Plant Pathology Seminar Series

"Computer Vision Solutions for Agriculture's Grand Challenges"

Todd M. DeZwaan, LemnaTec Corporation

Phenotyping is central to the human experience of the natural world. Phenotyping drove the domestication hallmarks of the Neolithic revolution, and underlies the yield gains of modern agriculture. Computer vision phenotyping tools are now in use by plant scientists and agronomists to deliver detailed information on plant development, gene function, and the effects of external factors. Continued development and refinement of these tools is needed to address the grand challenges of agriculture over the next 50-years including global food security and nutrition, climate change, and reduced environmental degradation. Crop yield, plant health, stress resilience, and resource use are some of the primary complex traits targeted for agricultural improvement. However the next generation of products must deliver these traits responsibly while preserving resources and avoiding unwanted secondary effects. Noninvasive sensor-based measurements and analytics are needed that deliver comprehensive sets of phenotypic traits and properties, as well as their spatial distribution and temporal changes.

LemnaTec is addressing this need by developing computer vision hardware and software for high-resolution plant phenotyping in the laboratory, controlled-environment, and field. LemnaTec integrates industrial sensors and illumination with powerful analytical software and robotic automation to deliver high-quality digital phenotypic data for agricultural research and product development. LemnaTec multi-sensor systems measure parameters in 2D images and 3D laser scans across the wavelength spectrum including the visible range, near-infrared, hyperspectral, and PAM fluorescence. The LemnaTec advanced analytics platform delivers customized machine learning solutions for proprietary screens, discovery of knowledge from large datasets, improved quality calling, and replacing monotonous manual imaging tasks. The results enable scientists to derive a comprehensive digital phenotype that describes plant growth, development, color, geometry, stress response, disease status, and much more.

4:10 pm | April 22 | Johnson Hall 343

Plant Pathology 515, Spring, 2019

College of Agricultural, Human, & Natural Resource Sciences

Washington State University