

# CPS: Medium: Collaborative Research: Field-scale, single plant-resolution agricultural management using coupled molecular and macro sensing and multi-scale data fusion and modeling

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- To create a new platform that can perceive and respond to varying conditions and crop responses across agricultural fields, and can decide agricultural responses to optimize trade-offs between overall yield, water use efficiency, and nitrogen use efficiency.
- Develop new point sensors that can detect leaf water loss, leaf temperature, soil nitrate level, and plant nitrate level. Fuse UAV-based multiple-time and -space scale data of the geographically mapped spectral images and the point sensor outputs to infer the nitrogen and water dynamics. Extract actionable information for decision-making on fertilization and irrigation scheduling.

## Impact:

- A data-driven decision support platform to provide actionable information on optimal agricultural management.
- Decrease the environmental impact (from N runoff) and reduce water use
- Increase farmer profitability.
- Train the next generation of scientists through existing STEM programs.

