

Haikuo Li

Postdoctoral Researcher at Yale University

haikuo.li@yale.edu | Twitter @HaikuoLi

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.**, Li, D., Ledru, N., Xuanyuan, Q., Wu, H., Asthana, A., ... & Humphreys, B. D. (2024). Transcriptomic, epigenomic, and spatial metabolomic cell profiling redefines regional human kidney anatomy. *Cell Metabolism*. ([URL](#))
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 ([PDF](#))
 - Research Highlights by *Nature Review Nephrology* ([URL](#))
 - Research Highlights by *Kidney International* ([URL](#))
3. **Li, H.**, & Humphreys, B. D. (2024). Spatially resolved metabolomic dataset of distinct human kidney anatomic regions. *Data in Brief*, 110431. ([URL](#))
4. **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](#))
5. 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](#))
6. 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

7. Li, H., & Humphreys, B. D. (2024). Multimodal characterization of sexual dimorphism in the mammalian kidney. *Kidney International*, in Press.
8. Li, H., & Humphreys, B. D. (2024). Targeting de novo lipogenesis to mitigate kidney disease. *The Journal of Clinical Investigation*, 134(4). (PDF)
9. **Li, H.**, & Humphreys, B. D. (2022). New functions for basophils identified in kidney fibrosis. *Nature Immunology*, 23(6), 824-825. (PDF)
10. **Li, H.**, & Humphreys, B. D. (2021). Single cell technologies: Beyond microfluidics. *Kidney360*, 2(7), 1196. (PDF)
11. **Li, H.**, & Humphreys, B. D. (2020). Surveying the human single-cell landscape. *Kidney International*, 98(6), 1385-1387. (PDF)

First-author book chapter

12. 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

13. Wilson, P. C., Verma, A., Yoshimura, Y., Muto, Y., **Li, H.**, Malvin, N. P., ... & Humphreys, B. D. (2024). Mosaic loss of Y chromosome is associated with aging and epithelial injury in chronic kidney disease. *Genome biology*, 25(1), 36. (PDF)
14. 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

Postdoctoral Research Associate, Rong Fan Lab Biomedical Engineering, School of Engineering & Applied Science, Yale University	2/2024 – present
Research Associate, Benjamin Humphreys Lab Division of Nephrology, Washington University in St. Louis	12/2023 – 1/2024
PhD Student, Benjamin Humphreys Lab Division of Nephrology, Washington University in St. Louis	4/2020 – 12/2023
<ul style="list-style-type: none">• 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. (PhD student in CSB/DBBS): Functional analysis of human kidney single-cell multiomics
- Peer Study Mentor, Washington University in St. Louis** 3/2023-6/2023
- Jenna U. (PhD student in MGG/DBBS): Genomics (Bio5488) and Python-based coding tutoring
- Rotation Project Bench Mentor, Washington University in St. Louis** 12/2022-1/2023
- Qiao X. (PhD student in BIDS/DBBS): Spatially resolved metabolomics analysis and package development
- Bench Mentor, Washington University in St. Louis** 9/2022-7/2023
- Dian L. (PhD student in CSB/DBBS): Single-cell multimodal integration on human kidney physiology
- Peer Study Mentor, Washington University in St. Louis** 1/2022 – 6/2022
- Julie C. (PhD student in HSG/DBBS): 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, 4/2023, 12/2023
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