

# Haikuo Li

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## EDUCATION

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### PhD Student, Program in Molecular Genetics and Genomics

8/2019 – 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

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### First-author research articles

1. **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 Highlights by *Nature Review Nephrology* (URL)
  - Research Highlights by *Kidney International* (URL)
2. **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)
3. 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)
4. (Unpublished ongoing research: Multimodal profiling of human kidneys with SHARE-seq and spatial metabolomics)

### First-author review/commentary articles

5. **Li, H.**, & Humphreys, B. D. (2022). New functions for basophils identified in kidney fibrosis. **Nature Immunology**, 23(6), 824-825. (PDF)
6. **Li, H.**, & Humphreys, B. D. (2021). Single cell technologies: Beyond microfluidics. **Kidney360**, 2(7), 1196. (PDF)
7. **Li, H.**, & Humphreys, B. D. (2020). Surveying the human single-cell landscape. **Kidney International**, 98(6), 1385-1387. (PDF)

## **First-author book chapter**

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

## **SOFTWARE DEVELOPMENT**

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**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**

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**PhD Student, Benjamin Humphreys Lab** 4/2020 – present

Division of Nephrology, Washington University in St. Louis

- Developing a single-cell atlas of kidney fibrosis with single-cell multimodal profiling
- 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 spatial 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

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### 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, 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 inference, fate mapping, gene activity prediction and multimodal analysis at the million-cell level. This also includes spatial 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

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

- Structural bioinformatics of proteins (Bio4525)

**Peer Study Mentor, Washington University in St. Louis** 1/2022 – 6/2022; 3/2023-6/2023

- Genomics (Bio5488) and Python-based coding tutoring

**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

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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 ( <b>PDF</b> )   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 ( <b>PDF</b> )   SJTU Academic Festival (Best Poster Award)	2/2019
• Modulating the Tumor-Targeting Specificity of “Decoy-Resistant” Interleukin-18 by Protein Engineering	
POSTER ( <b>PDF</b> )   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 ( <b>PDF</b> )   SJTU Academic Festival (Best Poster Award)	12/2017
• Detecting Positively Selected Genes among Mammalian Species Using Phylogenetic Analysis of Maximum Likelihood	

## HONORS & ACTIVITIES

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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 ( <b>URL</b> ) (Thesis <b>PDF</b> )	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