

Bharat Mishra*, Austyn Trull, Nilesh Kumar, Liz Worthey, and Lara Ianov

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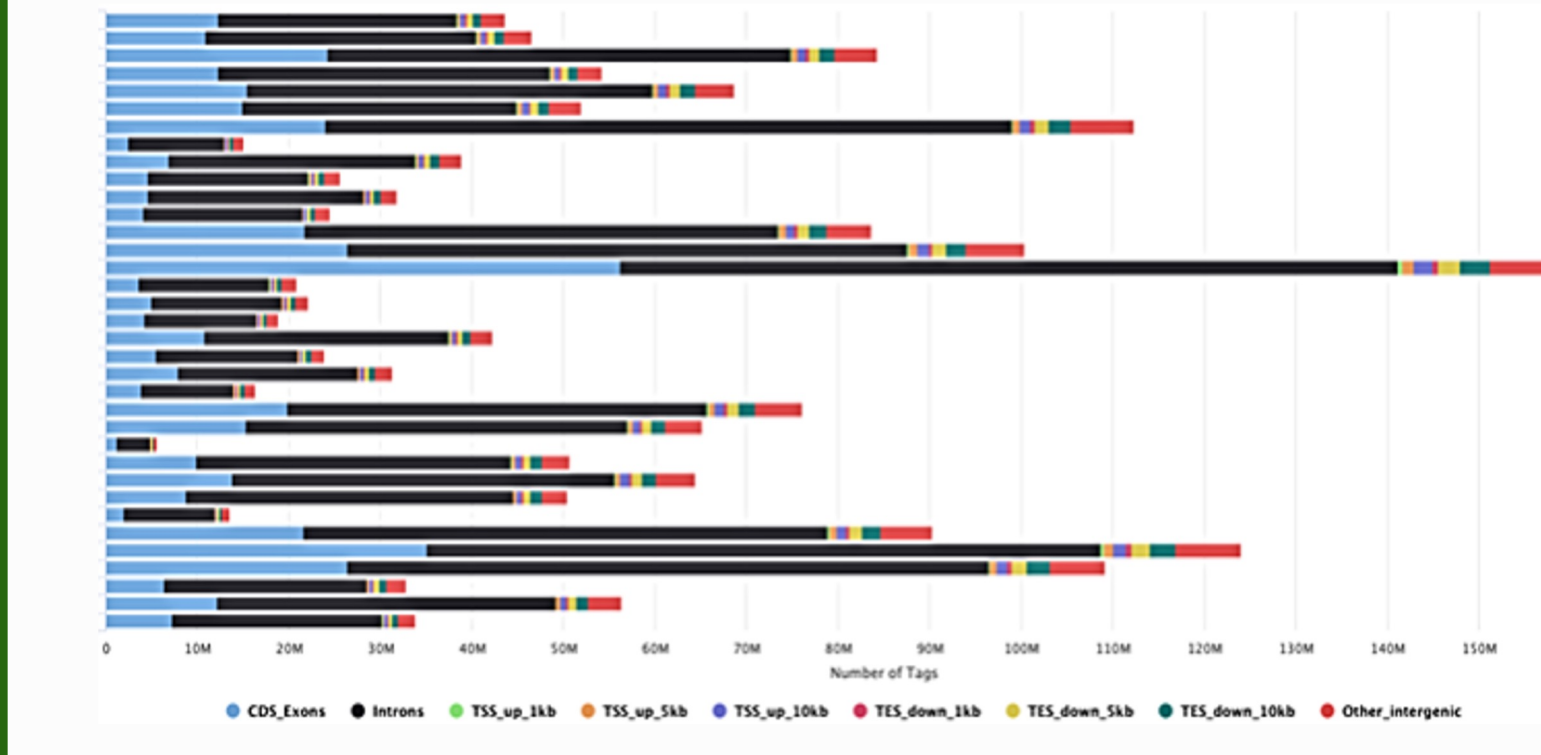
U-BDS Services Overview

Provides reproducible, high-quality and cost-effective computational services, resources, and training with emphasis in the areas of genomics, transcriptomics, and systems biology. The services currently provided include:

