Concrete Structure Monitoring Project

"During this project, my team and I created a sensor system to monitor the structural health of concrete structures. My primary role was in data processing, ensuring that the information we gathered from the strain gauges was accurately interpreted and meaningful. Additionally, I contributed to integrating the strain gauge sensors with our hardware, with a focus on maintaining stable readings.

Our complete system was made up of an ESP32-based microcontroller, a Wi-Fi/Cellular board, an ADC appropriate for measuring strain gauges, and a strain gauge sensing circuit. To configure our microcontroller to send information via a wireless connection we used NuvIoT and NuvIoT tailored firmware from Software Logistics. This software allowed us to deploy our system and establish a link, while only needing minor debugging to begin receiving usable data.

After finalizing the plans for our system deployment, with permission from Moffitt, we were able to install our system in their newly constructed parking garage. Our field tests in the Moffitt parking garage demonstrated the practical application of our system. As vehicles passed over our sensors, the system collected real-time data, which was then analyzed using a combination of tools. After I analyzed and filtered the data we collected, I was able to find trends in the data that correlated with the times of day that we expected to have the most activity."

- Alex Heisler

USF Electrical Engineering Student