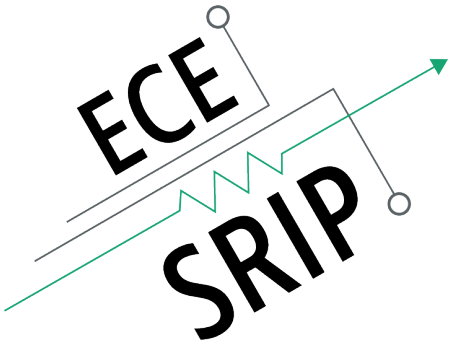


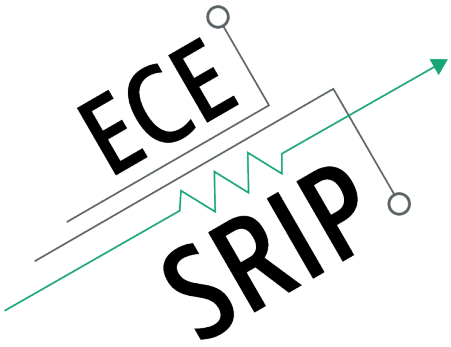
FACTULY MENTOR
Lo, Yuhwa

PROJECT TITLE
Detection of single photons

PROJECT DESCRIPTION
We will explore an innovative mechanism, cycling excitation process (CEP), for ultra high sensitivity light detection down to the quantum limit (i.e. single photon detection). The project will explore different materials, including semiconductors and disordered materials such as amorphous, polymer, and perovskite, etc. to detect light at different wavelengths (UV, visible, NIR, SWIR, MIR, etc.). It will also explore different device designs based on the CEP effect.

INTERNS NEEDED
2

PREREQUISITES
ECE230A.



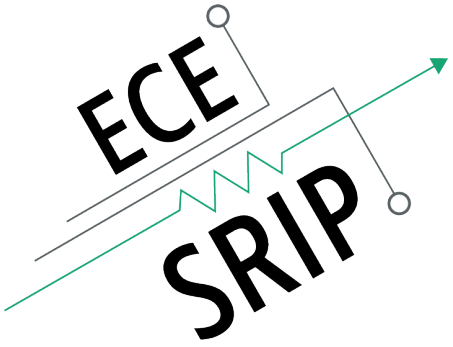
FACTULY MENTOR
Lo, Yuhwa

PROJECT TITLE
Wearable medical devices for detection of blood flow and cardio output

PROJECT DESCRIPTION
We will design a wearable optical device that can penetrate skins to detect arterial blood flow. The projects involves optics, signal process, noise cancellation schemes, and electronic circuits. From the optical scattering signals by flowing red blood cells, we detect the speed the blood flow, the concentration of red blood cells, their oxygen carrying capabilities, and finally, the cardio output, a measure of the blood supply to a specific organ or body part.

INTERNS NEEDED
1

PREREQUISITES
ECE240A, general knowledge in optics and signal processing.



FACTULY MENTOR
Lo, Yuhwa

PROJECT TITLE
3D imaging flow cytometer and cell sorter

PROJECT DESCRIPTION
Flow cytometer and cell sorter is the work horse for biomedical and clinical research. The device uses microfluidics and optics to detect single cells at very high throughput (> 1000 cells/s).On the the hand, microscopy is the most widely used tool in biomedical research because it provides high information contents although its throughput is limited. We develop innovative methods that integrate the attractive features of high throughput for flow cytometer and high spatial resolution for microscopy into the system of "imaging flow cytometer". The new system can be transformative for biomedicine.

INTERNS NEEDED
2

PREREQUISITES
Knowledge in optics and/or biophysics. Experience in microfabrication (e.g. microfluidics) is a plus.