# Transforming Specialty Crop Production with AI and Robotics

**Abstract**
Artificial intelligence (AI) and robotics are transforming specialty crop production by enhancing efficiency, precision, and sustainability. This talk will highlight state-of-the-art technologies, including Agroview and Agrosense, that enable data-driven decision-making in agriculture. Agroview leverages aerial RGB and multispectral imaging combined with AI to assess plant health, canopy size, nutrient deficiencies, and spatial variability, facilitating precise interventions such as nutrient prescription mapping. Complementing this, Agrosense integrates ground-based sensing for tree crop counting, canopy density classification, and fruit yield estimation, providing a comprehensive view of orchard conditions. The presentation will also explore AI-driven robotic innovations, including an intelligent weed management sprayer, an automated trunk injection system for HLB-affected citrus, and a smart crop sprayer. Additionally, AI-powered early disease detection systems will be discussed, demonstrating their ability to minimize input costs through real-time detection and targeted application. Attendees will gain insights into how these advanced technologies optimize resource use, enhance productivity, and address key challenges in specialty crop management.

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RESEARCH AREAS AND EXPERTISE
- General area: Agricultural Automation
- Specific area: AI in Agriculture

SELECTED AWARDS AND RECOGNITION
- **2024-2027** UF Research Foundation (UFRF) Professorship Award
- **2024** Leadership Enhancement and Administrative Development (LEAD) UF/IFAS, Cohort 16
- **2023** UF Standing Innovation Award for the AI-enabled Smart Tree Sprayer
- **2021** ASABE AE50 Award for Agroview, recognized as a top innovative new product of 2020
- **2020** UF Invention of the Year Award for Agroview
- **2020** Florida Venture Forum Aerospace & Technology Competition—1st Runner-Up for Agroview

Dr. Yiannis Ampatzidis is an Associate Professor in the Agricultural and Biological Engineering Department at the University of Florida (UF) and leads the Precision Agriculture Engineering program at the Southwest Florida Research and Education Center (SWFREC). His research focuses on smart and digital agriculture, artificial intelligence (AI), UAVs, machine vision for plant stress and disease detection, mechatronics, automation, robotics, precision agriculture, and machine systems. He is particularly interested in developing, implementing, and evaluating advanced agricultural machines and control systems for high-value crops.
Dr. Ampatzidis has published over 100 peer-reviewed journal articles and more than 220 papers and abstracts in national and international conference proceedings. He serves as an Associate and Special Content Editor for Computers and Electronics in Agriculture and as an Associate and Guest Editor for several other leading scientific journals. In recognition of his contributions, Dr. Ampatzidis was selected to participate in the 2019 CIGR Next Leaders Event.