

# Harvard HIVE Tools Component

Gehlenborg Lab | Biomedical Informatics | Harvard Medical School

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# Our Project

## *HuBMAP Portal Development*

- Lead UI workstream
- Focused contributions to data model and curation aspects

## *Data Visualization*

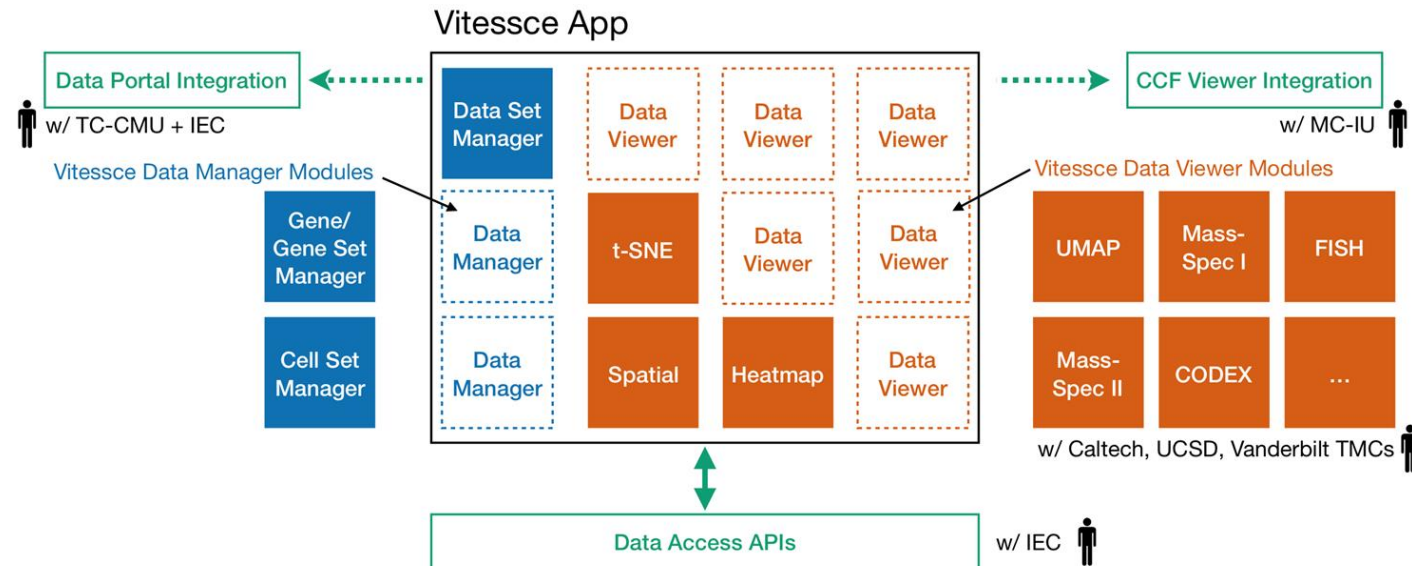
- Development of the Vitesse application and embeddable components for visualization HuBMAP data inside the portal

## *Data Science Working Group*

- Co-leading efforts for integrative analysis
- See presentation on future integration with HuBMAP Portal

# Next Year's Deliverables

- Minimum Viable Product for the HuBMAP Data Portal
  - Portal software & curated data sets
- Release of Vitessce visualization tool and components



# Collaborations

## *HuBMAP Portal Development*

- IEC
- TC-CMU

## *Data Curation*

- X-Consortium (HuBMAP, Human Cell Atlas, Human Tumor Atlas Network, others): bi-weekly calls
- Data Release Teams

## *Visualization*

- MC-IU Tissue Viewer (supplement)

