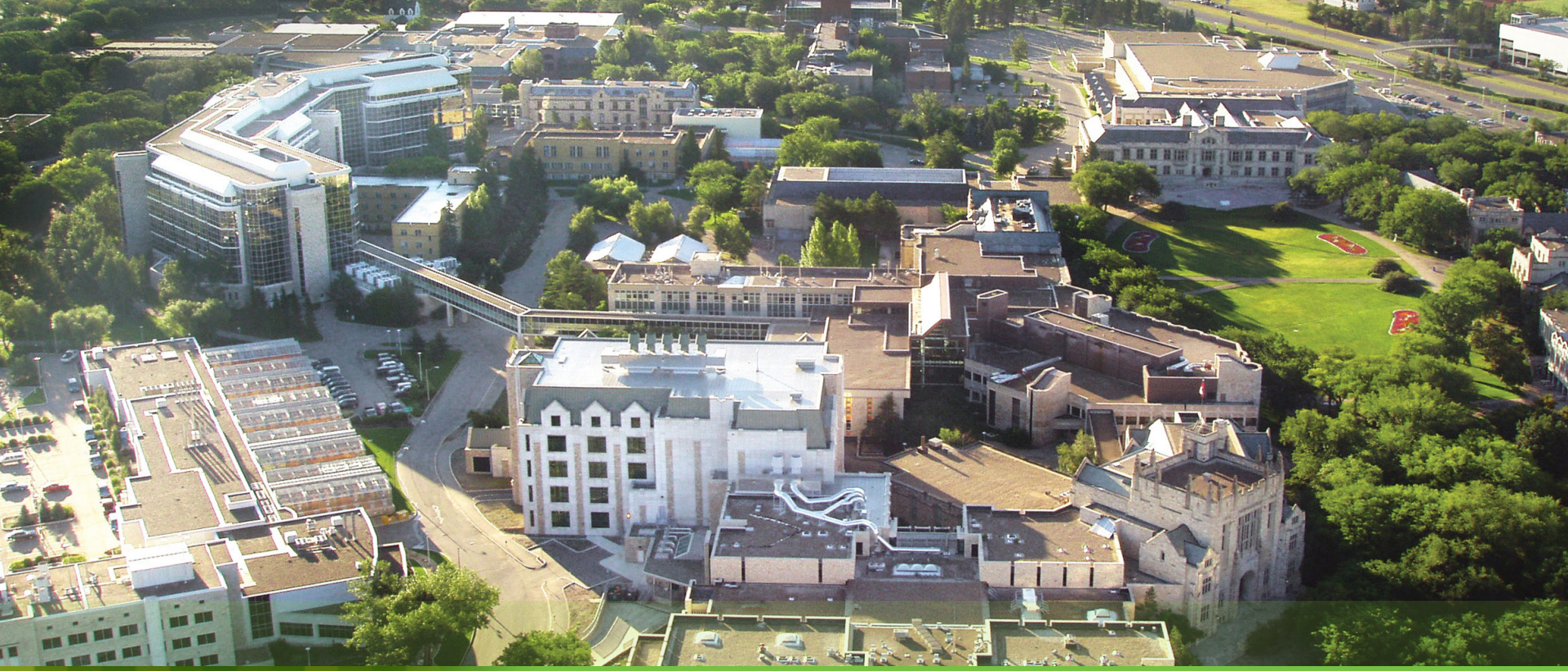


UNIVERSITY OF SASKATCHEWAN

Ian Stavness

Associate Professor, Computer Science

www.usask.ca

