Haikuo Li

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EDUCATION

PhD Student, Program in Molecular Genetics and Genomics 8/2019 – 12/2023
Washington University in St. Louis, MO, United States
- Thesis mentor: Benjamin D. Humphreys, M.D., Ph.D.
- Thesis committee: Ting Wang, Samantha Morris, Jeffrey Millman, Allegra Petti, Michael Meers

Bachelor of Science, Bioscience (Zhiyuan Honors Program) 9/2015 – 6/2019
Shanghai Jiao Tong University, Shanghai, China
- 2019 Top 0.2% Bachelor Thesis: Rank #1 in Bioscience
- 2019 Outstanding Graduate in Bachelor Degree, Shanghai

Visiting Student, Immunobiology 6/2018 – 4/2019
Yale University, New Haven, CT, United States
- Research supervisor: Aaron M. Ring, M.D., Ph.D.

PUBLICATIONS

First-author research articles

1. **Li, H.**, … & Humphreys, B. D. (unpublished work). Transcriptomic, epigenomic and spatial metabolomic cell profiling redefines regional human kidney anatomy.
2. **Li, H.**, Dixon, E. E., Wu, H., & Humphreys, B. D. (2022). Comprehensive single-cell transcriptional profiling defines shared and unique epithelial injury responses during kidney fibrosis. **Cell Metabolism**, 34(12), 1977–1998.e9. (**PDF**)
   - Research featured by NIH NIDDK annual report (upcoming link 2024)
   - Research Highlights by *Nature Review Nephrology* (**URL**)
   - Research Highlights by *Kidney International* (**URL**)
3. **Li, H.**, & Humphreys, B. D. (2022). Mouse kidney nuclear isolation and library preparation for single-cell combinatorial indexing RNA sequencing. **STAR Protocols**, 3(4), 101904. (**PDF**)
4. Ku, X.*, Wang, J.*, **Li, H.*** (co-first author), Meng, C., Yu, F., Yu, W., Li, Z., Zhou, Z., Zhang, C., Hua, Y., Yan, W.#, Jin, J.# (2022). Proteomic Portrait of Human Lymphoma Reveals Protein Molecular Fingerprint of Disease Specific Subtypes and Progression. **Phenomics**, 1-19. (**PDF**)
5. Wang, J.*, Ku, X.*, Ma, Q.*, **Li, H.*** (co-first author), et al., Jin, J.#, Yan, W.# (2023). Hsa_circ_0007099 and PIP4K2A coexpressed in diffuse large B-cell lymphoma with clinical significance. **Genes & Diseases**. (**PDF**)

First-author review/commentary articles

6. **Li, H.**, & Humphreys, B. D. (2022). New functions for basophils identified in kidney fibrosis. **Nature Immunology**, 23(6), 824-825. (**PDF**)

7. **Li, H.**, & Humphreys, B. D. (2021). Single cell technologies: Beyond microfluidics. **Kidney360**, 2(7), 1196. (PDF)
8. **Li, H.**, & Humphreys, B. D. (2020). Surveying the human single-cell landscape. **Kidney International**, 98(6), 1385-1387. (PDF)

First-author book chapter

9. Muto, Y*., **Li, H.*** (co-first author), & Humphreys, B. D. (2022). Single Cell Transcriptomics. **Innovations in Nephrology** (pp. 87-102). Springer, Cham. (PDF)

Other publications

10. Cheng, Z. et al. (special journal issue; author list alphabetically ordered) (2023). RNA-seq: questions and answers. **STAR Protocols**. (LINK)

SOFTWARE DEVELOPMENT

MALDIpy: Single-cell analysis of MALDI-MS imaging mass spectrometry data (first contributor; unpublished package)

- `pip install MALDIpy` (https://pypi.org/project/MALDIpy/)

RESEARCH EXPERIENCE

PhD Student, Benjamin Humphreys Lab 4/2020 – present
Division of Nephrology, Washington University in St. Louis