# What should HuBMAP Do?

Focus on initial **data release minimum viable product**

Ensure that we do **exciting science**

Harden **collaborative processes** within the consortium

Avoid **overpromising**

Champion **FAIRness and coordination** with other groups

Develop our own **identity** distinct from similar projects

Cool Thing - 5 Minutes

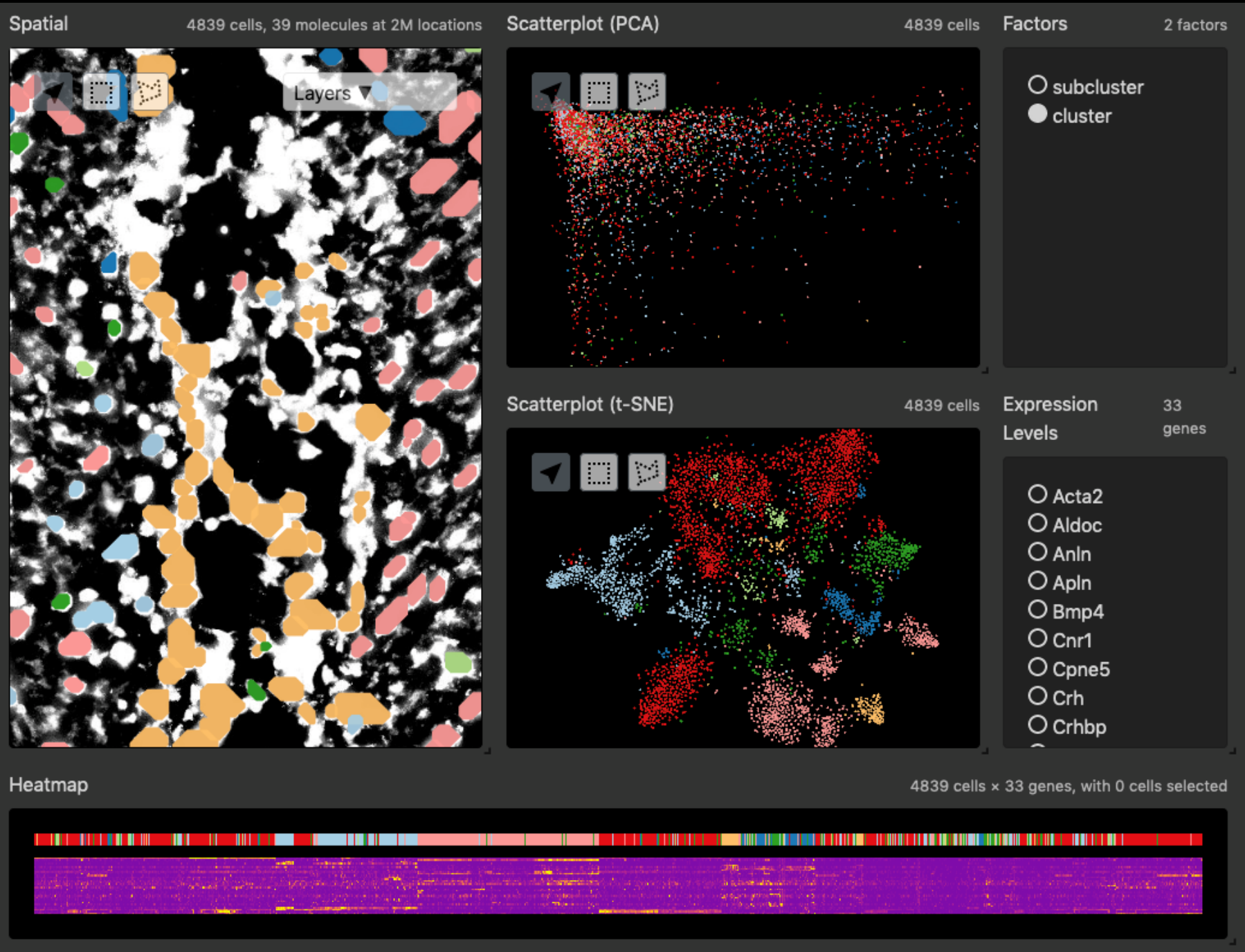
*Vitessce* - Visual Integration  
Tool for Exploration of Spatial  
Single-Cell Experiments

