Thesis Project Portfolio

A SPACE-BASED SOLUTION TO IMPROVE ROADWAY SAFETY AND EFFICIENCY IN VIRGINIA: REAL-TIME WINTER WEATHER DATA FOR NAVIGATION

(Technical Report)

The Integration and Advantages of Technology with Biomimicry with the Assistance of a new Engineering Design Process

(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

Kyle Naoya Ebanks

Spring, 2021

Department of Mechanical Engineering

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Sociotechnical Synthesis

(Executive Summary)

Analyzing the Creative Process of a Creator's Mind

Whether you're an artist, an architect, a builder, a designer, or an engineer there exists a creative instinct to conjure the final version of one's creations in his/her mind. That is mostly known as the final outcome or goal. The imagined goal is only achieved when the creator gains a clear scope of the project and has possession of all needed materials, which can include from a wide variety of items. The range of items can be anything from different types of paints and brushes, to an abundance of high grade materials such as steel. The aim in this synthesis is to observe the creative mind and its process and allow a new form of creativity that includes a scope of practice that is not normally introduced in execution. The introduction of this new mindset is one that extrapolated elements from nature such as structure, design, and function to mimic them when creation is in progress. An easy way for creators to exercise this practice is to unfold the steps of the engineering design process which outline the creative process in achieving one's goals.

The understanding of the engineering design process is a practice that has been perfected and practiced by made but only allows for a narrow margin that results in creations that are in my opinion limited due to the lack of creativity. The elements of nature derived from different aspects of functionality and mechanism are crucial variables that can drastically change the outcomes of one's creations/ design. The change in creativity by adding the variables taken from nature not only changes the outcome but also improves the effectiveness of the desired creation. In my STS research, I not only mention multiple examples where technology has adapted itself by looking at nature for inspiration but also how it has proved to be a better way of

accomplishing its functional requirement. With the relation of nature and technology proven to be useful, the same principles are stitched into the engineering design process where as creators, we ask ourselves, “What can I call upon for my creation to work better than before”. The inclusion of natures designs is implemented when given a small project of our own. The task of building a small bridge given only a sheet of printer paper was an experiment where one can learn the importance of associating nature with common practices of engineering. Given the requirements of building this small bridge we test its efficiency by stacking quarters in the middle to test whether or not if this new process of attaining a goal truly works.

My STS and technical research projects merge to make a stance on the value of integrating the study of nature and technology as well as the benefits that come from it. The research that was executed in both areas outline the urgency that our problem solving skills have yet to breach the borders of innovation and prove that creativity is at a mediocre level within creators in this modern age. The improvements that come from taking simple designs, structures and mechanisms that can be studied from nature have been proven to better our technology is a method of creation that is not practiced in common settings. My study shows that those advantages exist when compared to conventional engineering. Unfolding the steps of the engineering design process, which detail the artistic process in achieving one's aims, is a simple way for designers to learn this practice.