- Multiomics characterization of kidney physiology: developing an anatomically stratified human kidney atlas with single-cell combinatorial indexing multiomics sequencing
- Multiomics characterization of kidney pathology: studying mouse models of kidney fibrosis with single-cell combinatorial indexing RNA-seq and spatially resolved transcriptomics
- Studying metabolic mechanisms that drive kidney fibrosis
- Studying cell fate determination in kidney injury & regeneration and regional differentiation
- Method development: single-cell combinatorial indexing (split-pool barcoding) library generation and unique data analysis; computational pipeline of analyzing spatially resolved metabolomics data

PhD Rotation Student, Tim Peterson, Sidharth Puram, Benjamin Humphreys Labs 8/2019 – 4/2020
Washington University in St. Louis

- Peterson Lab: Understanding the intracellular effects of Cationic Amphipathic Drugs on organelles
- Puram Lab: Studying head and neck cancer by CITE-seq
- Humphreys Lab: Characterizing kidney injury and repair markers by RNAscope

Visiting Student, Aaron Ring Lab 6/2018 – 4/2019
Department of Immunobiology, Yale University

- Modulating immune cytokines by protein engineering
- Research mentor: Ting Zhou, Ph.D.

Undergraduate Researcher, Wei Yan Lab 9/2016 – 7/2018

Shanghai Center for Systems Biomedicine, Shanghai Jiao Tong University

- Identification of biomarkers of lymphoma with mass spectrometry; clinic proteomics
- Research mentor: Xin Ku, Ph.D.

Summer Intern, Manyuan Long Lab 6/2017 – 8/2017

Department of Ecology and Evolution, The University of Chicago

- Identification of mammalian positively selected genes by polygenetic analysis

Science Olympiad (Mathematics), Shandong Province Team, China 7/2014 – 2/2015

- Top10 students selected to participate in the Chinese Mathematics Olympics

SKILLS

Wet lab experiment

- Extensive experience in single-cell and single-nucleus library generation from diverse technologies, including 10X Genomics, sci-RNA-seq, SHARE-seq and INTACT, as well as multimodal profiling including RNA-seq, ATAC-seq, Hi-C, CUT&RUN, CARLIN and CITE-seq
- Extensive experience in molecular biology technologies such as cloning, vector construction, qPCR, immunohistology, and in-situ hybridization
- Extensive experience in tissue culture including primary cell isolation, immunocytochemistry and Seahorse metabolic measurement
- Strong experience in animal work such as mouse kidney disease surgery (UUO/IRI) and tumor implantation
- Strong experience in clinical sample management and processing such as human kidney dissection
- Strong background in protein chemistry including mass spectrometry sample preparation & recombinant protein preparation and protein liquid chromatography

Computational workflow

- Extensive experience in using Python, R, Shell and Jupyter
- Extensive experience in single-cell sequencing data preprocessing and analysis including UMAP visualization, data integration, sample demultiplexing, cell trajectory interference, fate mapping, gene activity prediction and multimodal analysis at the million-cell level.
- Extensive experience in spatially resolved transcriptomics and metabolomics analysis
- Strong experience in analysis of bulk RNA-seq, proteomics and metabolomics data
- Extensive experience in data mining and discovering biological insights
- Strong training background in mathematics

TEACHING EXPERIENCE

1. Trainee Supervisory Experience

Rotation Project Bench Mentor, Washington University in St. Louis 9/2023-11/2023

- Rachel W. (DBBS PhD student): Functional analysis of human kidney single-cell multiomics

Peer Study Mentor, Washington University in St. Louis 3/2023-6/2023

- Jenna U. (DBBS PhD student): Genomics (Bio5488) and Python-based coding tutoring

Rotation Project Bench Mentor, Washington University in St. Louis 12/2022-1/2023

- Qiao X. (DBBS PhD student): Spatially resolved metabolomics analysis and package development

