

# Using Single-cell Computation and Biology to Dissect Myeloid Cell States in Health and Disease

RUTGERS

School of Arts and Sciences  
DEPARTMENT OF GENETICS



Jiekun (Jackie) Yang, Ph.D.

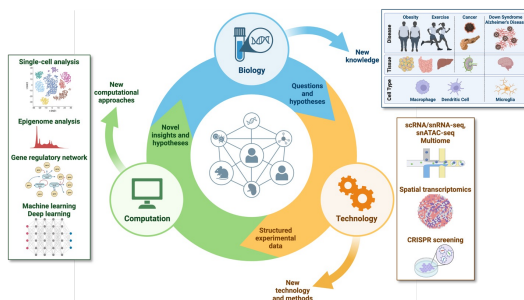
## Introduction

Imagine playing a key role in groundbreaking research that could redefine our understanding of human physiology and disease. The Yang Lab of Computational and Systems Biology will officially open in the Department of Genetics & the Human Genetics Institute of New Jersey at Rutgers, The State University of New Jersey on 1/1/2024. We are actively searching for ambitious students, postdocs, and staff members, who are talented and motivated. As part of our team, you will be at the forefront of an interdisciplinary venture, bridging the gap between computer science and biology. Embrace the opportunity to work in a vibrant, synergistic and open environment where collaboration sparks innovation.

### About the PI:

- Ph.D. in genetics w/ Dr. Ming Li @University of Virginia
- Postdoc: cancer epigenomics w/ Dr. Mazhar Adli @UVA (2016-2019); single-cell technology w/ Dr. Sunney Xie @Harvard (2019); single-cell disease w/ Dr. Manolis Kellis @MIT & Broad Institute of MIT and Harvard (2019-2023)
- NIH T32 Harvard training award, MIT Alana Fellowship

## Computational-driven Biological Discovery

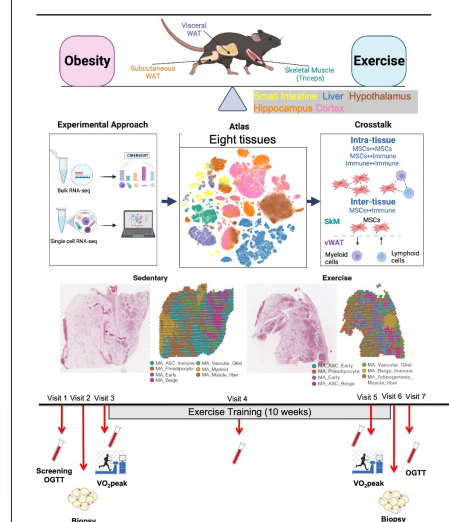


## Mentoring Philosophy

Mentoring extends beyond mere knowledge transfer. I champion:

- 1. Intellectual Equality** - Every question merits exploration; embrace the freedom to delve into science.
- 2. Shared Growth** - We evolve through failures, transforming them into successes.
- 3. Collaborative Spirit** - I neither compete with mentees over contributions nor foster competition within the team.
- 4. Holistic Wellness** - Prioritizing mental and physical well-being over sheer productivity.
- 5. Transparency** - Decisions and resources are communicated openly.

## Multi-tissue single-cell dissection of the obesity-exercise axis in mouse & human



Yang, *et al.* Cell Metabolism (2022)

- We have collected 8 tissues from obese and exercise trained mice and built a cross-tissue single-cell atlas (scmetab.mit.edu).
- We have mapped cell-type-specific molecular changes in adipose tissue using 10X Visium.
- We have been analyzing human tissues using different technologies.

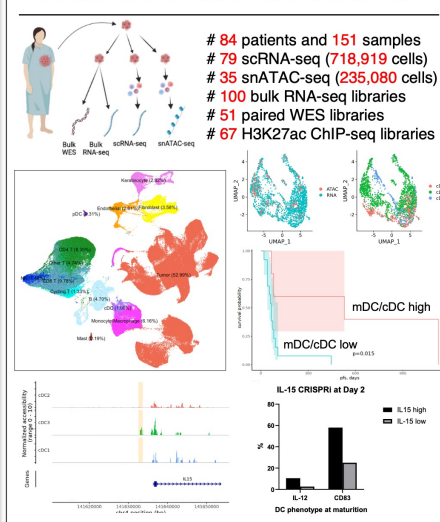
## Lab Environment

Our lab is a thriving hub of innovation, defined by:

- 1. Kindness** - Fostering a compassionate atmosphere.
- 2. Integrity** - Upholding unwavering ethical standards.
- 3. Collaboration** - Achieving excellence through teamwork.
- 4. Openness** - Welcoming diverse ideas and perspectives.

## Overview of Ongoing and Future Projects

### Understanding and epigenetic manipulation of dendritic cell state in the tumor microenvironment



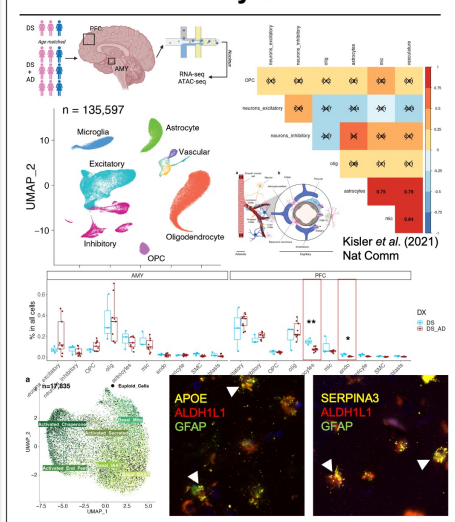
Yang, *et al.* Nature (submitted)

- We have put together a large cohort of clinical samples to query predictors of immune checkpoint inhibitor (ICI) response.
- We show mature dendritic cell (mDC) mediates ICI response and predicts patients' PFS.
- We have been manipulating DC epigenetically to drive its maturation.

## Selected List of Publications

- Yang, J.\*, Vamvini, M.\*, Nigro, P.\* et al., 2022. Single-cell dissection of the obesity-exercise axis in adipose-muscle tissues implies a critical role for mesenchymal stem cells. Cell Metabolism 34, 1578-1593.e6.
- Wei, X.\*, Yang, J.\* et al., 2020. Targeted CRISPR screening identifies PRMT5 as synthetic lethality combinatorial target with gemcitabine in pancreatic cancer cells. Proceedings of the National Academy of Sciences 117, 28068-28079.
- Yang, J.\*, Wei, X.\* et al., 2018. Recurrent mutations at estrogen receptor binding sites alter chromatin topology and distal gene expression in breast cancer. Genome Biology 19, 190.
- Yang, J.\*, Wang, S.\* et al., 2015. The contribution of rare and common variants in 30 genes to risk nicotine dependence. Mol Psychiatry 20, 1467-1478.

### Epigenomic & transcriptomic landscape of Alzheimer's Disease in Down Syndrome



Yang, *et al.* (in preparation)

- We have single-cell profiled amygdala and prefrontal cortex from age- and gender-matched DS individuals with or without AD.
- We observe significant co-depletion of microglia, astrocytes and vasculature in both brain regions.
- We have identified and validated heterogeneous populations of astrocytes.

## Contact

Contact us! Join us! [@yanjiekun](https://twitter.com/yanjiekun)  
[jackie.yang@rutgers.edu](mailto:jackie.yang@rutgers.edu); [jkyang@mit.edu](mailto:jkyang@mit.edu)

Video introduction



SCAN ME

Available positions



SCAN ME

Application form



SCAN ME



RUTGERS