

**Blue People – Silver Ion Point-of-Use Water Treatment Device**  
(Technical Report)

**Using Care Ethics to Examine the Samsung Galaxy Note 7 Explosion/Recall Case**  
(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 Computer Engineering

By

Joshua Yedam You

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## Sociotechnical Thesis: Water Treatment and the Virtue of Care by Samsung

My technical and STS thesis have a fairly loose relationship. My technical work explores the use of microcontrollers and electronics in controlling point-of-use water treatment devices. In addition, unlike other technical capstones, our end-product was developed in mind as a manufacturable commercial device. On the other hand, my STS research paper focuses on the ethical care relationship between the manufacturer and consumers in the Samsung Galaxy Note 7 explosion recall case. While the two papers do not have much in common, the STS paper demonstrates the importance of designing and testing a manufacturable electronic product such as my team's water treatment device. My technical work illustrates the difficulties and complexities of designing a device while understanding the ethical responsibilities that the engineers owe to their end-users. Thus, while the two papers are loosely related, the theme of ethical care and responsibility prevails between them.

My technical work was on developing a point-of-use water treatment device that is controlled by using a microcontroller and electronic components. The main purpose of the device was to help the South African water crisis by providing an affordable, user-friendly solution to water-borne illnesses and drinkable water. The device was designed to be placed in a bucket of water, which then the device would send an electric voltage signal to release a specific amount of silver ions to the water. The silver ions will then react with the water, killing harmful bacteria such as *Legionella*, the bacteria responsible for Legionnaires' disease. The amount of silver required to purify the water was experimentally measured by graduate students from the Civil Engineering department. Our team then measured the voltage required to release the measured amount of silver ions. While our team designed the software and electronic hardware from the ground up, the water-proof enclosure was outsourced as it was deemed to be out of the scope of

the project. The device was planned to be used by people in rural parts of South Africa, who in general are uneducated and impoverished; therefore, we designed it to be as simple to use and affordable as possible.

My STS thesis focuses on the ethical care relationship between Samsung and their consumers during the Samsung Galaxy Note 7 explosion recall case. On 2 September 2016, Samsung suspended sales and recalled their newly released flagship smartphone the Galaxy Note 7 due to multiple cases of them exploding. My paper explores the morality of Samsung's actions throughout the recall process, in particular I base my analysis on Tronto's framework of Attentiveness, Competence, Responsibility and Responsiveness to determine if Samsung fulfilled the virtues of care ethics. I argue that Samsung fulfilled their duty of care by quickly admitting their faults and providing their consumers with transparent support and compensation. By analyzing official statements from Samsung and academic papers on the incident, I aim to provide a reference for other corporations to use to plan their own recall processes with respect to care ethics.

While the two papers lack much correlation, writing the STS paper changed my values and goals for the technical work. In the beginning of the technical project, our aim was to just fulfill the requirements given to us by the Civil Engineering department. However, after conducting research for the STS thesis, I have gained better understanding of the moral responsibility as an engineer and the care relationship between the engineer and end-user. This understanding resulted in our team to conduct more research on the userbase in South Africa itself and include additional requirements to meet their needs. In conclusion, I believe that without writing the STS thesis, our capstone project would have lacked the social and moral dimensions required for a socially responsible technical product.