*<http://vitessce.io>*

*<https://github.com/hubmapconsortium/vitessce>*

# Vitessce

1. modular
2. linked views
3. agnostic
4. data
  - spatial
  - abstract
5. open source



### Data Set

Giotto

### Status

pleiden\_clus: Cluster 1; kmeans: Cluster 7

### Spatial

523 cells, 0 molecules at 0 locations

### Factors

2 factors



Layers ▾



- pleiden\_clus
- kmeans

### Scatterplot (t-SNE)

523 cells



### Scatterplot (UMAP)

523 cells



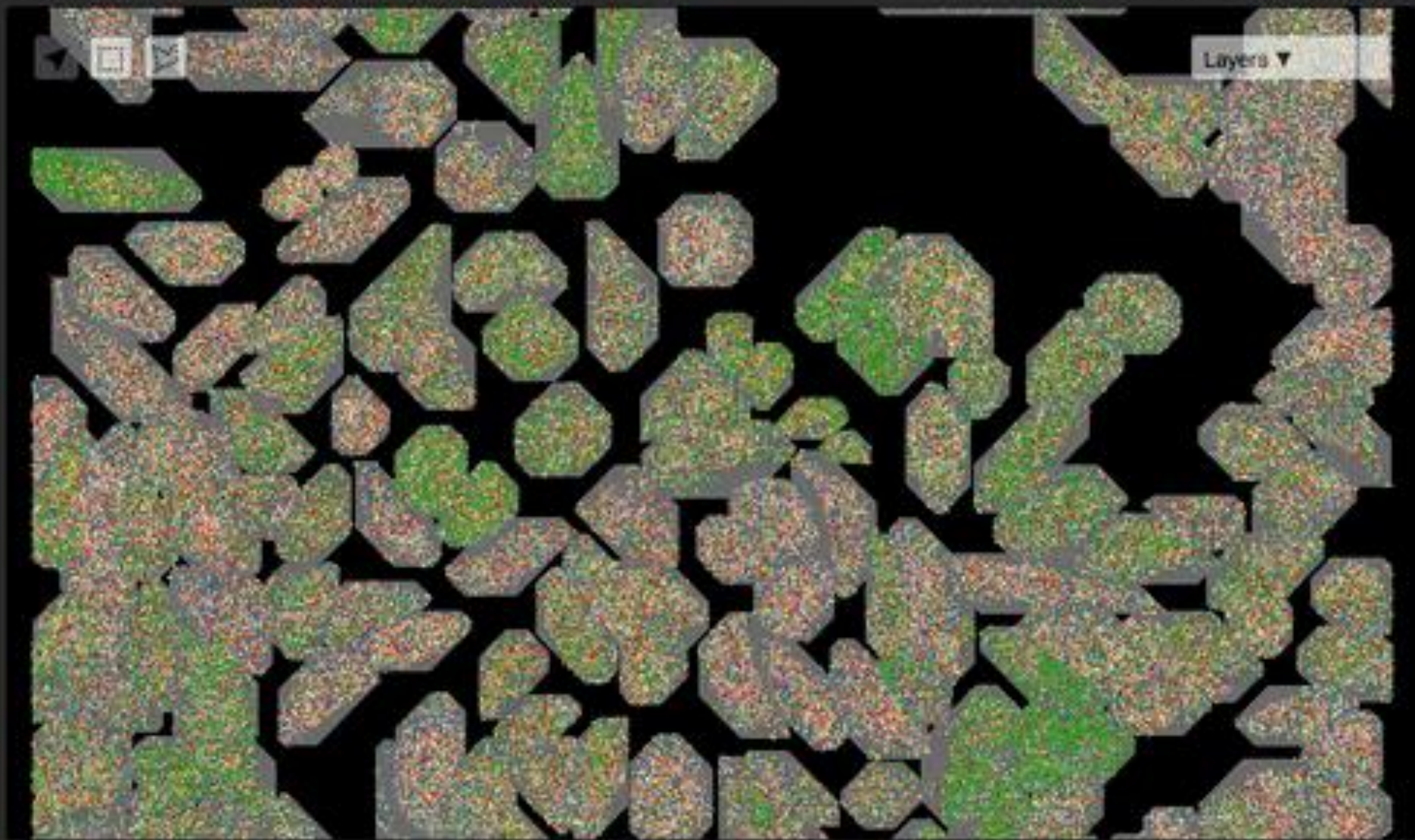


Spatial

102 cells, 30 molecules at 245.8K locations

Expression  
Levels

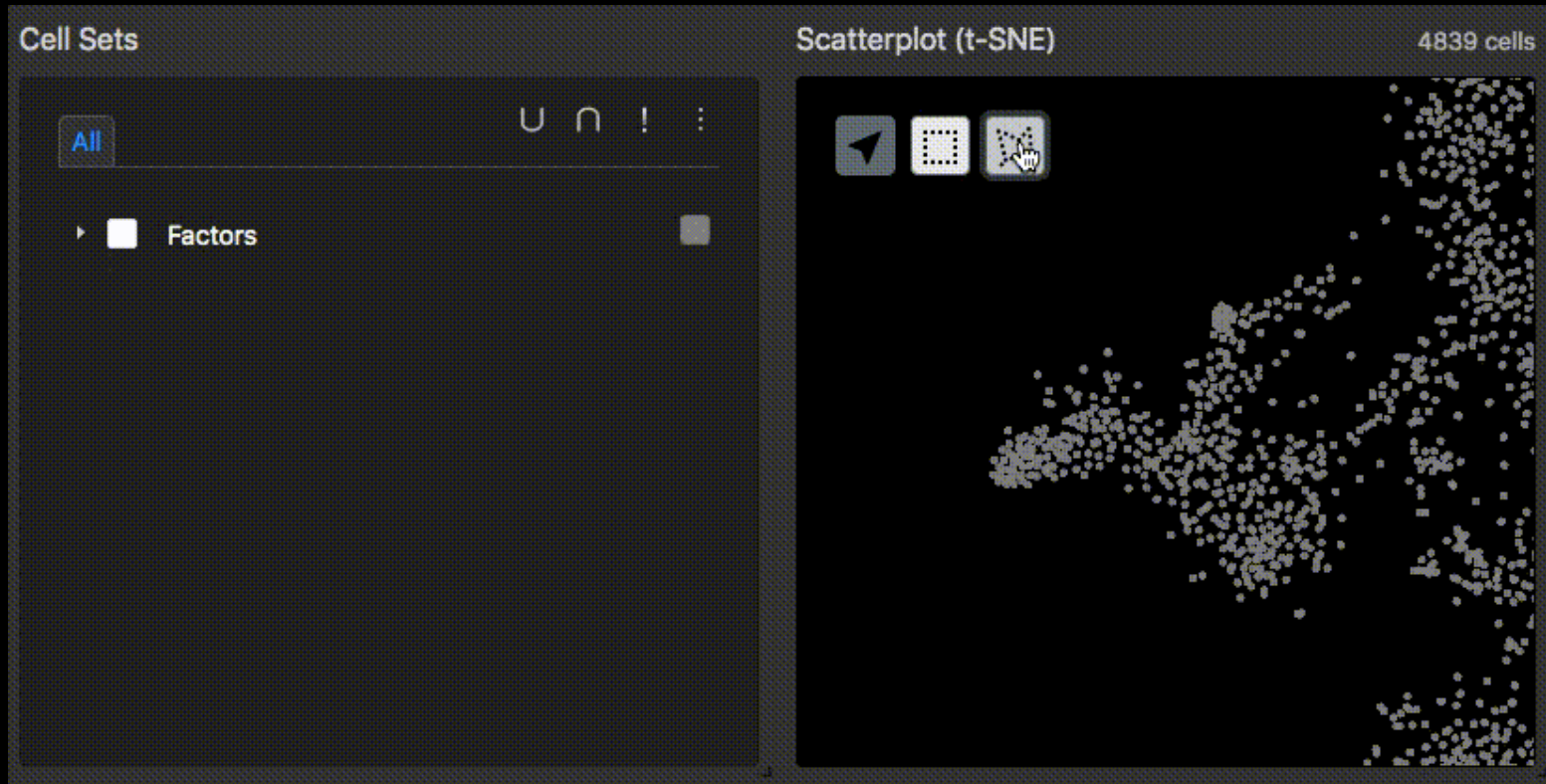
30  
genes



- ADAM9
- AHCY
- AKAP11
- ATN1
- ATP1A1
- ATP6AP1
- Blank-01
- Blank-02
- Blank-03
- Blank-04
- Blank-05
- Blank-06
- Blank-07
- Blank-08
- Blank-09
- Blank-10
- Blank-11
- BRCA2
- CDC45
- COLGALT1
- CRKL
- CSDE1
- CSE1L

