How might a plant cell atlas inform development?

What types of cells are there?

How are those cells made?

How do cells respond/change/maintain homeostasis when subjected to external information?
How might a plant cell atlas inform development?

What’s the best approximation of a cell?

*Its transcriptome?*
*Its chromatin state?*
*Its proteome? interactome, metabolome?*

*A sense of its history?*
Stomatal lineage

Systemic signals (hormones, nutrition)

Environmental cues (light, drought)

neighbor communication

SPCH
MUTE
FAMA

Chemical structure of a signaling molecule
Missing cell types

Collapsing multiple fates/states into one
Single-cell atlas of the Arabidopsis leaf

5000 leaf cells

+ all leaf cells

10x genomics, analyzed with Seurat
Marker genes indicate that many cell types were captured.
Marker genes indicate that many cell types were captured.
What’s a cells trajectory through self-renewing early phases?
Why would we want a plant cell atlas?

Opportunities to capture diversity of cell types in broad sample of plants
Why would we want a **plant** cell atlas?

Flexible, non “hard wired” development

Extensive regeneration capacity

_Efroni...Birnbaum (2016)_
Mapping cell types and trajectories

Dr. Camila Lopez-Anido
*scRNA-seq for leaves & stomatal lineage*

Dr. Ao Liu
*scATAC-seq for stomatal lineage*

Dr. Andrea Mair
*TurboID for cell-type specific subcellular proteomes*  
(Collaboration with Alice Ting and Shouling Xu)