

LESA Center URP Opportunity

Title: *Micro-spectrometer System Development*

Location: Low CII 7015

Duration: **Fall 2022 Semester**

LESA is seeking an undergraduate researcher to work with the LESA engineering team to continue the development of a micro-spectrometer based spectral optical monitoring system for integration with LESA's greenhouse lighting system.

Background

LESA participates in advanced research of horticultural lighting and control systems for applications in indoor growth chambers and greenhouses. Current research activities include enhancing the lighting control system with sensing capabilities that will ultimately enable feedback control.

Project Description

The goal of this URP project is to fully develop an optical sensor system based on a selected μ spectrometer to provide spectral data to the greenhouse lighting control system, in a weatherproof package, with orientation/location capabilities. The optical sensor system will record and monitor specific wavelengths that are available from the LESA spectrally tunable greenhouse lights. The sensor system includes:

- μ spectrometer for capturing photon flux measurement between 400 nm and 700 nm
- A controller that interfaces directly to the spectrometer (such as ESP32 or raspberry pi)
- Wireless connectivity to a control computer (part of an existing larger system controller)
- Output data formatted for display in a light control GUI (developed separately)
- Location and orientation capabilities connected to or as part of the microcontroller

Applicant Requirements

- Preferred junior or senior student majoring in ECSE/CSE, CSE, MECHE or CS
- Demonstrable experience with microcontrollers - i.e., Raspberry Pi, ESP32 (examples beyond coursework preferred)
- Experience with Python
- Familiarity with Bluetooth communication protocols
- Familiarity with IoT messaging protocols such as MQTT
- Good documentation and communication skills
- Reliable availability (minimum 6-8 hours/week; maximum 12 hours/week allowed) in-person
- Familiarity with CAD design

Interested students, send your resume & cover letter to LESA no later than **Monday, September 5, 2022**

Send to:

Michelle Simkulet simkum@rpi.edu