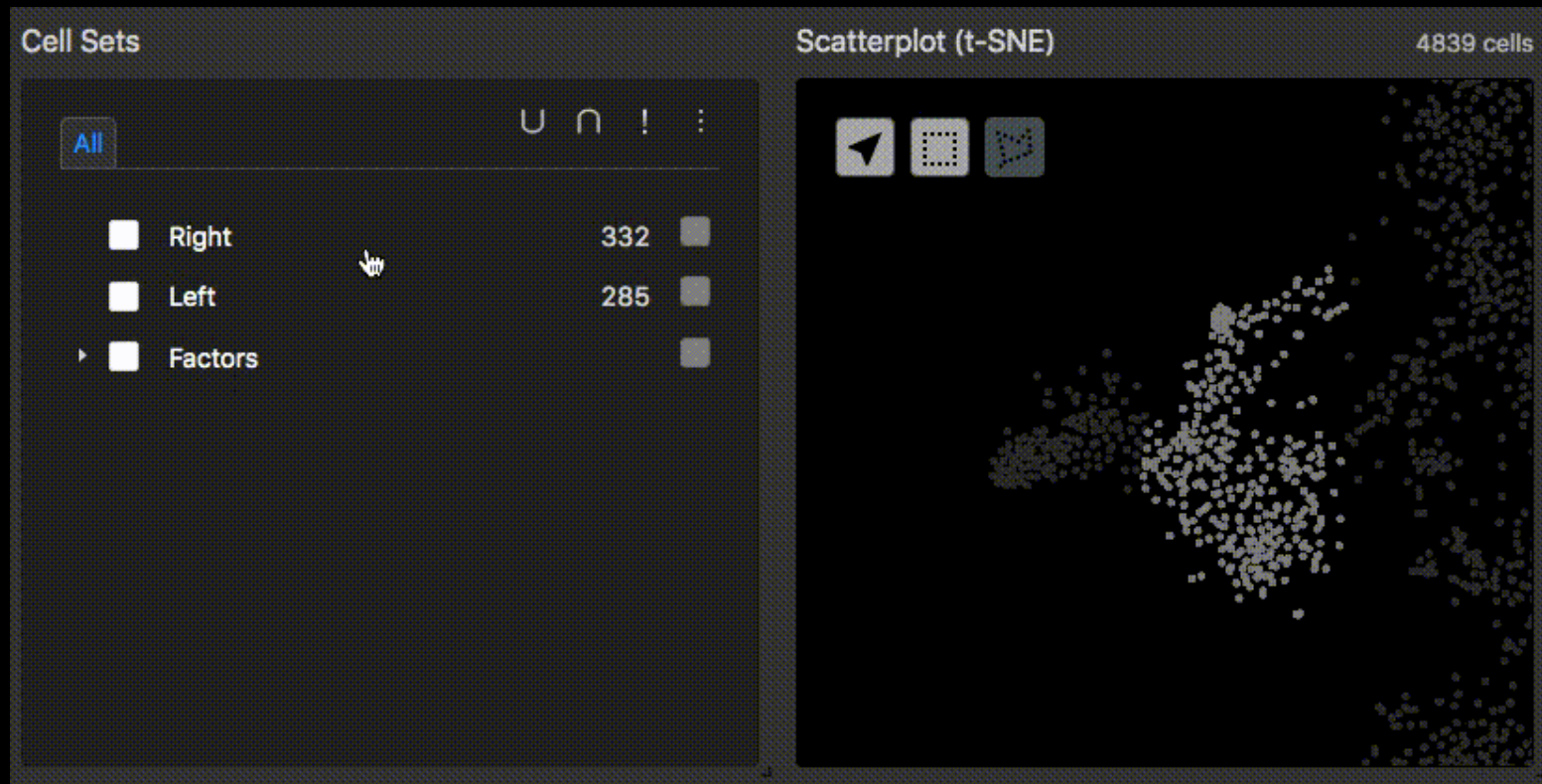
# Vitessce Overview

## Cell Set Management: Create



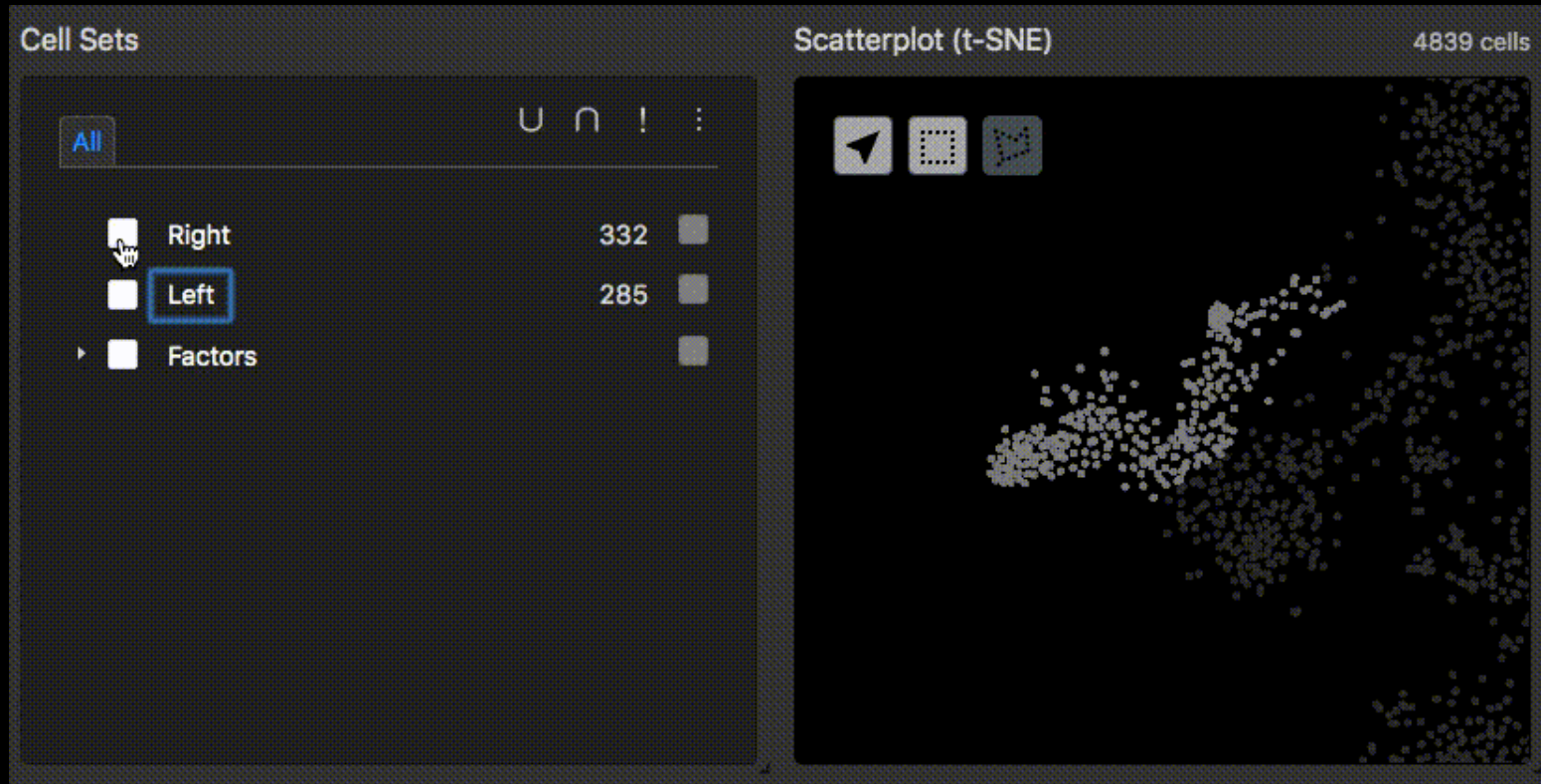
# Vitessce Overview

## Cell Set Management: Merge



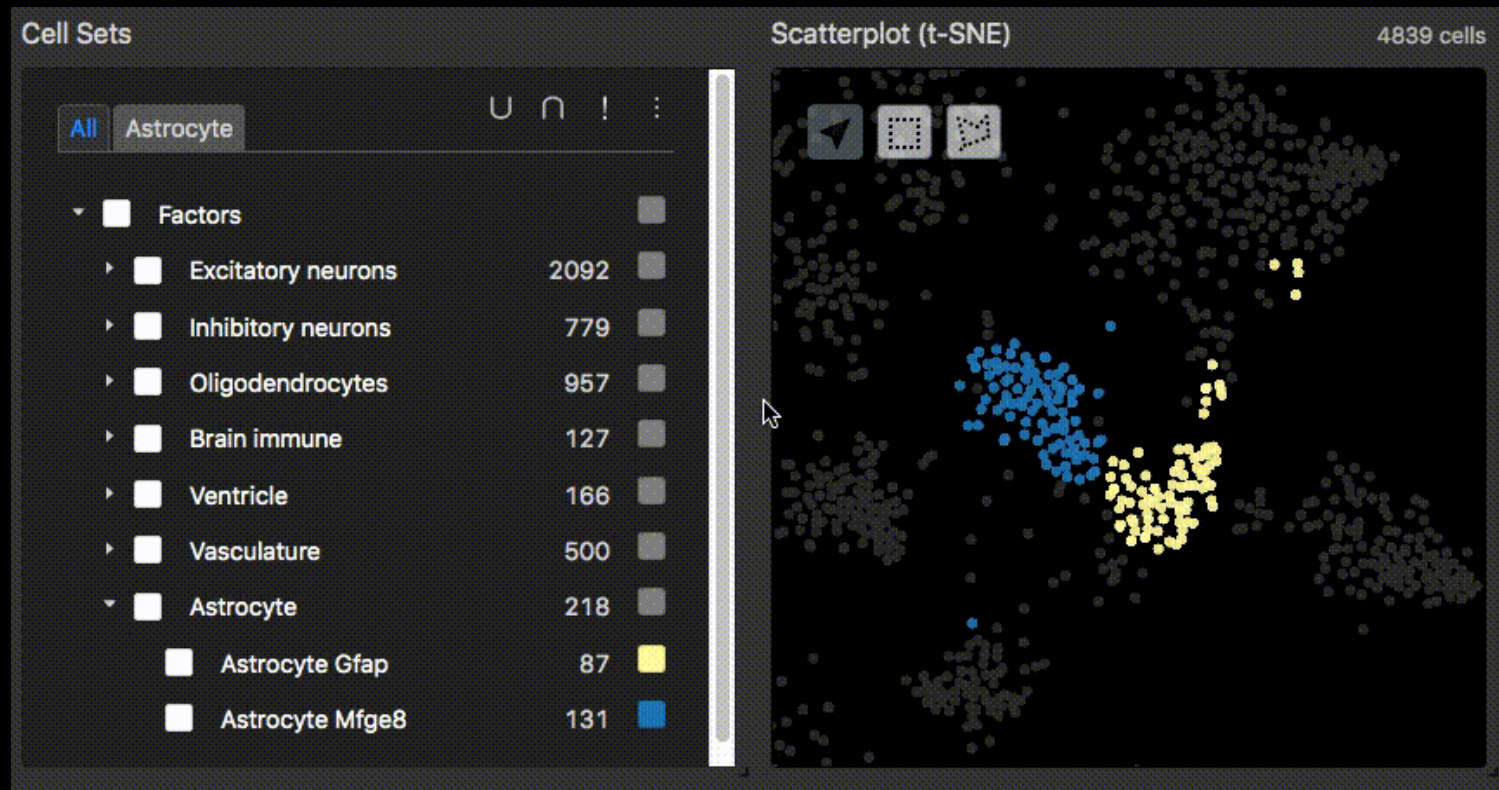
