



# Retrieval of crop parameters using UAV-based imaging spectroscopy

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imaging spectroscopy a

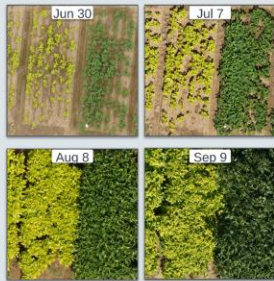
Erekle Chakhvashvili

## Data collection



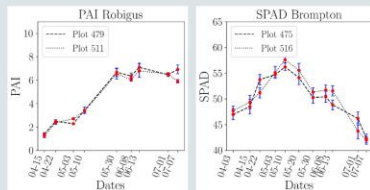
### UAV setup

- ▶ 10-channel multispectral camera mounted on UAV
- ▶ Image data acquired at 1.5 cm resolution
- ▶ Target field: PhenoRob central experiment



### Time-series image data

- ▶ Acquired over vegetation period 2020, 2021, 2022



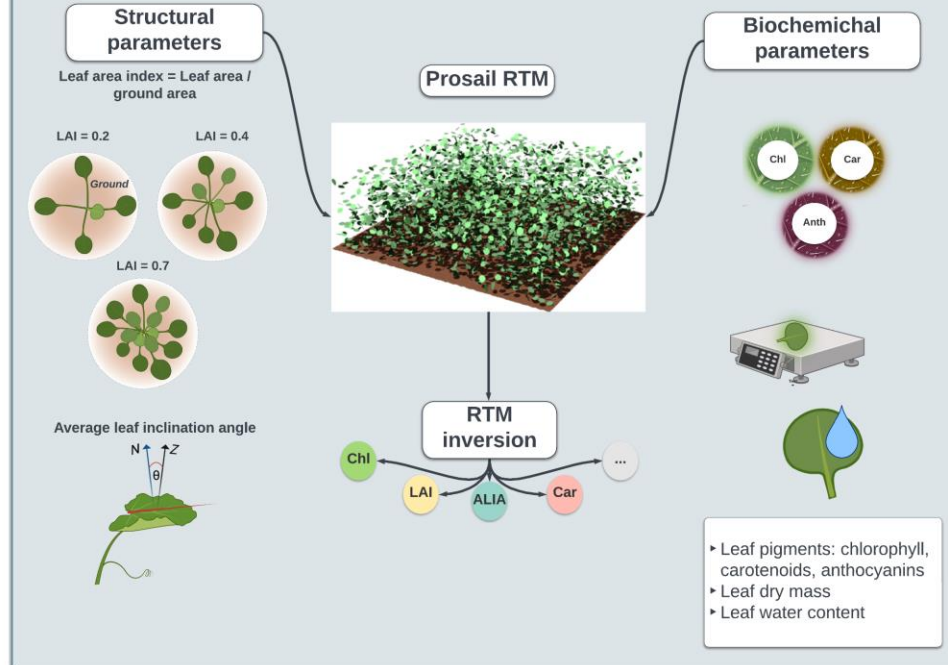
### Ground measurements

- ▶ Chlorophyll and leaf area index measurements
- ▶ Various crops: wheat, soybean, maize
- ▶ Destructive and non-destructive measurements

## Research objective

The aim of the project is to explore the capabilities of a UAV-based crop parameter retrieval using multispectral cameras and radiative transfer models (RTMs). Proximal UAV imagery creates opportunities to map these parameters at a high spatial resolution. Meanwhile, RTMs offer transferable and repeatable solution to the retrieval problem.

## Parameter retrieval



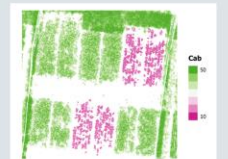
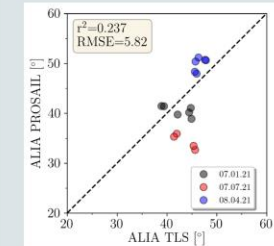
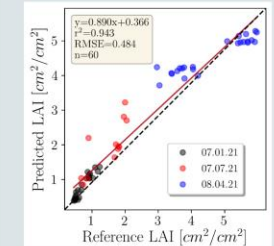
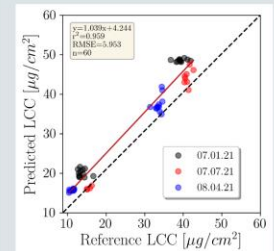
## References

Chakhvashvili, Erekle, Bastian Siegmann, Onno Muller, Jochem Verrelst, Juliane Bendig, Thorsten Kraska, and Uwe Rascher. "Retrieval of Crop Variables from Proximal Multispectral UAV Image Data Using PROSAIL in Maize Canopy." *Remote Sensing* 14, no. 5 (2022): 1247.

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Chakhvashvili, Erekle, Bastian Siegmann, Juliane Bendig, and Uwe Rascher. "Comparison of Reflectance Calibration Workflows for a UAV-Mounted Multi-Camera Array System." In *2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS*, pp. 8225-8228. IEEE, 2021.

## Results



- ▶ Assessing retrieval accuracy
- ▶ Parameter mapping