Cornell Digital Agriculture Initiative - Seminar Series

“The Efficient Vineyard Project: Spatial Data Driven Vineyard Crop Load Management”

Terry Bates, Senior Research Associate, School of Integrative Plant Science, Horticulture Section
Director, Cornell Lake Erie Research and Extension Laboratory

Monday April 16, 2018 - Room 114, Gates Hall, Ithaca, NY
11:30am to Noon - Networking Refreshments/Lunch Will Be Served
Noon to 12:45pm - Presentation
12:45 to 1:00pm - Q&A

Abstract: Cornell is currently leading a USDA-NIFA Specialty Crop Research Initiative project focused on bringing precision agriculture technology to the juice, wine, and table grape industries in the United States. Grapes are one of the largest specialty crops in the U.S. with a farm gate value of over $6 billion and an annual production of over 7 million tons on one million acres. Commercial vineyard blocks, in general, are managed uniformly because producers lack the tools and technology to measure and respond to variation in environmental resources, vine growth, and crop production. With increasing pressure on land, water, and labor resources, it is imperative for the U.S. viticulture industry to develop and adopt new management strategies to improve overall production efficiency. The “Efficient Vineyard” project brings together a multi-disciplinary team of engineers, precision agriculture specialists, viticulturists, economists, and extension specialists to measure vineyard soil, canopy, and crop characteristics, model spatial vineyard crop load, and manage vine production and fruit quality through mechanized variable-rate technologies. The specific objectives of our project are to:
- **Collect Spatial Data**: Use existing sensor technologies, identify technology gaps, and develop novel sensor systems to collect spatial soil, canopy, and crop data in wine, juice, and table grapes.

- **Transform to Information**: Transform soil, canopy, and crop sensor data into usable viticulture information by relating high density sensor measurements with stratified manual samples.

- **Understand Relationships**: Use semi-automated spatial data processing techniques and data fusion to construct vineyard maps showing relevant vineyard management zones.

- **Apply Variable Management**: Develop a variable-rate crop load management system on a commercial scale that integrates sensing technologies within a feedback mechanism.

- **Scientific Evaluation**: Evaluate the effect of precision crop load management on vineyard yield, fruit quality, and production economics.

- **Facilitate Implementation**: In consultation with the grape industry, develop end-user tools for semi-automated spatial data processing and educate practitioners on how to achieve spatial crop load management.

**Bio**: Terry Bates is a senior research associate with Cornell University’s School of Integrative Plant Sciences and the Director of the Cornell Lake Erie Research and Extension Laboratory in Portland, NY. He earned a B.S. in Biology (1992) from St. John Fisher College, a M.S in Horticulture (1994) and a Ph.D. in Plant Physiology (1997) from the Pennsylvania State University. Terry has been conducting production viticulture research at Cornell University for the past 20 years with a focus on supporting 30,000 acres of ‘Concord’ grape production in the Lake Erie American Viticultural Area. Focusing on industry solutions which integrate viticulture and technology, he was awarded the inaugural Extension Distinction Award from the American Society for Enology and Viticulture in 2014. Currently, Terry is the national project leader on a USDA Specialty Crop Research Initiative funded project: Precision Vineyard Management: Collecting and Interpreting Spatial Data for Variable Vineyard Management.

**Background on the Cornell Institute for Digital Agriculture**: An interdisciplinary group of Cornell University faculty began meeting in early 2017 to formulate an Institute for Digital Agriculture, believing that Cornell is uniquely equipped to lead in this emerging arena that will benefit the public
for generations. We define DA to mean the application of computational and information technologies coupled with nanotechnology, biology, systems engineering and economics to both the research and operational sides of agriculture and food production. With approximately 100 faculty from 5 Cornell colleges participating, we are collaborating with external stakeholders to shape and implement a research agenda for DA that will build a pipeline of discovery and innovations for the next 10+ years. For further information, please contact Dr. Jim Ballingall, Executive Director at jmb436@cornell.edu.