WSU Plant Pathology Seminar
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Unmask Genomics Tricks and Treats, by Exploring Functional Genomics using Comparative Analysis and Machine Learning

Dr. Huiting Zhang
Postdoctoral Research Associate,
Department of Horticulture,
Washington State University

Abstract: Functional genomics seeks to understand how genes and intergenic regions of the genome contribute to phenotypic traits and biological processes. Rather than studying individual genes, functional genomics studies genes or regions on a "genome-wide" scale, with the goal to narrowing them down to a list of candidates for more focused investigation. My research focuses on unraveling the genetic basis underlaying complex plant traits through functional genomic approaches, particularly utilizing natural mutants. In my first project, I employed QTL mapping and identified key genes associated with differential freezing tolerance in Arabidopsis populations along Yangtze River in China. My second research investigated parasitic plants, a unique group of plant that "steals" water, nutrients, and even nucleic acid from host plants. Importantly, some parasitic plants are devastating pathogens to agriculture. We implemented a comparative transcriptomic approach and identified key genes contributing to the evolution of plant parasitism as well as the development of haustoria, with further functional validation conducted through molecular techniques. Currently, I am focused on predicting maturity in pome fruits, an essential factor influencing susceptibility to various postharvest diseases and disorders. This area presents challenges, as existing physiology-based maturity indices are often low resolution and impacted by environmental conditions. My goal is to develop a next-generation maturity index leveraging gene expression data via comparative analysis and machine learning techniques. In summary, my research journey integrates functional genomics to address critical challenges in plant biology, enhancing our understanding of genetic influences on plant traits.

Biography

Dr. Huiting Zhang received her BA in life sciences from the Peking University in China and began her scientific training on plant science. In 2013, she joined the lab of Dr. Claude dePamphilis at the Pennsylvania State University for her Ph.D. Her research mainly focused phylogenetic and functional studies on parasitism genes, especially the evolution of cell wall genes in parasitic plants. In 2020, she joined Dr. Ficklin's research group at Washington State University as a Postdoc Research Associate, working on a collaborative project with Dr. Loren Honaas from USDA ARS Tree Fruit Research lab that aims to use functional genomics and artificial intelligence to learn about the genetic control of maturity in pome fruits. She is a bold, productive molecular biologist and bioinformatician, and willing to share her scientific experience with people at all levels.