Bench Mentor, Washington University in St. Louis 9/2022-7/2023

- Dian L. (DBBS PhD student): Single-cell multimodal integration on human kidney physiology

Peer Study Mentor, Washington University in St. Louis 1/2022 – 6/2022

- Julie C. (DBBS PhD student): Genomics (Bio5488) and Python-based coding tutoring

2. Course Instructor Assistant

Assistant Instructor, Washington University in St. Louis 8/2022 – 6/2023

- Structural bioinformatics of proteins (Bio4525)

Assistant Instructor, Washington University in St. Louis 1/2021 – 6/2021

- Genomics (Bio5488)

Undergraduate Teaching Assistant, Shanghai Jiao Tong University

- College Genetics Course (2/2019–6/2019)
- College Macrobiology Course (2/2018–6/2018)
- College Biochemistry Course (9/2017–1/2018)

PRESENTATIONS & POSTERS

Oral Talk Speaker, American Society of Nephrology Annual Meeting (ASN Kidney Week) 11/2023

Retreat Talk (MGG/CSB/HSG/IMSD programs), Washington University in St. Louis 9/2023

POSTER (**PDF**) | PhD program retreat, Washington University in St. Louis 9/2023

- Transcriptomic, epigenomic and spatial metabolomic cell profiling redefines regional human kidney anatomy

Project Talk, CZI Single-Cell Biology Annual Meeting 11/2022

Speaker, Nephrology Division Research Seminars, Washington University in St. Louis 9/2022

Retreat Talk (MGG/CSB/HSG/IMSD programs), Washington University in St. Louis 9/2022

POSTER (**PDF**) | PhD program retreat, Washington University in St. Louis 9/2022

- Cell profiling defines metabolic dysregulation in kidney fibrosis

DBBS Friday Talks (MGG/CSB/HSG/IMSD programs), Washington University in St. Louis 5/2022

REBUILDING A KIDNEY Spring Meeting | lighting talk 4/2022

PhD Program Thesis Committee Meeting, Washington University in St. Louis 8/2021, 4/2022

REBUILDING A KIDNEY Work in Progress | small group meeting 12/2021

PhD Program Qualifying Examination Committee Meeting 9/2020

POSTER (**PDF**) | SJTU Academic Festival (Best Poster Award) 2/2019

- Modulating the Tumor-Targeting Specificity of "Decoy-Resistant" Interleukin-18 by Protein Engineering

POSTER (**PDF**) | Human Proteome Organization World Congress 10/2018

- Clinical Proteomics Analysis using Data Independent Acquisition-Mass Spectrometry (DIA-MS) Identified Classifiers for Molecular Characterization of Lymphoma

POSTER (**PDF**) | SJTU Academic Festival (Best Poster Award) 12/2017

- Detecting Positively Selected Genes among Mammalian Species Using Phylogenetic Analysis of Maximum Likelihood

HONORS & ACTIVITIES

Award for Outstanding Students Abroad [highest award granted by the Chinese government to Chinese students

overseas (**LINK**)] 2023

Member, NCFDD (National Center for Faculty Development & Diversity) 2023 - present

Member, ASN (American Society of Nephrology) 2020 - present

Top 0.2% Bachelor Thesis of Shanghai Jiao Tong University (**URL**) (Thesis **PDF**) 2019

Outstanding Graduate in Bachelor Degree, Shanghai 2019

Academic Excellence Scholarship (First-class), Shanghai Jiao Tong University 2016, 2017, 2018

Rank #1 Student Presentation, National Biology Education Conference of Chinese Ministry of Education 2018

Vice President, Students' Union of Zhiyuan Honors Program, Shanghai Jiao Tong University 2017 - 2018

Top 0.1% in Chinese University Entrance Examination (681 points) 2015

Bronze medal, Chinese Mathematical Olympiad (CMO) 2014