Title: Advancing crop monitoring and modeling from field to regional scales to assess agroecosystem productivity, sustainability, and climate adaptations

Abstract: In this talk, I will provide an overview of the research work at my group related to advance the science and technology of crop monitoring and modeling from field to regional scales, with a central focus on the US Corn Belt, where about 1/3 of the global corn and soybean are produced. I will illustrate how we use different remote sensing technology, from field, airborne to satellite for the comprehensive monitoring of farmland management, productivity, and sustainability. I will further describe our crop modeling efforts to assess the farmland sustainability and climate change adaptation. My group aims to bring the domain knowledge, satellite data, supercomputing, and machine learning together to revolutionize the agricultural research, such that we can observe every crop field in real-time, monitor crop growth condition, water demands, and nutrient needs, forecast crop yield and risks, and provide farmers our solutions to best manage their fields, across the U.S. Corn Belt and Worldwide.

Bio:

Dr. Kaiyu Guan is a Blue Waters Assistant Professor in ecohydrology and remote sensing in the Department of Natural Resources and Environmental Sciences (NRES), College of Agricultural, Consumer and Environmental Sciences (ACES) at the University of Illinois at Urbana-Champaign, and at the National Center for Supercomputing Applications (NCSA). His group uses satellite data, computational models, field work, and machine learning approaches to address how climate and human practices affect crop productivity, water resource availability, and ecosystem functioning. His group has keen interests in applying their knowledge and skills in solving real-life problems, such as large-scale crop monitoring and forecasting, water management and sustainability, and global food security. His group closely works with scientists in computer science (deep learning, high performance computing), plant physiologists, agronomists, and economists in addressing the above real-world challenges. Guan has published 80+ papers in leading scientific journals, including Science, Nature, Global Change Biology, etc. Guan is the awardee of NSF CAREER Award, NASA New Investigator Award, AGU Early Career Award in Global Environmental Change, and SoAR Foundation's 2019 annual selection of the 20 U.S. national agricultural research highlights.