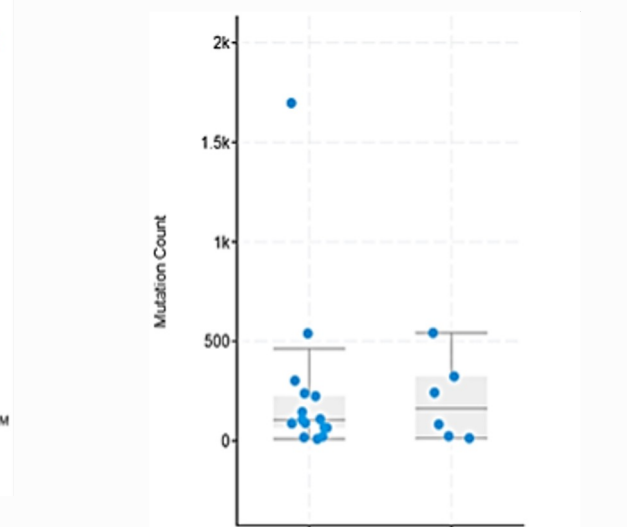
- **Genomics:** Exome and Whole Genome Sequencing analysis
- **Transcriptomics:** Bulk RNA-seq (whole-transcriptome, mRNA, and miRNA)
- **Single-cell/nuclei (sc/sn) omics:** RNA-seq, ATAC-seq, CITE-seq, multiome, cell hashing (multiplex) sequencing
- **Spatial Transcriptomics:** 10x Genomics (Visium and Xenium) with plans to expand to NanoString (GeoMx and CosMx)
- **Support in method development:** pipeline development & custom projects overlapping with areas of U-BDS specialization
- **Web-app development:** R Shiny and Streamlit apps for interactive visualization of data
- **Support for writing manuscripts and grant applications:** budget justification, LoS, methods write-up, and supporting docs
- **Training:** workshops, guides, and weekly data science office hours (open to UAB) - Thursdays 1:30-2:00 pm
- **Other custom work:** develop reproducible research environments (e.g.: Docker containers)
- **Consultations:** 30 minutes to discuss study designs, analysis needs, grant application, and other technical details

