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Shifting the field R&D paradigm to technology driven phenotyping

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Recent decades have witnessed a great advance in plant breeding thanks to high throughput genotyping technologies. This advance is now bottlenecked by our limited ability to describe high quality phenotypes at scale, and to quantify genotype interactions with an environment that is highly spatially and temporally variable. Historically, phenotyping has been the domain of experts walking plots with pad and pen, or more recently, experts walking plots with mobile computers. Environmental metrics have been of a coarse spatial resolution that is challenging to relate to small breeding plots. And sensing technologies to quantify temporally changing phenotypes and environmental factors have met with significant cost and technological barriers to scale - both for the sensors themselves as well as data acquisition & retrieval. That is all changing, however, and quickly. We can now entertain the imminent prospect of completely reinventing how we manage field testing, phenotyping, and characterization of agricultural products – with technology at the front lines. This revolution at Monsanto is only made possible by a collaboration of technologists, engineers, breeders, scientists, and agronomists to deliver scalable, scientifically validated, highly usable solutions that truly enhance field R&D. This talk will describe some of the key principles of this revolution, its enabling technologies, and the culture shifts that we are creating to bring about the future of high throughput, high resolution phenotyping and field characterization.