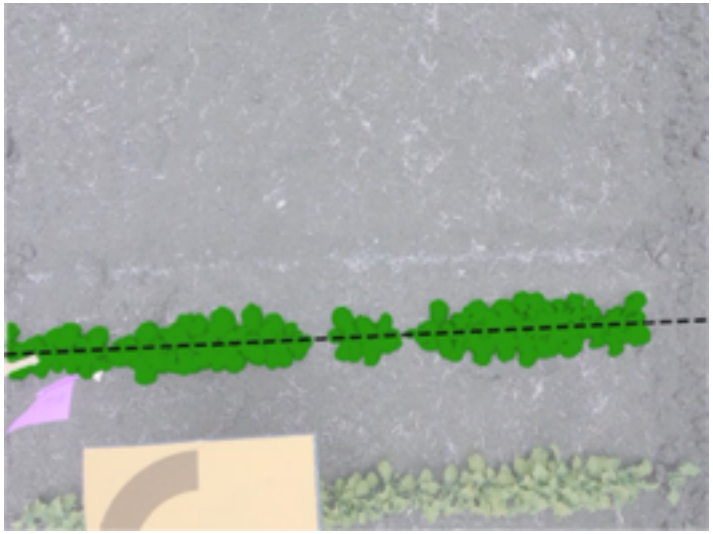
USask

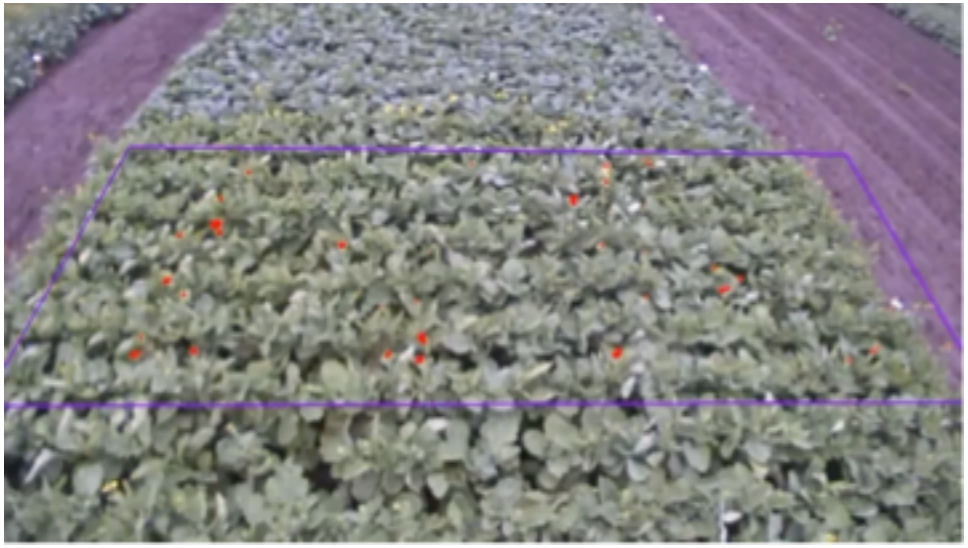
➥ UBC

➥ Stanford

➥ USask (Comp Sci, since 2012)