Genomics

Cohort based variant classification/visualization

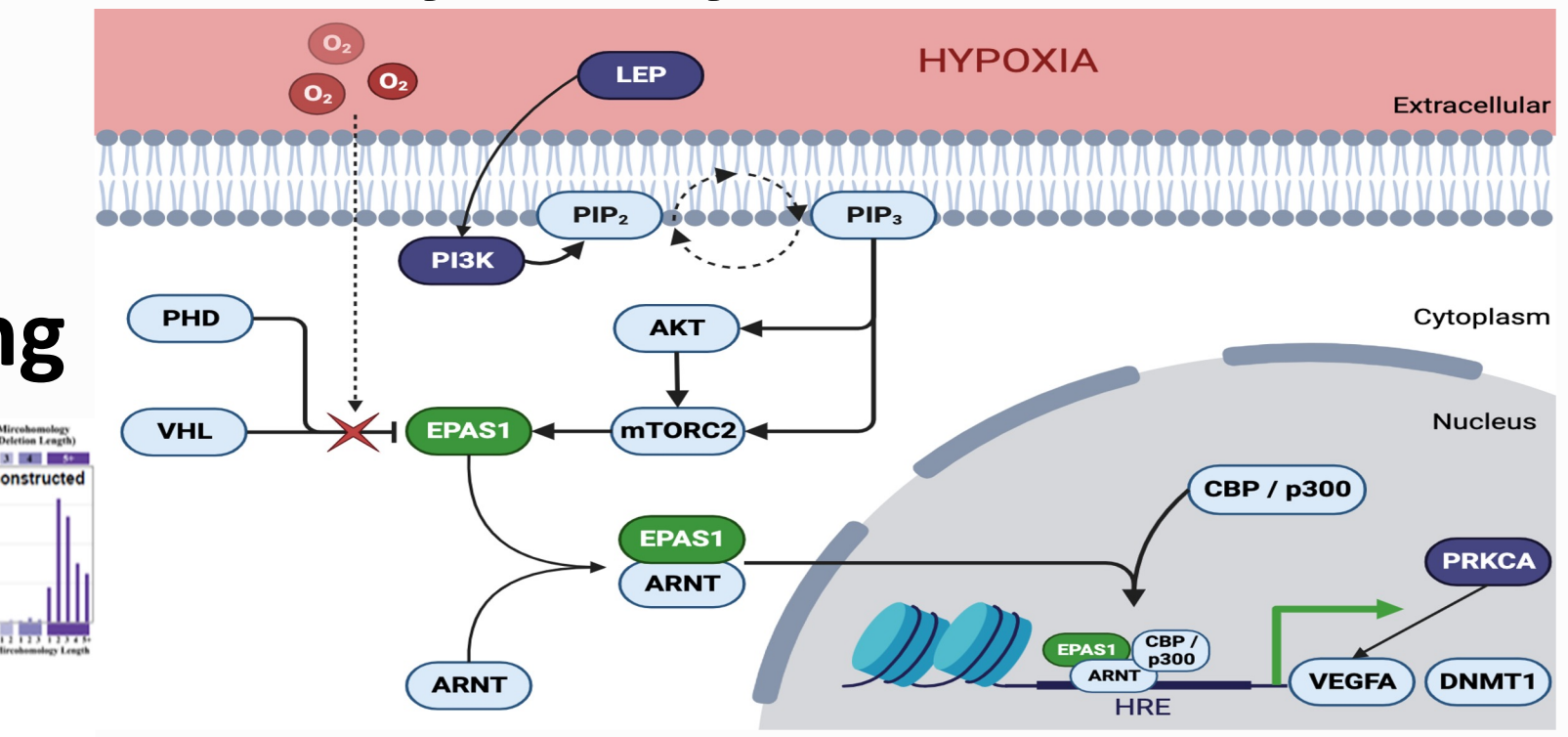


G x P associations

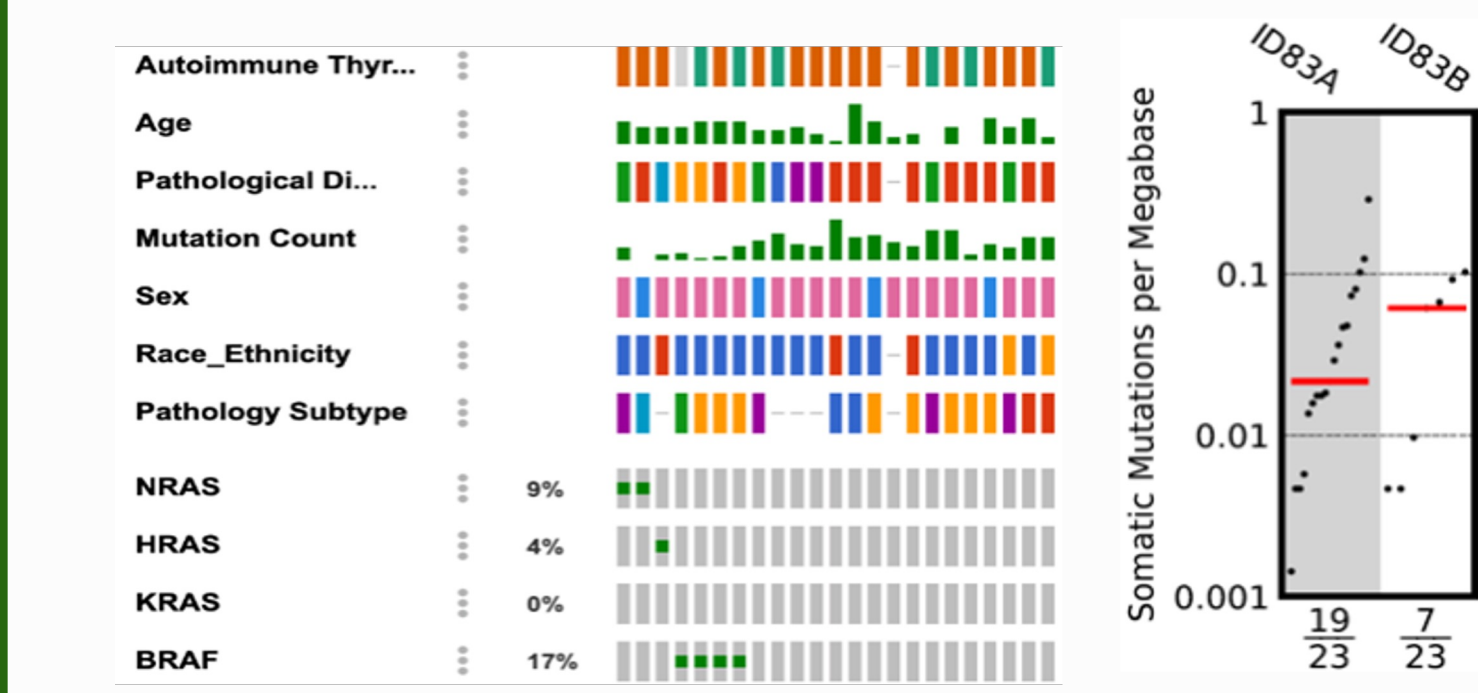


WGS & WES based genomic analysis. Data QC, alignment, variant calling, functional impact analysis, and interpretation (small and structural variants and somatic and germline)

Pathways analysis & visualization

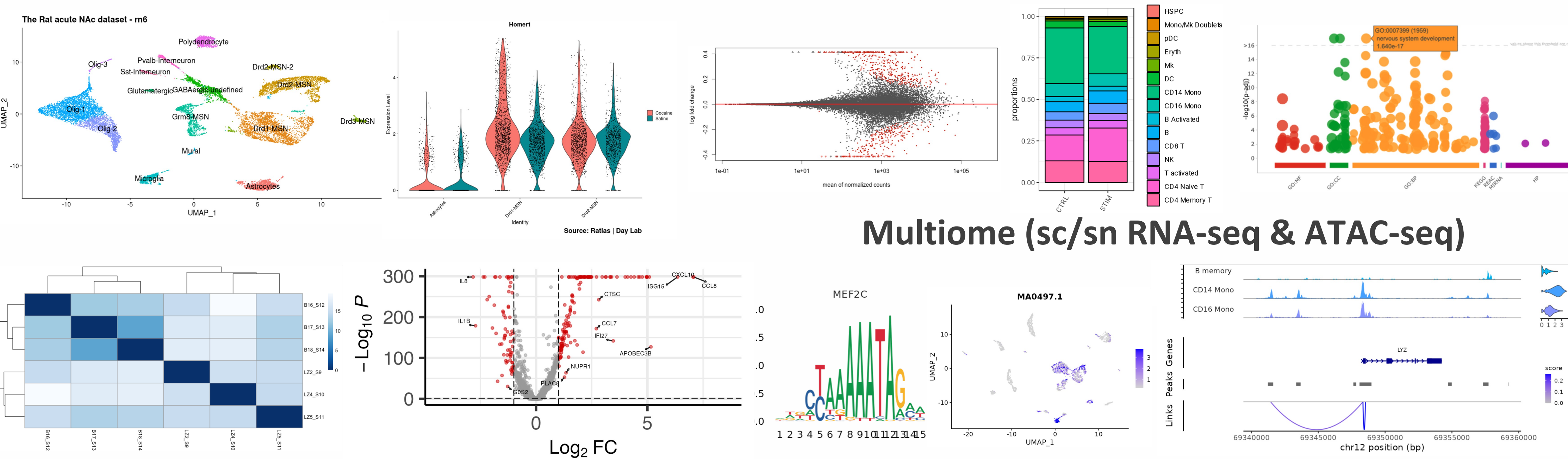


Signature profiling



Transcriptomics

Standard single-cell/nuclei analysis includes several layers of QC, dimensional reduction, data normalization, cell type identification, pseudobulk analysis, data visualization, among others



Pipeline & App Development

- R and Python applications:
 - **R Shiny apps and Streamlit apps**
- Pipelines:
 - U-BDS supports nf-core pipelines, and develops custom pipelines with NextFlow and/or Snakemake
- Assistance in app hosting:
 - Leverage UAB Research Computing (RC) resources with app hosting*

*U-BDS does not charge for app hosting in cloud.rc. We provide services for app development and aid users in app hosting only. Cloud.rc infrastructure is a RC resource and subject to RC policies and regulations.

