Project background:

Electro-chemical biosensors for water quality monitoring

Development of robust sensor nodes and edge-compatible machine health monitoring algorithms

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General guidelines

• If you are interested in working with our group, please visit our group website (link on first page) and read about our work. You are also welcome to contact students in the group and the PI to know more about us.

• Our group has been in existence for less than 5 years. In a short time we have garnered several accolades and awards, details of which are on our website. Several students have won awards at international conferences and competitions.

• We set a high bar for ourselves. If you are not averse to hard-work and have excellent professionalism, you will thrive in our group.
Electro-chemical biosensors for water quality monitoring

This project involves development of low-cost potentiostat and PCB electrode assays for a variety of environmental and healthcare applications. We have recently demonstrated detection of SARS-CoV-2 nucleic acid in waste water samples, and SARS-CoV-2 spike protein in saliva samples using the platform that we have developed. Presently we are working on making a small form-factor system that is powered and configured directly by plugging into a smart phone. Future goals for this platform include developing application specific solutions for aquaculture and agriculture, pollutant monitoring in water samples, and pathogen ID to monitor food spoilage.

Work packages where RA can contribute: embedded system (smartphone-potentiostat), electrode assay development and characterization, packaging, product development

Link to our recently published paper: https://www.sciencedirect.com/science/article/pii/S0925400521007383
Development of robust sensor nodes and edge-compatible machine health monitoring algorithms

The health condition of machines can be measured from recording "vital signs" (vibration signature, power consumption, temperature etc.) in order to identify early indicators of abnormal operation to better inform predictive maintenance strategies. This project leverages ongoing work on development of vibration sensor based light-weight ML algorithms to estimate the state of health of machines (motors), that are deployed on low-cost embedded computing platforms.

Work packages where RA can contribute: embedded algorithm development (presently we use PYNQ Z2 FPGA and Raspberry Pi in 2 separate applications), wireless sensor node, sensor fusion (e.g. vibration and power consumption)