Co-lead P2IRC Flagship 3:
Deep Learning for Phenomics





collaborators

Mark Eramian

Kevin Stanley

Carl Gutwin

Steve Shirtliffe

Kirstin Bett

Curtis Pozniak

Sally Vail

Christina Eynck

Isobel Parkin

Bobbi Helgason

Steve Siciliano

what methods do we *develop*

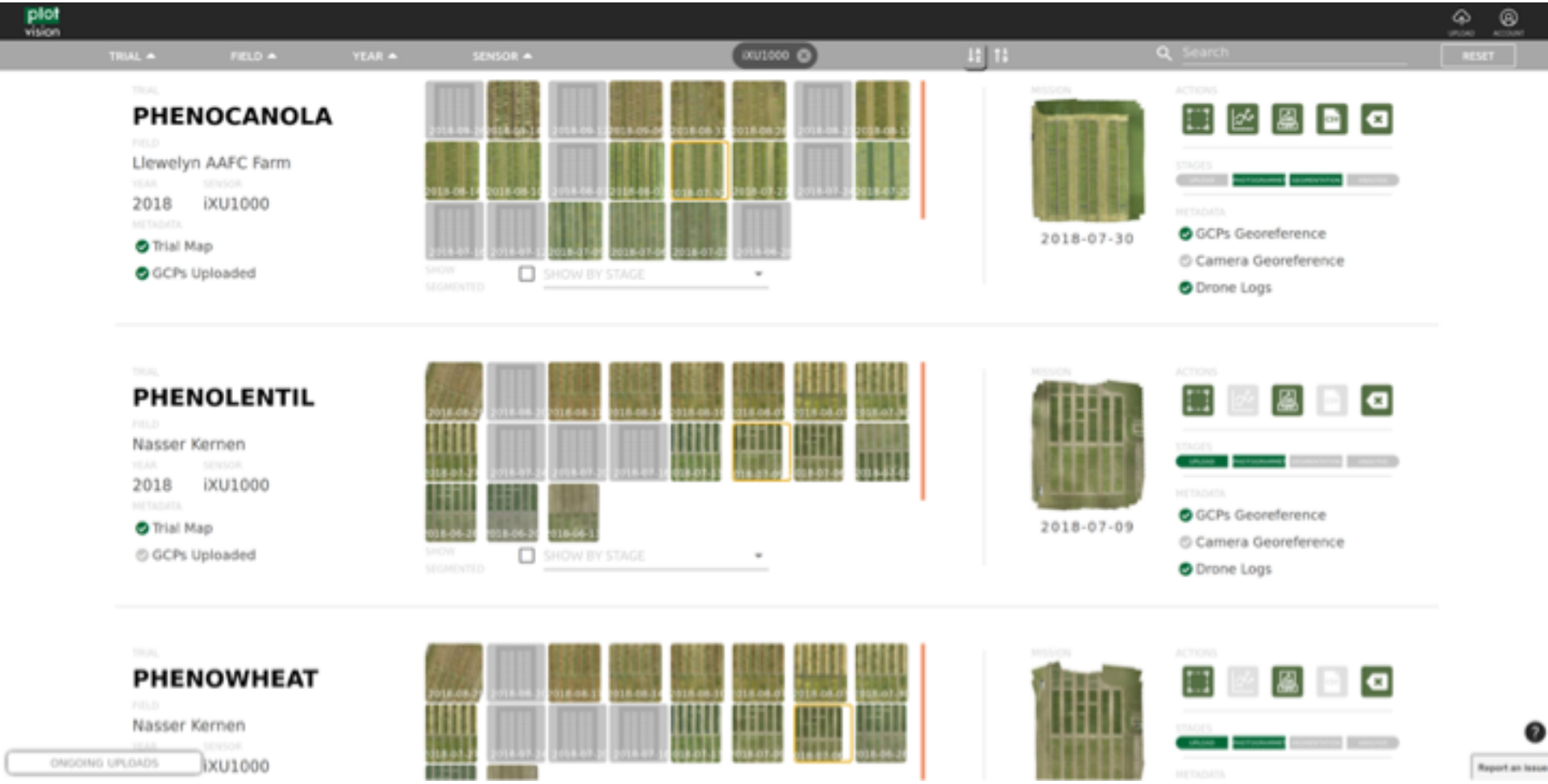
- Modeling (mechanistic, Bayesian)
- Machine learning (hand-selected features)
- Deep learning (learned features)

