Plant Agriculture Winter Seminar Series

Wednesday, April 1st

3:35 – 4:35 pm

Thornbrough 1307

Potential Uses of Remote Sensing for Agronomic and Germplasm Assessment

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Remote sensing offers a tool to assess plant canopies with a spatial and temporal resolution capable of detecting plant response to the environmental conditions. The development of remote sensing platforms in the 1970's has opened new doors evaluating crop canopies. Since those early stages with only a few wavebands of information we have expanded to hyperspectral data with hundreds of wavebands. However, the basic premise has remained the same and that is the utilization of combinations of wavebands into different vegetative indices. These vegetative indices have been related to some canopy parameter and represent a method of being able to assess that parameter without the physical disruption of the canopy. This allows for repeated measurements across the same area throughout the growing season, which offers a value in being able to quantify the changes in crop growth and development. These vegetative indices range from simple ratios to complex formulas and detect canopy biomass, canopy chlorophyll, light interception, water stress, canopy senescence, leaf area, and net or primary productivity. The development of scanning technology with enhanced spatial and temporal resolution allows for the assessment of these changes across fields to quantify the effect of management practices on crop growth and development and the assessment of differences among germplasm entries for the purpose of screening germplasm in response to different stresses. The potential of using remote sensing to quantify the phenotypic variation among germplasm and to quantify the degree and type of stress being encountered will open new avenues for agricultural research.

Brief Bio: Dr. Jerry L. Hatfield is the Laboratory Director of the USDA-ARS National Laboratory for Agriculture and the Environment in Ames, Iowa. His research focuses on quantifying the interactions among the components of the soil-plant-atmosphere system to quantify resilience of cropping systems to climate change. He is a Fellow of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America and Past-President of the American Society of Agronomy and a 2014 inductee into the ARS Science Hall of Fame along with numerous professional awards. He is the author of over 412 refereed publications and 16 books.