**Thesis Portfolio**

**Universal Automated Blinds**
(Technical Report)

**The Effects of Light Devices on Human Behavior**
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Mesgana Dinare
Spring, 2021

Department of Electrical and Computer Engineering

## Table of Contents

## Sociotechnical Synthesis

With the introduction of artificial light and smart technology the transformation of light has brought to attention the analysis of the possible effects that it can have on humans. Specifically human behavior, with new smart light devices emerging the effects that light could have on humans is not necessarily general knowledge. Too much light it is possibly get skin cancer. Too little light and it is possible to develop health problems from the lack of Vitamin D. These are the two extremes and do not discuss the positive effects of light nor the inverse effects that have appeared with the invention of artificial light. Artificial light has eclipsed the natural darkness of the night which will be later discussed to have severe impacts on society. The case study by the Department of Psychiatry at the McGill University located in Canada will discuss the possible effects that light therapy has on human behavior through quantitative and qualitative data.

The STS and technical papers are slightly related, they both relate to light devices and the introduction of smart tech to artificial lighting. The technical portion consist of an automated blinds system that is designed and constructed by myself and my capstone team. The objective of the automated blinds is to provide an easier way for homeowners to adjust their blinds and have set states depending on the time of the day or the amount of ambient light that is coming through the window. Users may also have to ability to enable a privacy setting which will close the blinds if there is movement detected outside. A societal concern may arise from this as these blinds may allow, people passing by, the ability to scope the user's home. Since this privacy state could be enable this risk is mitigated, but not completely gone as some issues may still arise. Another societal concern is the possible effects that the increased amount of light may have on the users. Further analysis will be done to express the possible concerns and the decision engineers have to make when designing these devices. Additionally, data is sent via Wi-Fi pertaining to any information about the blinds position or set states which is then is parsed and stored in a cloud database for future use. This raises ethical concerns on the design of these blinds and its transfer of data. The engineer tasked with this project, my team and I, are primarily responsible for the possible invasion of privacy. There are possibilities to collect data from users which could provide sensitive information (inferring when the users are home). Privacy laws indicate the correct steps for designers/engineers to take in these cases, where the information is not publicly listed nor does it have information relating to the users such as their names or address. The engineers have a duty to ensure the privacy of its users and to keep their health and safety in mind when designing new devices.