what tools do we *use*

- GPU Servers (Copernicus), Cameras, Python

Aerial Image Analysis

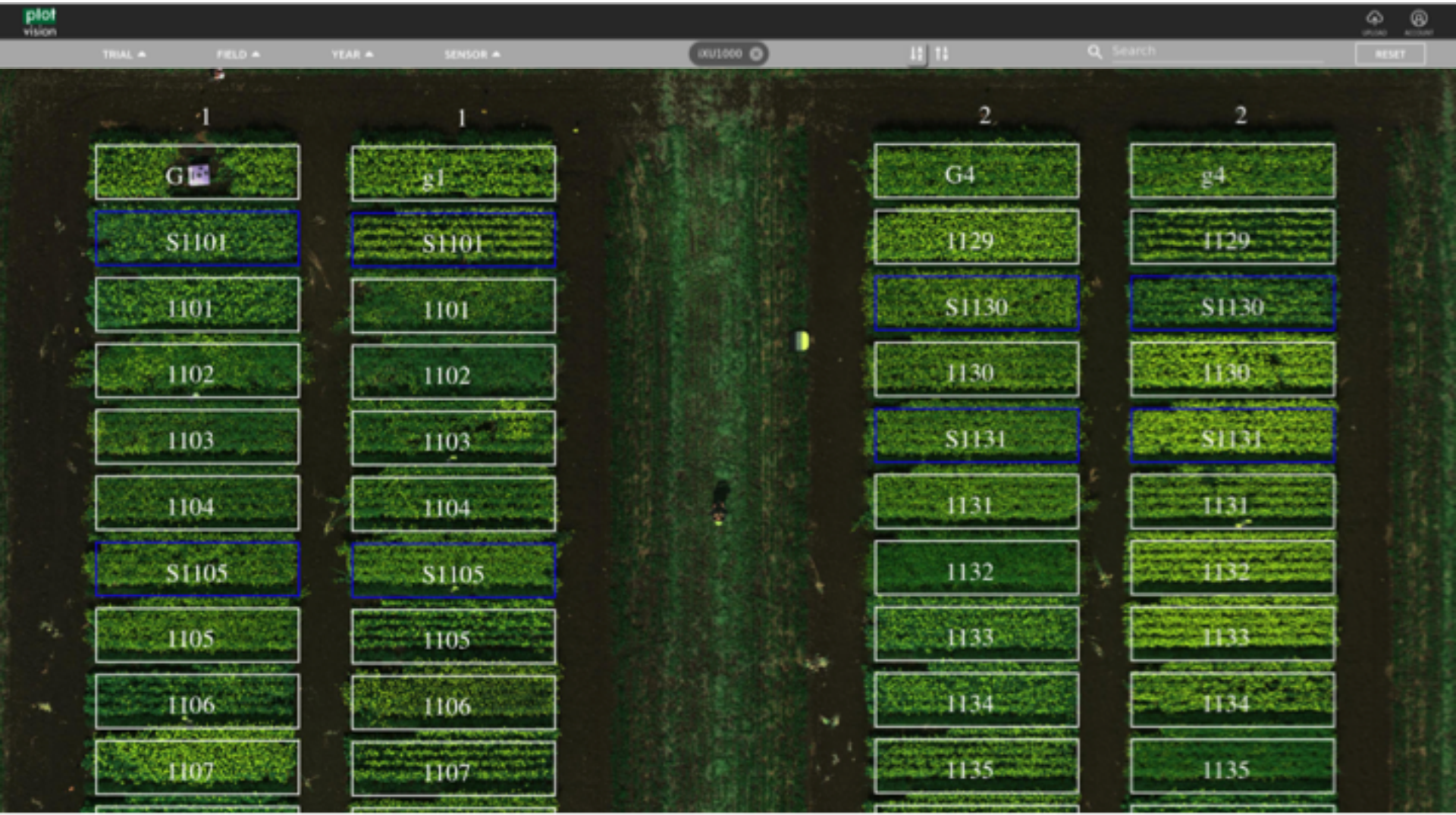
https://plotvision.usask.ca



UNIVERSITY OF SASKATCHEWAN

Aerial Image Analysis

https://plotvision.usask.ca



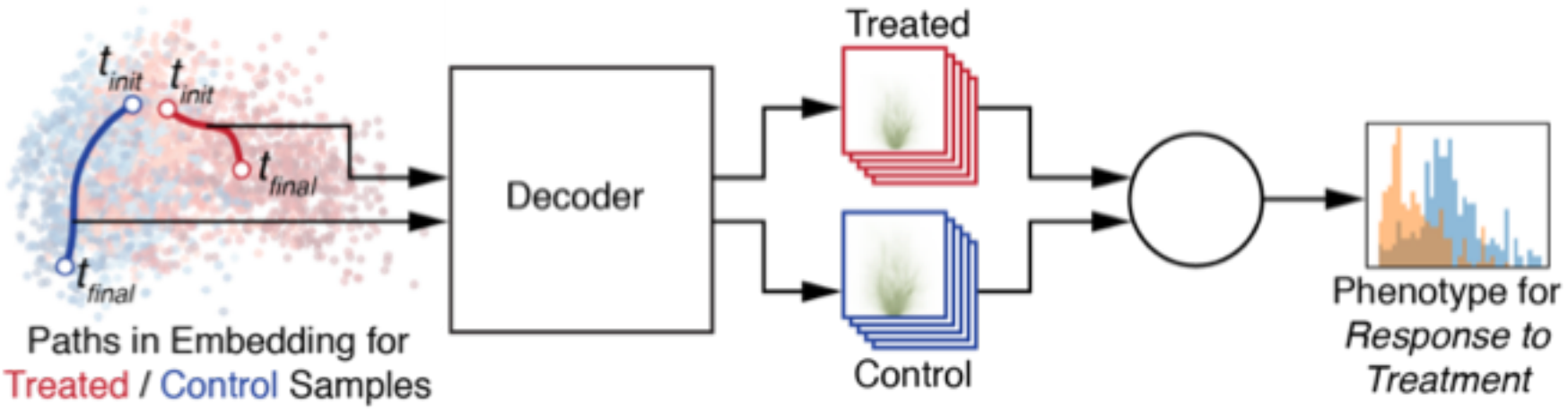
Stress Response Phenotyping

https://github.com/p2irc/lsplab

Ubbens, J., Cieslak, M., Prusinkiewicz, P., Parkin, I., Ebersbach, J., & Stavness, I. (2020). Latent space phenotyping: Automatic image-based phenotyping for treatment studies. *Plant Phenomics*, 2020, 5801869.

