

*End of Summer Report | FURSCA 2023*

My name is Nomin Bilegdemberel and I'm a rising junior at Albion College. My major is Dual Degree Program (Engineering), so for my summer research project, I focused on neuromorphic computing in small robotic cars. This project was heavily focused on robotics, building and creating a small robotic car, and in doing so, coding to process visual input in order to avoid objects in its surroundings.

Over the eight weeks of my research, I built a Hosityond Small Robotic car, piece by piece, and wrote a code for this small robot to avoid any objects near 20 cm and move accordingly. To do so, I have researched online to learn more about coding on Arduino Uno, a platform that enables this small robot to move as instructed. On top of that, following the instruction and guidance of Dr. Demian Cho, I have built a small camera for more precise movements. The challenging part of this task was to convert previous input to visual input and re-coding the car to process said visual input feed from a miniature camera.

Neuromorphic computing is a process in which a small chip can act as a brain neuron, processing, and firing information at an extremely elevated level. To be able to create a neuromorphic computing car, a small robot that can learn and better its movements on its own without any other person having to interfere, we needed to research more. Upon researching more about what neuromorphic computing is and how it is coded, I quickly realized that we needed to obtain very crucial data in order to proceed. Dr. Cho advised me to contact researchers from the Tennessee Lab, so I wrote an e-mail asking for help. Unfortunately, I was not able to receive any reply back.

Thanks to FURSCA, I was able to explore this amazing, booming physics field and able to experiment with robotics. I am extremely grateful for this opportunity, as I learned how I would progress in the real scientific world. I'm really excited to share my experience with my peers in the upcoming Elkin Isaac, and even more ecstatic to explore more about neuromorphic computing and; hopefully, write my honors thesis on this specific topic. This summer research really reignited my adoration for physics and science, so for that, I'm grateful.

Thank you so much to my advisors Dr. Cho and Dr. Khalifa, for patiently helping me through my endless questions and trials. My gratitude extends to Elizabeth Palmer and Renee Kreger as well for nurturing such an amazing FURSCA community. To Charles J. Strosacker thank you so much for offering help to many students to explore and nurture their curiosity!

Here's my [presentation](#) on my summer research!