Genotype and environmental interactions and stresses

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Agricultural systems face numerous challenges. Expanding world populations that are adopting meat-rich diets and the widespread conversion of grain into biofuels are enhancing the demand for agricultural production. At the same time, the increased weather variability associated with global climate change threatens to reduce food security. It is therefore essential that we understand how crop plants respond to environmental stresses and how genotypes and environmental factors interact to influence crop growth. Fortunately new high-throughput methods for assaying plant phenotypes and new computational approaches for analyzing phenotypic data are becoming available. Our first panelist, Jianming Yu (Iowa State University) will discuss computational approaches that offer the potential to improve our ability to predict crop traits from genotyping data by accounting for genotype x environment interactions. Our second panelist, Fabio Fiorani (Institute of Bio- and Geosciences) will discuss novel non-invasion methods for assaying phenotypes with a special emphasis on developing adaptive traits for agricultural systems that have limited nutrient and/or water availability. Our third panelist, Mitchell Tuinstra (Purdue University) will share lessons learned about stacking resistances to multiple abiotic stresses (e.g., heat and drought) from inter-specific comparisons.