Transforming Agriculture and Food Systems

Cornell Digital Ag Workshop - Tuesday Oct 9 @ 9am-5pm
Cornell University - Ithaca, NY

Background: An interdisciplinary group of Cornell faculty from multiple colleges (College of Agriculture and Life Sciences, the College of Engineering, Computing and Information Science, the College of Veterinary Medicine, and the S.C. Johnson College of Business) began meeting in early 2017 to formulate a digital agriculture (DA) initiative that encompasses research, education and extension. 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.

Purpose: The purpose of this Workshop is to build relationships and seek input from external stakeholders to inform the research, extension and policy that can shape agriculture and food systems for the next 30+ years.

Attendees: We welcome stakeholders in all facets of food production and distribution – from industry, government and non-profits.

Format: We plan a full morning of talks to inform, spark ideas and discussion. In the afternoon, we will (1) introduce working groups led by teams of interdisciplinary faculty, (2) invite input from attendees in breakout sessions, and (3) summarize the breakout sessions’ findings at the end of the afternoon.

There will be ample time for networking and a reception at the end of the day.

These are the current working groups and their leaders:

Rapid Phenotyping: Mike Gore, College of Agriculture and Life Sciences, Associate Professor of Molecular Breeding and Genetics for Nutritional Quality, Liberty Hyde Bailey Professor, International Professor of Plant Breeding and Genetics

This group explores the limits of DA (new sensors, models and computational techniques) to reliably bridge the genome-phenome gap on a wide variety of dimensions (environment, management and microbe).

Institutional Analysis and Development of Innovation Systems for Digital Agriculture: Steven Wolf, College of Agriculture and Life Sciences, Associate Professor, Department of Natural Resources
We address the social and economic coordination challenges that structure the potential of digital technologies. This work addresses strategic behavior attached to hoarding and pooling of data, and we analyze a variety of models for structuring data access, privacy, and oversight. We are interested in interactions between farmers and off-farm service providers in the application and continuing development of digital tools for agricultural production and environmental protection. Based on engagement with relevant histories, we aim to advance analysis and dialogue around questions of whose vision and problem definitions inform technological designs, how benefits are distributed, and which people and places are disrupted by digital technologies in agriculture.

Weather, Climate and Agriculture: Abe Stroock, College of Engineering, Gordon L. Dibble Professor of Chemical and Biomolecular Engineering, William C. Hooey Director of the School of Chemical and Biomolecular Engineering

In the lab and in the field, this group seeks to discover new paradigms for sustainable agricultural management enabled by the integration of newly available and anticipated data streams (via novel in situ and remote sensors and methodologies) with emerging multi-scale hybrid models of crop and climate.

The Software-defined Farm™: Hakim Weatherspoon, Computing and Information Science, Associate Professor of Computer Science

The SDF is being designed to work for large and small-scale farms; for farms with significant, limited, or even absent internet connectivity; and for farms with varying types of digitally controlled infrastructure, such as sensors, autonomous vehicles, or robots. SDF enables data-driven machine learning, artificial intelligence (AI), and a hybridization of cloud, edge and local compute resources.

Systems Engineering and the Food, Energy, Water Nexus: Fengqi You, College of Engineering, Roxanne E. and Michael J. Zak Professor, Smith School of Chemical and Biomolecular Engineering

This work connects the animal science arena (dairy manure & poultry litter) with crop science (organic fertilizer production through nutrient recycling to "close the loop"), as well as energy/environment/climate issues (watershed protection, food waste processing, energy system development) and social sciences aspects (resource/environmental economics, policy, etc.).

Call for presentations: We are inviting two-minute lightning presentations on DA, and especially encourage presentations that bear on the working group topics. Please respond to José Martínez, Professor of Electrical and Computer Engineering (martinez@cornell.edu) with a brief abstract. Please be aware that the number of slots is limited.

Registration: Please register at https://goo.gl/3Qx5X1. Upon registering, you will receive additional information to prepare you for the workshop.

Next steps - beyond the Workshop: We invite attendees to participate in ongoing working group meetings, as well as other opportunities for collaboration. Our collective efforts are expected to drive white papers, proposals, and projects that lead to new discoveries, methods and technologies; plus we intend to educate a new generation of leaders with deep interdisciplinary skills that will guide the transformation of agriculture and food systems.