NSF NANOSCALE SCIENCE AND ENGINEERING GRANTEES CONFERENCE: NANOBIOLOGY
DECEMBER 7-8, 2023

THE PLANT CELL WALL; A CARBON SINK

Samuel P. Hazen

Professor of Plant Biology
University of Massachusetts Amherst

Abstract: A key aspect of plant growth is the synthesis and deposition of cell walls. Plant cells are surrounded by a primary wall consisting mainly of polysaccharides and proteins. In specific cell types including xylem and fiber, a thick secondary wall comprised of cellulose, hemicelluloses, and lignins is deposited. This layer accounts for the bulk of all plant biomass. Secondary cell walls provide a physical barrier that protects plants from pathogens and fortifies cells to withstand the forces associated with water transport and the physical weight of plant structures. The main goal of our research is to better understand the regulatory mechanisms that control the thickening of cell walls. I will review the nature and interactions of the wall matrix molecules, how they are assembled, and the regulation of those processes. The role of cell walls in the production of food, fiber, fuel, and carbon sequestration will also be discussed.

Bio: Dr. Sam Hazen's research focuses on the examination of regulatory networks that govern plant growth; specifically, protein-DNA interactions and the environmental factors that influence cell wall thickening. Dr. Hazen is currently a Professor of Biology and the Director of the Interdepartmental Graduate Programs at the University of Massachusetts Amherst. He worked as a cereal breeder while he earned his B.S. in Plant Sciences from the University of Arizona and his M.S. and Ph.D. in Plant Breeding and Genetics from Michigan State University. As a postdoc he studied cell wall biosynthesis at the Department of Energy, crop genomics at Syngenta's Torrey Mesa Research Institute, and the circadian clock at The Scripps Research Institute where he was a National Institutes of Health Ruth L. Kirschstein Postdoctoral Fellow. Dr. Hazen has received many awards including the Constantine J. Gilgut Professorship of Plant Biology, Bob B. Buchanan Plant and Microbial Biology Endowed Lecturer, University of Massachusetts Exceptional Merit Award, and a Department of Energy Early Career Research Award. Dr. Hazen co-founded Genoverde Biosciences in 2015 and served as Chief Science Officer.