



Research Projects in the SMART DiSTAP IRG

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1. Project Title: Nanosensor for Polyamine Sensing in Plants

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Project Description

Polyamines (PAs) are essential molecules that play a vital role in plant growth and stress tolerance. They can be applied to plants exogenously (from outside the plant) or induced endogenously (within the plant) through genetic engineering. Both exogenous and endogenous PAs can positively affect plant growth, productivity, and stress tolerance.

Real-time PA sensing in plants would help to elucidate the PA metabolic pathway and its crosstalk with the ROS signaling pathway. It also has the potential to revolutionize the way that we grow and manage crops. By enabling early detection of stress, precision agriculture, and the development of new stress-tolerant crops, real-time PA sensing could help to improve food security and sustainability.

Goals

At DiSTAP, we have preliminarily identified a potential near-infrared nanosensor candidate for polyamines. The student will help to perform further in vitro investigation, including screening and improving the nanosensor for selectivity, specificity, and sensitivity. The student will also be involved in testing the nanosensor's performance in plants using our custom-built stand-off camera system.

Prerequisites/Skills

The student should have the knowledge in chemistry and nanomaterial. His or her work will be involved in nanosensor fabrication and characterization (with UV-Vis-nIR spectroscopy, photoluminescence).

Types of Software Applications

Not identified

Relevant Papers and or URLs

Not identified