Advance Plant Breeding through Optimized Planning and Management: Challenges and Opportunities for Industrial Engineers

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Abstract
The plant breeding industry is constantly facing the decision-making challenges, ranging from cultivar design, mating strategy, to field deployment, in order to achieve improvements in phenotypes. The plant phenotype is known to depend on genotype of the seed (G), growing environment (E), management practice (M), and their complex interactions. In this talk, Dr. Hu will cover some of her ongoing research projects related to decision making and optimization in plant breeding, including system modeling for genomic selection, optimization for training set selection, GxE%M analysis, and decision tools for precision agriculture. In addition, challenges and opportunities for industrial engineers in this area will be discussed, as motivated by the gap between decision making theory and the plant breeding applications.

About the Speaker
Dr. Guiping Hu is an Associate Professor in the department of Industrial and Manufacturing Systems Engineering at Iowa State University. She is also affiliated with Graduate program of sustainable agriculture (GPSA), Bioeconomy Institute (BEI), and the graduate program of bioinformatics and computational biology (BCB). Her research interests include mathematical modeling, optimization, and data analytics with applications in digital manufacturing, plant sciences, renewable energy, and sustainable agriculture. Dr. Hu has recently been awarded as one of the Plant Sciences Institute (PSI) Scholars.