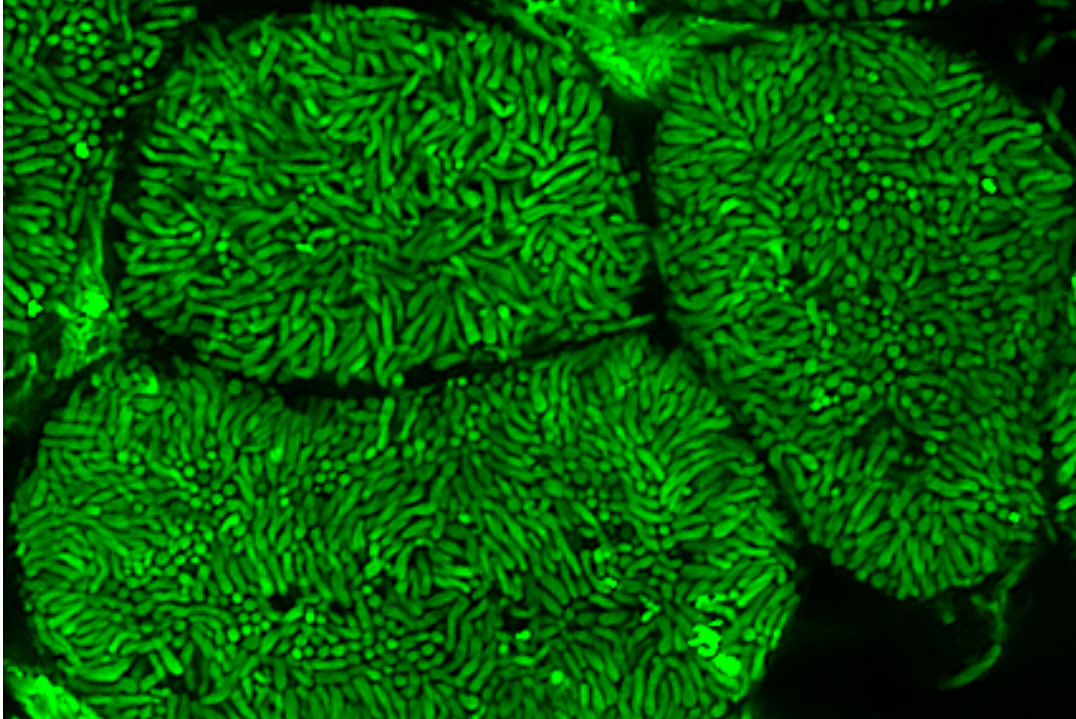


Plant and Microbial Innovation

CURRENT RESEARCH AND EXPERTISE



Developing Technologies to Improve Plants and Microbes to Meet Society's Needs

Plant and Microbial Innovation investigators address key problems in food security and nutrition, medicine and bio-based products, renewable energy, and climate change. We explore complex interactions at the molecular, cellular, and organismal level in order to design systems for translational application.

Beneficial Plant-Microbe Interactions

Screening bacterial culture collections for improved plant growth and nutrient use efficiency

Directed evolution of soil communities for better plant stress resistance.

Cross-Kingdom Fungal Pathogenesis

We aim to identify mechanisms of fungal pathogenesis and develop therapeutic treatments for infections by organisms such as *Cryptococcus* and *Fusarium*, which infect humans and infect or decay plants.

Food Crop Biotechnology

Improving nutrition by controlling plant iron uptake and distribution.

Developing improved oxidative stress tolerance and nitrogen use efficiency in agricultural crops.

Identifying critical developmental regulators of crop architecture.

Theme Leader

Samuel Hazen

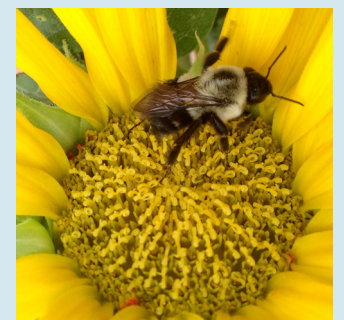
Biology Department

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The UMass Amherst **BioFoundry**: the largest living plant cell culture collection including more than 2,000 plant species from around the world.
pccl.library.umass.edu



Discovery of Plant Products to Improve Pollinator Health: Adler, Normanly, and Savinov are working to identify plant compounds that reduce pathogen load in important pollinators.

This group combines expertise in functional genomics, systems and computational biology, with cellular imaging, biochemistry, microbial and plant physiology, and genetics to enhance functional properties and create value.

Non-Food Crop Biotechnology

Plant metabolic engineering for sustainable biofuel and bioproduct manufacturing.

Manipulating gene regulatory networks to increase plant biomass yield.

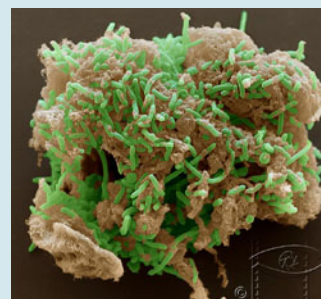
The UMass Amherst BioFoundry: Discovery and Synthesis of Bioactive Molecules

The Plant Cell Culture Library at UMass Amherst is available for natural product and genomic research by both academia and industry.

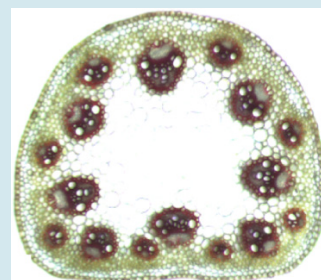
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Investigators

Lynn Adler	Madelaine Bartlett
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Sibongile Mafu	Sergei Savinov
Jennifer Normanly	Ludmila Tyler
Elizabeth Vierling	Elsbeth Walker
Dong Wang	



Development of Microbes Nanowires: The Lovley Lab discovered *Geobacter* conductive pili that connect to their food source. This function can consume oil and radioactive pollutants and form useful and non-toxic nanowires.



Engineering Plant Growth: The DaCosta, Hazen, and Parkash Labs have developed approaches to engineer growth to increase oil and lignocellulosic biomass.



Reproductive Structure Design to Accelerate Breeding: The Bartlett Lab has resolved genetic determinants of flower architecture that can be manipulated to advance crop improvement.

Facilitated by:



Institute for
Applied Life Sciences



Research and Innovation to Improve Human Health

Plant and Microbial Innovation is on the forefront of exciting collaborative, translational, and product-driven science with a mission to improve human health and well-being. Within the new Life Science Laboratories at UMass Amherst, made possible by a \$95-million investment by the Massachusetts Life Sciences Center, IALS houses a vibrant community of interdisciplinary faculty, as well as, state-of-the-art laboratory space and IALS Core Facilities.

The use of **Genomics Resource**, **Mass Spectrometry**, **Biophysical Characterization**, and **Light Microscopy** have been instrumental in the ongoing research efforts of this theme. For more information on the IALS Core Facilities, please visit: umass.edu/ials/core-facilities.