The Smithinator: Recumbent Vehicle Design and Entry for the 2020 ASME Human-Powered Vehicle Challenge
(Technical Report)

Using Care Ethics to Examine Police Use of Facial Recognition Technology
(STS Research Paper)

An Undergraduate Thesis Portfolio

Presented to the Faculty of the
School of Engineering and Applied Science
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Bachelor of Science in Mechanical Engineering

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STS 4600

Socio-technical Synthesis: Human Powered Vehicle and Facial Recognition Technology

Although my technical and STS projects are not strongly related, working on both projects at the same time has allowed me to become a better engineer by developing many technical and managerial skills, which I learned through metalworking with steel to build the technical project, keeping track of a budget and applying for funding, organizing multiple subteams, and giving multiple presentations, and by developing critical thinking skills with respect to the broad socio-technical impacts of technologies.

My technical work is centered around the creation of a human powered vehicle. My capstone team built a three wheeled, human powered vehicle to meet specifications posed by the American Society of Mechanical Engineers (ASME) and self-imposed qualifications. The ASME specifications dealt with benchmarks for stability, and speed, along with many safety requirements involving a harness, a rollover protection system (RPS) with specific deflection grades, a braking system, and assorted internal safety measures. The team used self-imposed specifications to ensure that the vehicle was efficient, comfortable, and as user-friendly as possible. The vehicle was designed and built to be a useful method of transportation and to showcase the skills we have attained through our mechanical engineering coursework.

My STS research is centered around facial recognition technology (FRT). I explore the use of FRT by the police, and its potential for negative impact on citizens. I use Carol Gilligan's theory of care ethics and Joan Tronto's four aspects of care ethics to show how the

implementation of facial recognition technology by law enforcement results in a breach of their duty of care that they owe the citizens they protect.

Working on both projects simultaneously gave me a significantly better understanding of the potential for repercussions from design decisions. My analysis of FRT gave me a better understanding of unintended societal repercussions of technology, and a more complete view of care ethics. The research I conducted influenced my team's design because we paid more attention to how the design decisions might have negative consequences for others, and it made us think much more about the care that we owed to the future users of the vehicle. My STS research resulted in my capstone project being of higher quality than it would have been otherwise.