



Henry Mitchell Scholarship Report
Research visit to Professor David G.
Mendoza-Cózatl's Laboratory,
University of Missouri



University of Missouri

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Cape

Background and Objectives

Coming from a background in the biocontrol of fungal plant pathogens and the alleviation of heavy metal stress through fungal interactions, my expertise primarily lies in plant-microbe interactions, fungal pathogens, and, more recently, heavy metal stress and its mitigation in plants. This research visit provided a unique opportunity to expand my scientific knowledge and technical skills while gaining valuable hands-on experience in plant genetic manipulation.

The primary objective of my research visit was to construct tissue-specific gene expression constructs for *Arabidopsis thaliana*. Specifically, I aimed to isolate promoter regions from *Arabidopsis thaliana* that drive gene expression in specific tissues, preparing them for introduction into *Agrobacterium* to facilitate plant transformation. A key focus of this visit was acquiring experience in various cloning techniques and plant transformation methods, essential skills in plant biotechnology.

Technical and Scientific Learning

Engaging in plant transformation and cloning techniques allowed me to enhance my practical expertise in genetic manipulation. Applying theoretical knowledge in a laboratory setting deepened my understanding of tissue-specific gene expression and transformation methodologies. Furthermore, working in a collaborative lab environment improved my problem-solving skills and provided valuable insights into the intricacies of conducting research in this field. Exposure to daily lab operations and experimental design strengthened my confidence in executing scientific procedures effectively.

During my time in Professor Mendoza-Cózatl's lab, I gained exposure to research on metal transporters responsible for the long-distance movement of heavy metals such as cadmium, lead, arsenic, and mercury within plants. These transporters play a crucial role in understanding how plants accumulate and detoxify heavy metals, an essential area of study for environmental health and agricultural sustainability. This experience broadened my perspective on plant sciences, allowing me to explore new dimensions of plant stress biology.

Collaborations and Knowledge Exchange

Professor Mendoza-Cózatl is also a member of the Interdisciplinary Plant Group, which hosts weekly research discussions covering diverse topics in plant science. These discussions were invaluable in expanding my knowledge of how plants can be utilized for various applications, from studying stress response mechanisms to improving crop resilience and sustainability. Engaging with researchers from different backgrounds fostered stimulating scientific exchanges and provided new perspectives on my research interests.

Personal and Professional Growth

This visit also marked my first international travel experience, offering significant personal and professional growth. Scientifically, I broadened my research perspectives by engaging with cutting-edge plant biotechnology studies. Personally, immersing myself in a different culture and social environment enriched my understanding of global scientific collaborations. Beyond the laboratory, I had the opportunity to explore St. Louis and Columbia's downtown area, attend basketball games, and participate in social events. A particularly memorable experience was a pumpkin carving gathering hosted by Prof. David Mendoza-Cózatl and his wife, Dr. Norma Castro-Guerrero, which brought together lab members in a welcoming and interactive setting.

Acknowledgments

I would like to express my sincere gratitude to the Henry Mitchell Scholarship for funding this opportunity and to my principal investigator, Professor Marshall Keyster, for nominating me for this scholarship. I am also deeply grateful to Professor Mendoza-Cózatl for hosting me in his lab and to Dr. Mather Khan for his invaluable guidance. Additionally, I appreciate the support and hospitality of the entire lab team, who created a welcoming and collaborative environment throughout my visit. I would also like to thank the National Research Foundation for funding my PhD program.