FACULTY MENTOR
Ng, Tina Nga Tse

PROJECT TITLE
Organic Short-Wavelength Infrared Photodetectors
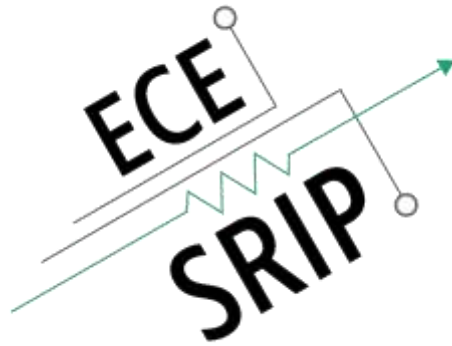
PROJECT DESCRIPTION
This project aims to develop short-wavelength infrared photosensors by using a new generation of narrow bandgap conjugated polymers. The polymer semiconductors are processed by solution processing techniques and allow printing deposition to bypass the limitations of die transfer and bonding in conventional devices. The proposed research will involve fabrication of photosensors and device characterization to identify the fundamental constraints in the exciton dissociation and charge collection processes as polymer bandgaps are reduced. The resulting knowledge will be applicable not only to infrared sensing applications but also to other areas including photovoltaics and optical communications, and will be essential to theoretical efforts to rapidly predict better photo-active polymers.

INTERNS NEEDED
1 BS or MS Student

PREREQUISITES
ECE103

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PROJECT TITLE
Recording Motor Disorder

PROJECT DESCRIPTION
The project description is to incorporate wearable sensors for objective assessment of motor disorder, or repetitive behaviors in children with autistic spectrum disorder. The student should have some prior experience with Arduino-type of programming electronics.

INTERNS NEEDED
1 BS or MS student

PREREQUISITES
Arduino programming
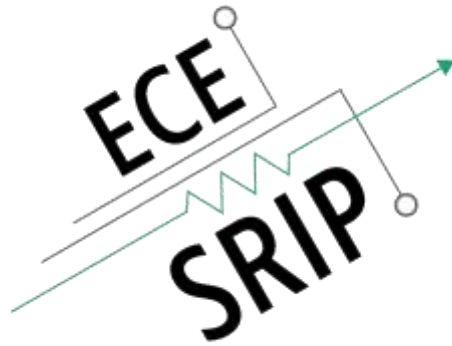
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PROJECT TITLE
Understanding Cycle Life of Conducting Polymers as Anodes for High-Energy Supercapacitors

PROJECT DESCRIPTION
The goal of this proposal is to connect the electrochemical and mechanical properties of n-type conducting polymers, in order to extend their redox stability for a new class of energy dense, high power supercapacitors. This project aims to understand the mechanisms that lead to capacitance fade and potentially solve major constraints on the operational lifetime and scalability of Faradaic energy storage materials.

INTERNS NEEDED
1 BS or MS student

PREREQUISITES
ECE103