Training

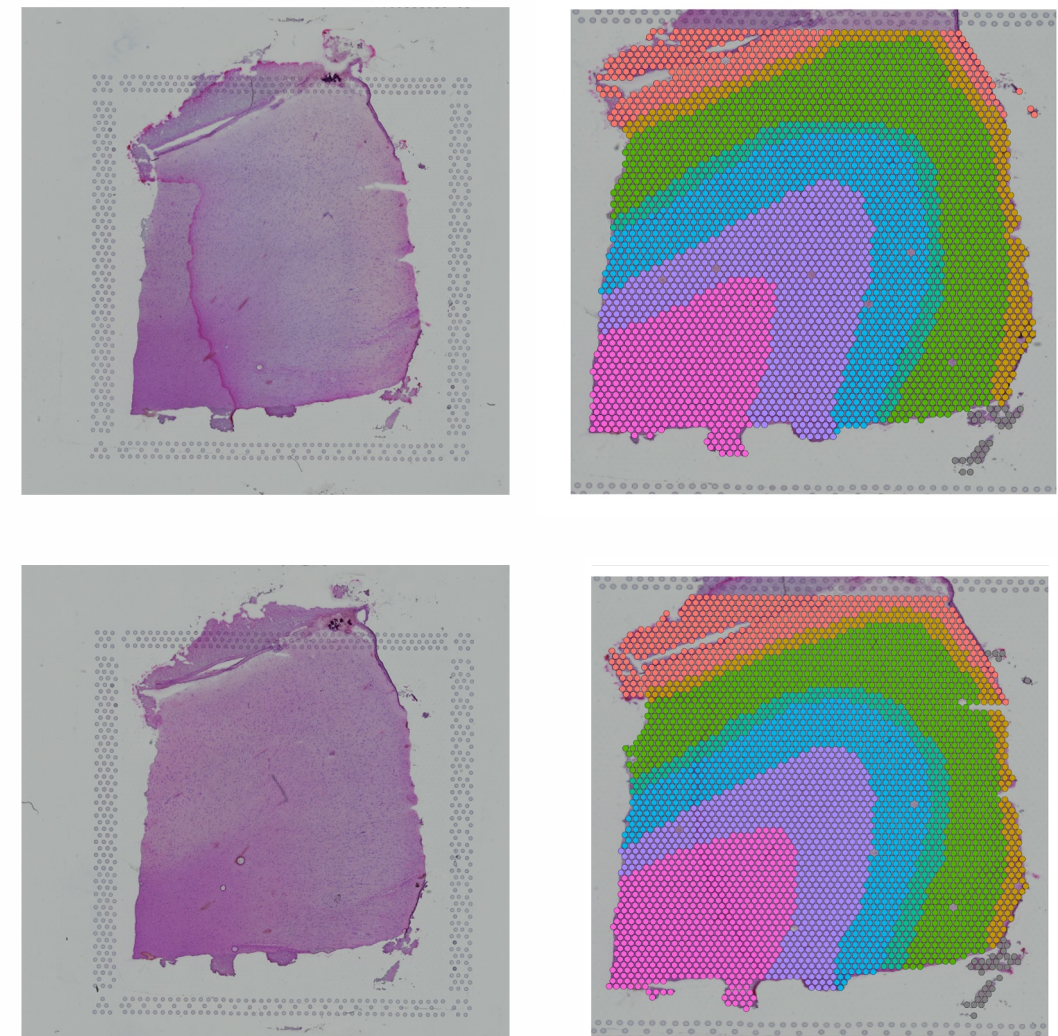
- Weekly data science office hours
- Join #datascience Slack channel for more information: <https://join.slack.com/t/uablabs/signup>
- Online guide:
 - https://u-bds.github.io/training_guides
- Includes training material for Docker, Singularity, nf-core pipelines, and examples of data wrangling
- Carpentry workshops
- Tri-annual workshops
- Reproducible research
- UNIX, Git, R, and Python
- Plans to expand to other topics

