OBSERVING ECOSYSTEM METABOLISM & BREATHING

Identifying patterns and association among hyperspectral data and meteorological and biological measurements for investigating near-surface atmosphere-biosphere interactions

OVERVIEW

Improving projections of future climate requires better representation of local-scale biosphere-atmosphere interactions in global-scale Earth System Models (ESMs).

We developed a novel methodology using optical-infrared hyperspectral remote sensing to observe and visualize land surface functions and processes that take place at the local scale.

We examined plant/soil responses to environmental factors occurring at high temporal frequency and translated them into diurnal, seasonal, and annual time-scale information that can inform ESMs.

Our results demonstrate the effectiveness of hyperspectral remote sensing to study ecosystem functions and land surface biosphere-atmosphere interactions at multiple time scales.

The EcoSpec system collects hyperspectral reflectance from the land surface. EcoSpec data help visualize, for the first time, high-frequency ecosystem dynamics that are invisible to the naked eye.
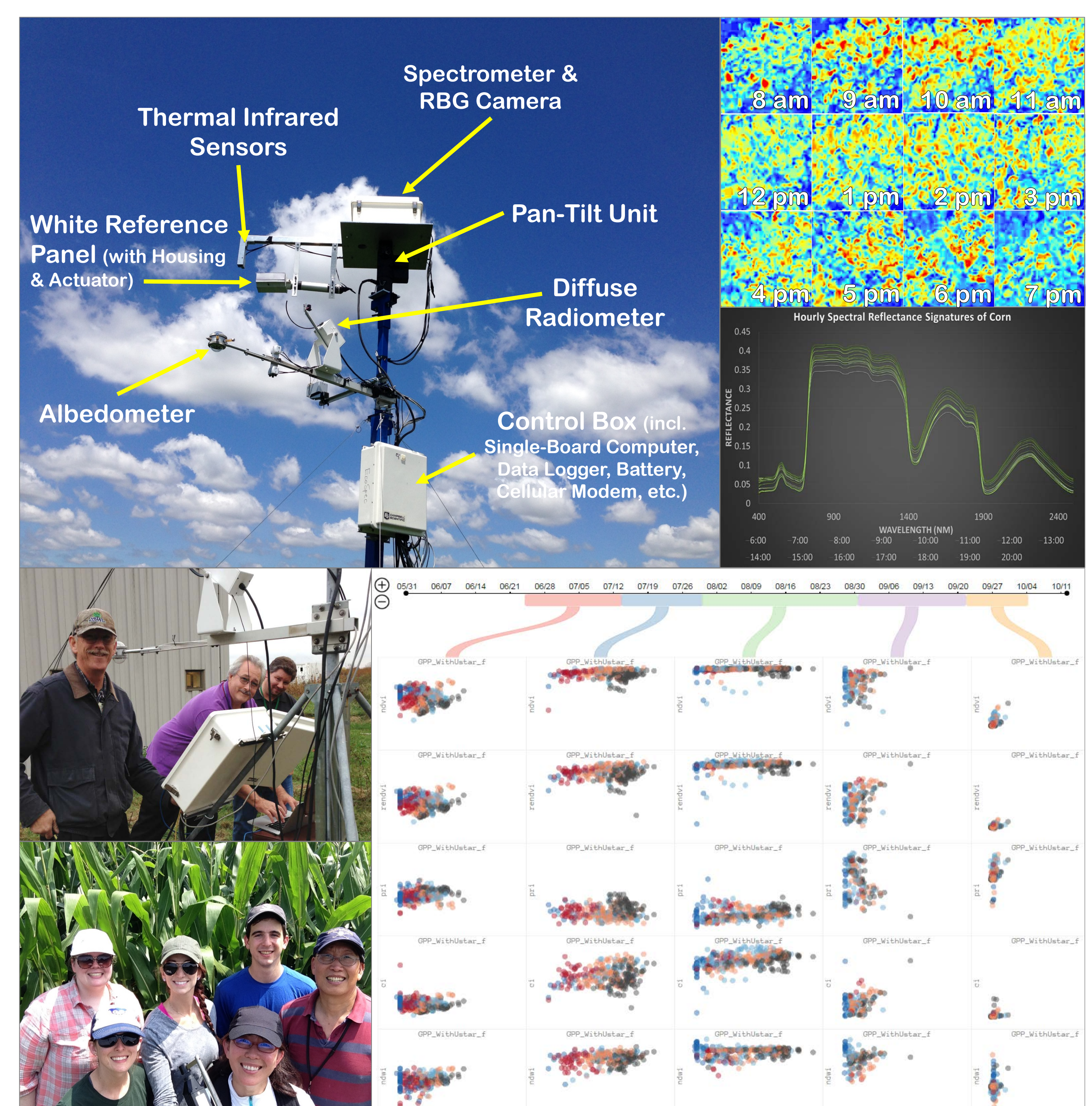
BENEFITS

Key impacts:
- Develop methodology to observe and analyze land surface phenomena tied to ecosystem functions.
- Advance ecosystem modeling to better represent the biosphere component in ESMs.
- Improve projections of the Earth's future climate by facilitating research on local-global climate interactions.

Key industry beneficiaries:
- Agricultural, insurance, and energy industries.

INVESTIGATORS

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FUTURE

Formulating predictive models for ecosystem functions using hyper-dimensional time-series data can improve the accuracy of climate forecasts.

CONTACT

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