UW Bothell STEM Students design Signal Processor for an Electrocardiogram (ECG)

A **Capstone Project** is a culminating senior project facilitated by the Electrical Engineering (EE) department and sponsored by a company in a related industry. The goal is for graduating seniors to demonstrate proficiency and skill in multiple EE areas.

The Challenge:
The goal of the Capstone project, sponsored by **Philips Healthcare**, was to take an analog signal from the apex and sternum of the patient , process the signals through a digital signal processor, and display them on a PC.

The Result: A front end header that handles the inputs from apex and sternum. From there the signal goes through the ADC and FPGA for the signal to be processed. Lastly the microprocessor formats the data into packets to send to the Philips HVue software which then displays the ECG and CMC signals.

> " *What I can take away from the capstone experience is that the learning process will never stop as an engineer... and to never underestimate the time a task could take.*
>
> *Student Team Member* "
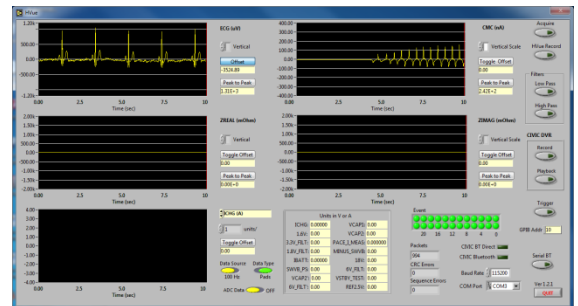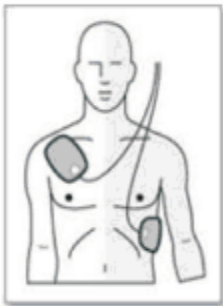
The ECG front-end is a bioelectrical data acquisition system that acquires the cardiac rhythm signals and displays them on a viewer for analysis. Pads are placed on the chest, in an apex-sternum configuration to acquire signals. These signals are passed through the front-end circuitry and signal processing chain, consisting of amplifiers, analog to digital converters and digital signal processing elements to display the ECG signals of interest.