10X GENOMICS

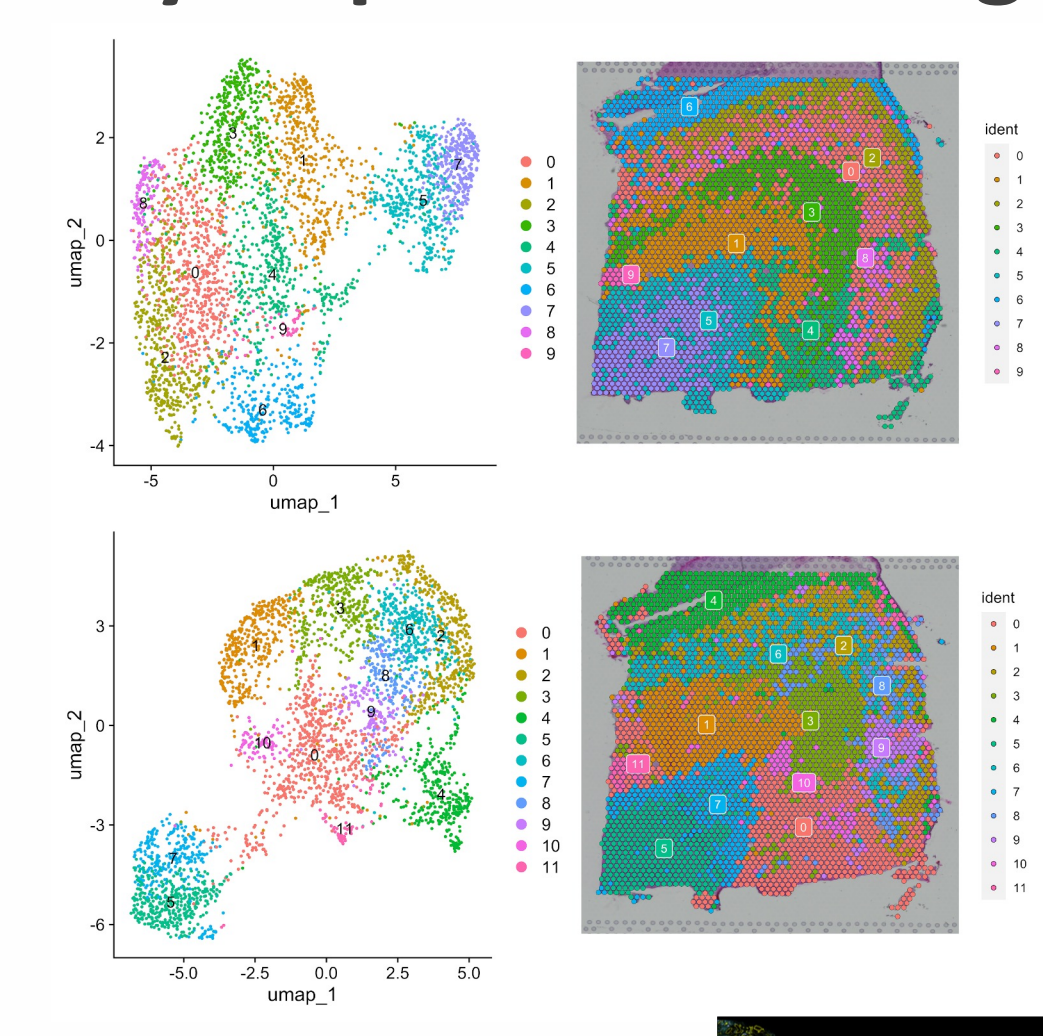
Spatial Transcriptomics

nanoString

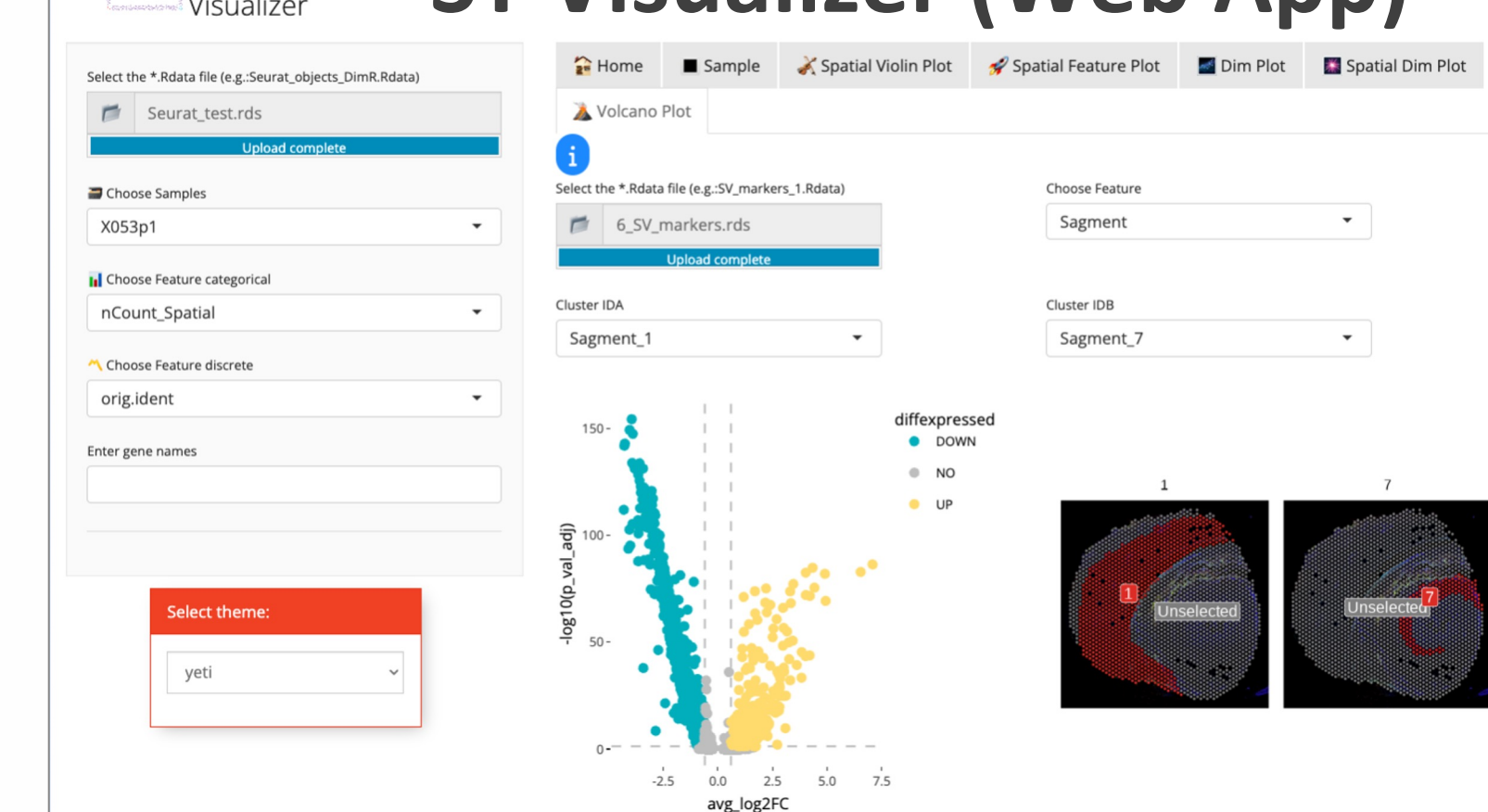
Human Brain



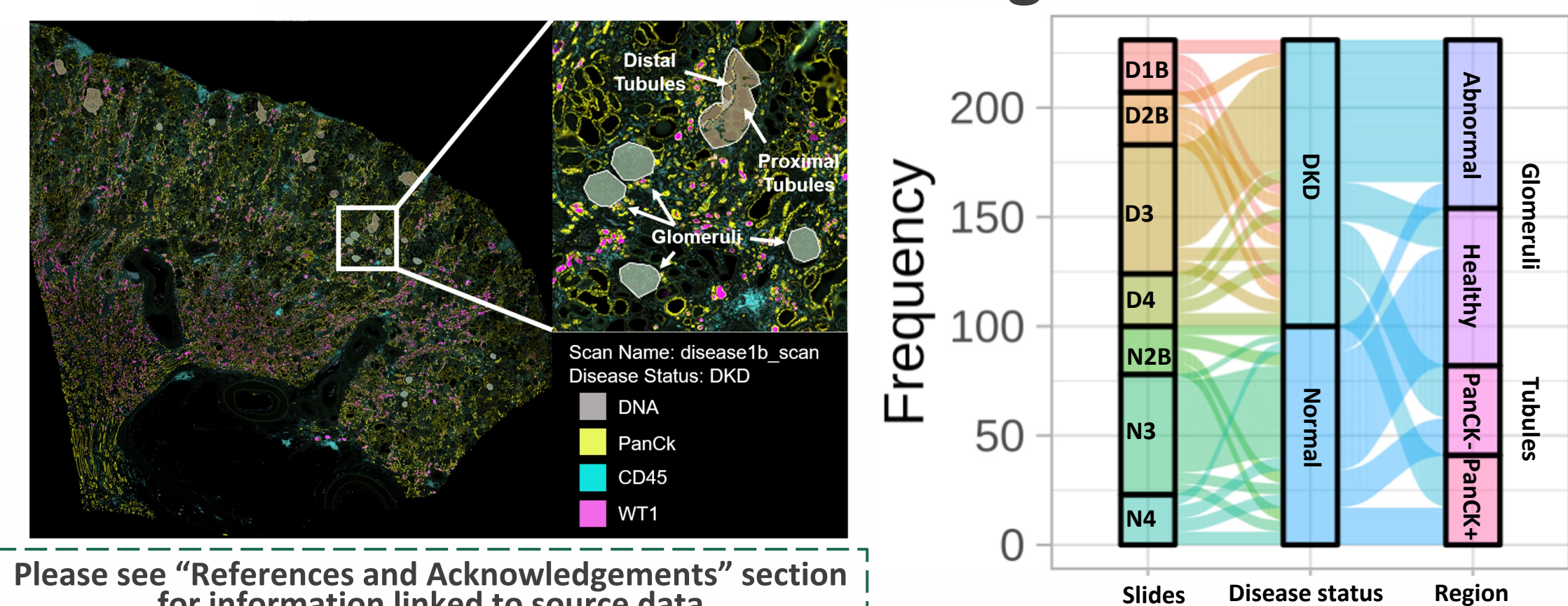
BayesSpace Clustering



ST Visualizer (Web App)



NanoString GeoMx



Mouse Tissue Microarray (TMA)



How to Get Started

- Step 1** Submit enquiry form
Submit an enquiry form from the U-BDS website
- Step 2** Consultation
Upon review of the enquiry form, 30 minute consultation is scheduled to discuss project or grant application
- Step 3** U-BDS documents
Generation of documents linked to enquiry. 1. Scope of Work (SOW) for projects detailing background, methods, milestones, deliverables, and quote or 2. grant support documents (due to demand, all document preparation costs \$75/hr)
- Step 4** Start of project
Project is initiated following established core protocols and work detailed under the SOW or grant application.

References & Acknowledgements

Jeremy Day Lab (PMID: 30863790 and Ratlas) PMID: 29227470
 Spatial: Mouse Brain (spatialLIBD), PMID: 33603232
 TMA (10X Genomics)
 NanoString GeoMx: Diabetic kidney disease and healthy
 10X Multiome Human PBMC (10k)
 UAB Research Computing
 Center for Computational Genomics and Data Science (CGDS)
 Dr. Pallavi Iyer, UAB IRCP, and CIRC

Contact Information

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