

Zian Liu

Professional affiliation

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EDUCATION

Doctor of Philosophy, Quantitative and Computational Biosciences 2019-07 – 2024-04
Dissertation title -
Mechanism and consequence of CpG methylation: statistical insights into mutation rates and aging
Baylor College of Medicine, Houston, TX

Graduate Certificate, Biochemistry and Molecular Biology 2018-08 – 2019-05
Purdue University, West Lafayette, IN

Bachelor of Science, Biochemistry; Nutrition Science 2015-08 - 2019-05
GPA: 3.95/4.00 (with distinction)
Minors: Statistics, Biology
Purdue University, West Lafayette, IN

HONORS AND AWARDS

Graduate Student Scholarship, MD Anderson Foundation 2019-10
Purdue Honors College 2016-08 – 2019-05
Dean's List, College of HHS 2015-08 – 2019-05
Edwin T. Mertz Memorial Scholarship, Department of Biochemistry 2018-08 – 2019-05
Martin Agricultural Research Scholarship, College of Agriculture 2018-08 – 2019-05
OUR Scholars, Purdue Office of Undergraduate Research 2018-01 – 2018-05
Watts Family Scholarship, College of Health and Human Sciences 2017-08 – 2018-05
Sharon Rulon Broadhead Scholarship, College of HHS 2016-08 – 2017-05

PUBLICATIONS

Peer-reviewed

- **Liu Z**, Samee MAH. Structural underpinnings of mutation rate variations in the human genome. *Nucleic Acids Research* (2023); gkad551.
- Shi X, Li M, Tan L et al. (**co-author**). Purine metabolism modulates leukemia stem cell maintenance in MLL-rearranged acute leukemia. *Blood* (2023); 142 (Supplement 1): 582.
- Xu W, Graves A, Weisz-Hubshman M et al. (**co-author**). Assigning pathogenicity for TAB2 variants using a novel scalable functional assay and expanding TAB2 disease spectrum. *Human Molecular Genetics* (2022).
- Akhand SA, Hao C, Purdy SC et al (**co-author**). Fibroblast growth factor receptor facilitates recurrence of minimal residual disease following trastuzumab emtansine therapy. *npj Breast Cancer* (2021); 7: 5.
- Akhand SS, **Liu Z**, Purdy SC et al. Pharmacological inhibition of FGFR modulates the metastatic immune microenvironment and promotes response to checkpoint blockade. *Cancer immunology research* (2020); 8(12): 1542–1553.

- Mao F, Li J, Luo Q et al (**co-author**). Plk1 inhibition enhances the efficacy of BET epigenetic reader blockade in castration-resistant prostate cancer. *Molecular cancer therapeutics* (2018); 17(7).

Preprints/in preparation

- **Liu Z**, Samee MAH. Imputation approaches and quality standards for single-cell epigenetic age predictions. *bioRxiv* (2023); 571557.
- **Liu Z**, Samee MAH. Epigenetic age analysis of single cell colorectal cancer data reveal pathways contributing to aging variation.

RESEARCH EXPERIENCE

Samee Lab, Baylor College of Medicine, Houston, TX 2020-03 – 2024-04

Project: Epigenetic age analysis in human single cells

- Designed the first pipeline for applying epigenetic age analyses on human single-cell data
- Benchmarked performances of epigenetic age clocks on synthetic data
- Analyzed and interpreted epigenetic age values of single-cell colorectal cancer data

Project: Analysis of mutation rate variations with DNA shape

- Modeled DNA mutation rate variations with DNA shape features and outperformed state-of-the-art model
- Identified relationships between DNA shape variations and transcription factor binding site position-specific mutation rates
- Built novel bash pipeline for mutation rate calculation with VCF files

Various lab management experiences and collaborations

- Managed the lab Codeberg repository at <https://codeberg.org/sameelab>
- Mentored several past and current lab employees and trainees
- Analyzed and interpreted transcriptomics and epigenomics sequencing data
- Calculated pathogenicity scores for various genomic variants identified through experimental arrays
- Performed RNA-DNA binding analyses for a novel non-coding RNA

Wendt Lab, Purdue University, West Lafayette, IN 2018-08 – 2019-07

Undergraduate researcher

- Analyzed immune effects of a novel covalent fibroblast growth factor receptor (FGFR) inhibitor
- Evaluated intramolecular mechanisms of antibody-drug conjugate resistance via multiple cell-based assays
- Compared metastatic potential of drug-treated cancer cells in mice via injection, surgery, and immunostaining

Liu Lab, Purdue University, West Lafayette, IN 2017-01 – 2018-07

Undergraduate researcher

- Assisted identifying a novel Plk1 substrate by purifying wildtype/mutant DNA and protein fragments
- Tested Plk1 as a marker for ascorbate effectiveness in inhibiting prostate cancer cell line growth
- Genotyped transgenic mice for the presence of Plk1, Cre, or other relevant genotypes

PRESENTATIONS

Liu Z, Stoeger T. LLMs are biased toward well-studied genes. *CSHL Biological Data Science* (poster). 2024-11-14

Liu Z, Samee MAH. Imputation approaches and quality standards for single-cell epigenetic age predictions. *CSHL Single Cell Analyses* (poster). 2023-11-09

Liu Z, Samee MAH. DNA structural information underpins mutation rate variations and regulatory site

polymorphisms in the human genome. *ASHG Annual Meeting* (poster). 2023-11-02
Liu Z, Samee MAH. Structural underpinnings of mutation rate variations and regulatory site polymorphisms in the human genome. *CSHL Biology of Genomes* (poster). 2021-05-11
Liu Z, Akhand SA, Wendt MK. Fibroblast growth factor receptor inhibition via FIIN-4 interferes with T-cell receptor pathway. *Purdue Undergraduate Research Conference* (talk). 2019-04-09
Liu Z. Pharmacological targeting of growth-factor receptor to combat breast cancer drug resistance. *Purdue Fall Undergraduate Research Exposition* (poster). 2018-11-12
Liu Z, Zhang Y, Liu X. To study the role of Plk1 in ascorbate-toxicity in prostate cancer cells. *Purdue Undergraduate Research Conference* (poster). 2018-04-10

MEMBERSHIPS

American Thoracic Society	2024-10 – Present
Phi Beta Kappa	2018-04 – 2019-05
American Society for Biochemistry and Molecular Biology	2016-11 – 2019-05

SKILLS

Programming: Python, R, GNU bash, C, HTML/CSS, git, docker, nextflow
Scientific: statistics, data science/machine learning, bioinformatics, molecular biology
Languages: Mandarin Chinese (fluent), English (fluent), Japanese (N1), German (beginner)

OTHER EXPERIENCES

<i>Mentoring Up and Down Workshop</i> , Northwestern University, Chicago, IL	2024-10
<i>UCLA Bio-Launch Competitive Postdoc Recruitment Program</i> , Virtual	2023-05
<i>Summer research program coordinator</i> , Baylor College of Medicine, Houston, TX	2020-07
<i>Student Editorial Board Member</i> , West Lafayette, IN	2017-12 – 2019-04
<i>Lab assistant</i> , Camp DASH, West Lafayette, IN	2017-05 – 2017-07
<i>Undergraduate Research Assistant</i> , Grant Lab, West Lafayette, IN	2015-11 – 2016-08