

## **BCHM 421/422 Project – 2023-24**

**Project Outline:** Student projects will involve addressing questions aimed at understanding calcium signal transduction in plants. Using the genetic model, Arabidopsis, our lab explores the biochemical properties and functions of the unique calcium-binding proteins that plants have evolved to coordinate cell responses to developmental cues and stresses such as drought, pathogen attack, and soil salinity. All 421/2 projects involve extensive lab training across a broad range of techniques. A background in protein biochemistry is sufficient and courses in plant biology are helpful but not necessary. Interested students should contact Dr. Snedden directly to learn more about different project options and details.

**Supervisor: W.A. Snedden**

**Project Title: Investigating calcium signal transduction in plants**

**Key Words:**

- 1. signal transduction**
- 2. protein biochemistry**
- 3. plant biotechnology**
- 4. molecular biology**
- 5. stress biology**

**Project Goals:** The overarching goal of the lab is to understand how plant cells use calcium signalling to process information about their environment. Hypotheses will vary depending on student interests but for all projects, students will explore the biochemical properties and cellular roles of calmodulin-related proteins that are unique to plants. These proteins function during plant responses to stresses such as drought, pathogen attack, salinity, and heat stress. Understanding how plants use calcium sensor proteins during stress response is of great interest to the agricultural biotechnology industry and lays the foundation for engineering enhanced stress tolerance in crops.

**Experimental Approaches:** protein biochemistry (recombinant protein expression and purification, protein-protein interaction assays, structure/function analyses), molecular biology (PCR, cloning), genetics (plant transformation, use of gene knock-out transgenic plants, etc), basic bioinformatics, and a range of other DNA- and protein-based techniques. This training is suitable to students interested in a lab-based research career.

**Contact:** Please feel free to reach out to **Dr Snedden**, [sneddenw@queensu.ca](mailto:sneddenw@queensu.ca), if you wish to discuss possible projects or would like further information.