publication worthy” P-values.
- Due to a faculty committee finding him guilty of committing scientific misconduct, Dr. Wansink was removed from all teaching and research responsibilities, and subsequently retired in 2019. Since 2020, he has had 18 research papers retracted, and others have been marked with “expressions of concern” or corrected.

- Questions to consider:
  - How did Dr. Wansink’s behavior impact his students and Cornell University? What about other researchers in his field who may have been competing with him for research grants?

Case Study #2: Ethics of Autonomous Vehicles

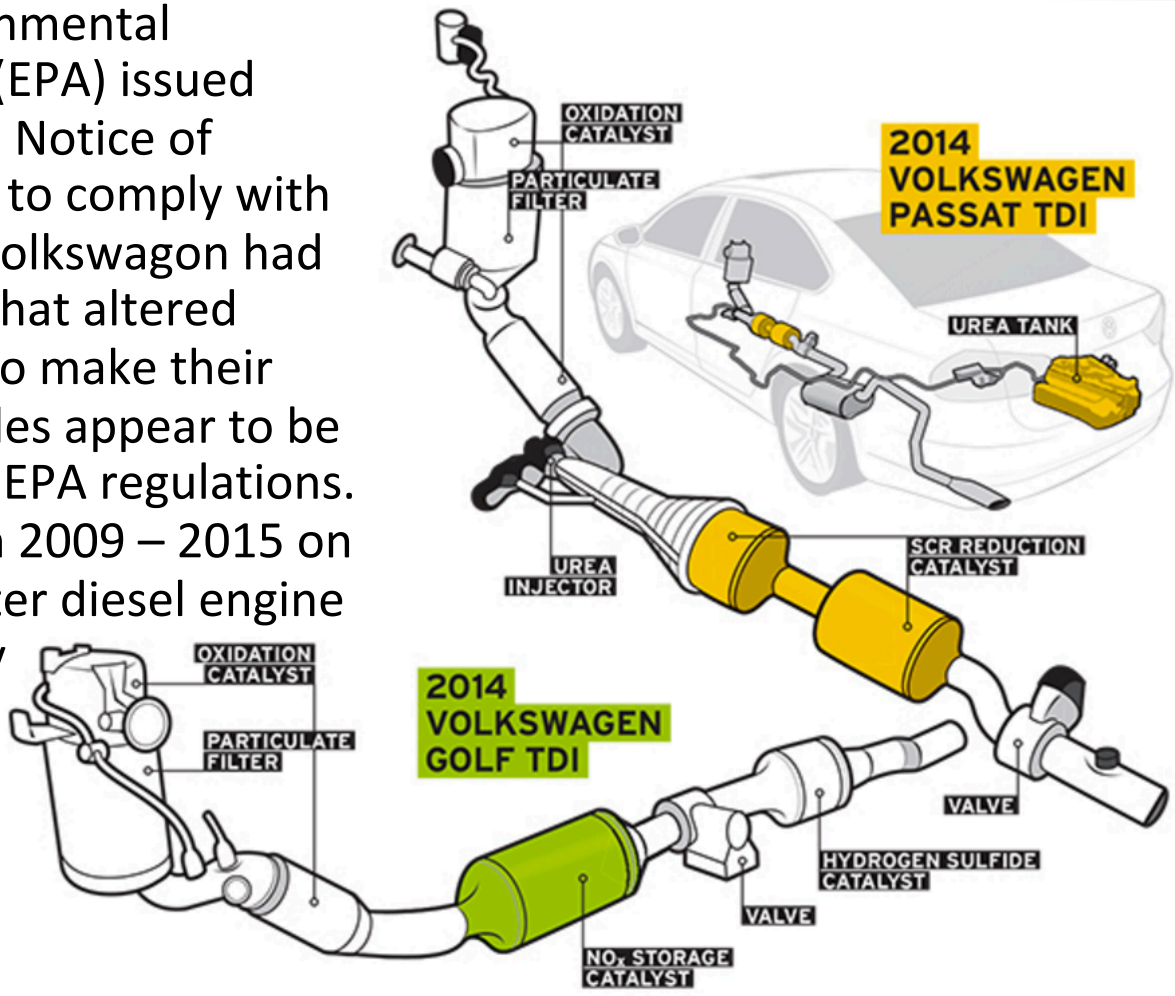
- MIT researchers developed a survey for people from around the world to share their thoughts about decisions that autonomous vehicles may have to make. The participants were 2 million online individuals from over 200 countries representing various demographics (i.e., age, gender, ethnicity, religion, education, etc.). The work titled The Moral Machine Experiment was published in *Nature* in 2018. The researchers found cultural and geographical affiliations had the strongest impact on the participant responses.

- Questions to consider:
  - How do you think an autonomous vehicle should be programmed to handle an accident where a fatality is inevitable? For example, a group of school children are walking on one side of the street and an elderly person using a cane is walking on the other side of the street. How should the vehicle respond if there is no way to avoid a fatal collision with the children or the elderly person?

Source: Peter Dizikes, MIT News Office 10/24/2018

Case Study #3: Falsified Work

In 2015, the Environmental Protection Agency (EPA) issued Volkswagon (VW) a Notice of Violation for failing to comply with the Clean Air Act. Volkswagon had installed software that altered tailpipe emissions to make their diesel engine vehicles appear to be in compliance with EPA regulations. This was done from 2009 – 2015 on over 10 million 2-liter diesel engine vehicles. A study by researchers at West Virginia Univ. revealed the emissions were as much as 40 times over regulated limits for NO_x.



Case Study #3 continued

- Motives for VW unethical behavior:
  - There is speculation that there was pressure to increase sale of clean air compliant vehicles to change the perspective of diesel.
    - Diesel engines of the past were dirty, noisy, and sluggish.
  - VW engineers wanted to satisfy US regulators to continue sales in the States, while providing high mileage that customers wanted.
- What would you have done if you were an engineer at VW and you were asked to develop such a software?
- How does VW's actions impact it's customers and society?
- What are some of the outcomes of this scandal?
  - January 11, 2017 - 6 executives arrested, 1 sentenced to 7 years of prison
  - By June 1, 2020 – Volkswagon had paid $33.3B in fines and various penalties
  - Volkswagon had to buy back 85% of all cars involved

Resources

- Online Ethics Center for Science & Engineering
  - www.onlineethics.org
- National Science Foundation
  - nsf.gov/oig/
- Resources or Research Ethics Education - UC San Diego
  - http://research-ethics.net/
- Academy of Management
  - Ethics of Research & Publishing Video Series
    - http://aom.org/About-AOM/Ethics-of-Research---Publishing-Video-Series.aspx
- Academic Integrity at MIT
  - http://integrity.mit.edu

Thank you for your attention.