Stress Response Phenotyping

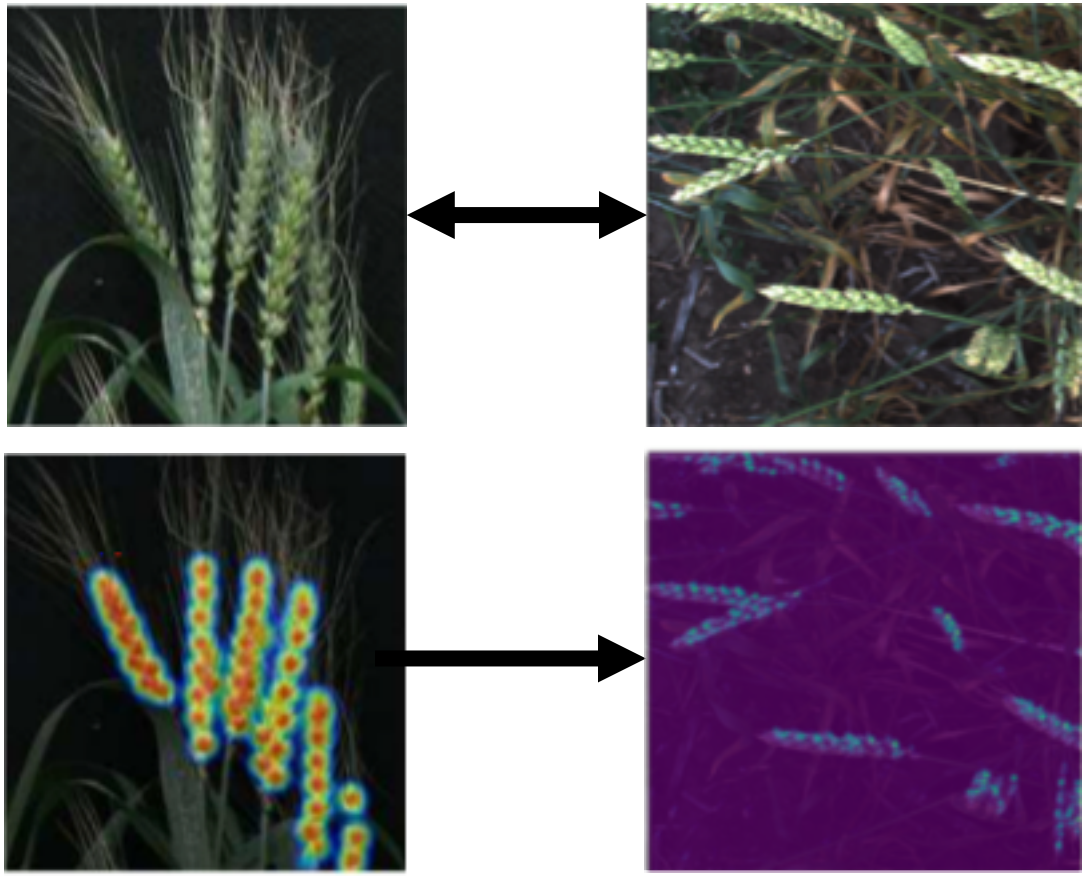
https://github.com/p2irc/lsplab



Ubbens, J., Cieslak, M., Prusinkiewicz, P., Parkin, I., Ebersbach, J., & Stavness, I. (2020). Latent space phenotyping: Automatic image-based phenotyping for treatment studies. *Plant Phenomics*, 2020, 5801869.

Domain Adaptation

https://github.com/p2irc/uda4poc



Ubbens, J., Ayalew, T., & Stavness, I. (2020). Unsupervised Domain Adaptation For Plant Organ Counting. ECCV Workshops, 2020.

Global Wheat Competition

https://www.kaggle.com/c/global-wheat-detection/

what would I like in a food-water nexus

- Computer science as a *research* pillar
  and a *technology* platform

- Research problems:
  - Learning across scale and modality
  - Using field measurements to calibrate aerial analyses
  - Generating *actionable* information and *useful* tools

- Training programs, e.g. CMPT/PLSC 898

big question for the group

What *new data analysis* would transform your experiment?

Can we be the *world leader* in food-water *data*?