# Vitessce Overview

## Cell Set Management: Intersect



# Vitessce Overview

## Cell Set Management: Organize



## Data Set

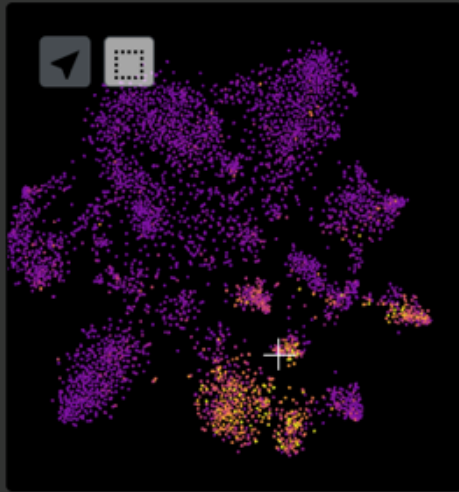
Linnarsson: Spatial organization of the somatosensory cortex revealed by cyclic smFISH

## Status

subcluster: Oligodendrocyte NF; cluster: Oligodendrocytes

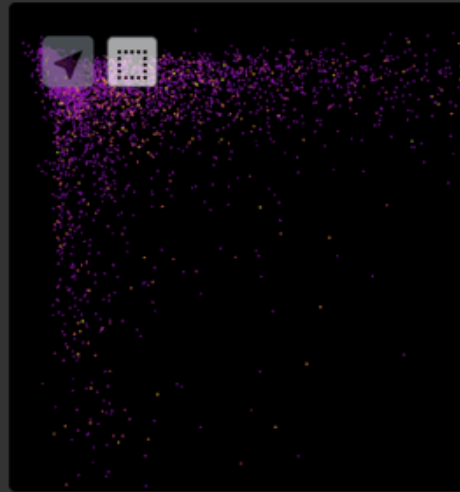
## Scatterplot (t-SNE)

4839 cells



## Scatterplot (PCA)

4839 cells



## Spatial

4839 cells, 39 molecules at 2M locations



## Factors

2 factors

- subcluster
- cluster

## Expression Levels

33 genes

- Pthlh
- Rorb
- Serpinf1
- Slc32a1
- Sox10
- Syt6
- Tbr1
- Tmem2
- Ttr
- Vip
- Vtn

## Heatmap

4839 cells × 33 genes, with 0 cells selected

