

## Faculty of Engineering

### Summer Research Program 2022-2023

Project Title: A Multi-Sensor Technology for Newborn Health Monitoring

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### Objective

This research aims to achieve objective, non-invasive and automated assessment of newborns, including, cardiac, respiratory, and digestive health, with a compact versatile device. This smart technology replaces the conventional stethoscopes to address the clinical needs in a non-invasive, reliable, and affordable way. This summer research will be focused on improving our current prototype, including its hardware, software and design aspects, to achieve a more compact design, more powerful signal processing and denoising, and more accurate physiological monitoring.

### Project Details

Digital stethoscope can be used beyond its conventional application, particularly if coupled with extra sensors and powerful software for signal processing and artificial intelligence. There exist great potentials for automated assessment of neonatal breath and heart sounds, bowel sounds, swallow and digestive function. An automated, non-invasive, compact, userfriendly device and software can help in the health assessment of preterm to full-term newborns and infants. This device that can separately assess the sounds emanating from lungs, heart and bowels, while cancelling the noise and interferences. We have also developed a similar device which can be used to assess swallowing and feeding. This project focuses on enhancements of our current novel prototype. More specifically, it will be focused on advanced signal processing to reduce the background noise and interferences, separate the signals of interest and extract the useful clinical features. It also involves hardware refinements, to reduce the physical size of our prototype.

### Prerequisites

Engineering students, preferably with competent with programming, designing electronic circuits and signal processing.

### Additional Information

Applicants may be required to attend an interview.