

# Zhongxuan Sun

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## RESEARCH FOCUS

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Statistical genomics and causal inference, with interests in single-cell CRISPR perturbation analysis, gene regulatory network inference, bias in genetic association studies, and polygenic risk score methodology.

## EDUCATION

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### University of Wisconsin–Madison

*Ph.D., Biomedical Data Science*

Madison, WI

2023–Present

- Advisors: Prof. Sündüz Keleş and Prof. Hyunseung Kang.

### University of Wisconsin–Madison

*B.S., Mathematics and Statistics — Graduation with Distinction*

Madison, WI

2019–2023

- Research advisor: Prof. Qiongshi Lu.

## PUBLICATIONS

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\* Equal contribution.

### First / Co-first Author

- **Sun, Z.**, Kang, H., Keleş, S. Causal gene regulatory network inference from Perturb-seq via adaptive instrumental variable modeling. *Research in Computational Molecular Biology (RECOMB)*, 2026.
- Wu, Y.<sup>\*</sup>, **Sun, Z.**<sup>\*</sup>, Zheng, Q., Miao, J., Dorn, S., Mukherjee, S., Fletcher, J., Lu, Q. Pervasive biases in proxy genome-wide association studies based on parental history of Alzheimer’s disease. *Nature Genetics*, 56(12): 2696–2703, 2024.

### Co-author

- Park, K., **Sun, Z.**, Liao, R., Bresnick, E. H., Keleş, S. Systematic background selection with BasCoD enhances contrastive dimension reduction in single cell genomics. *Nature Communications*, 2026.
- Zhao, Z., Gruenloh, T., Yan, M., Wu, Y., **Sun, Z.**, Miao, J., Wu, Y., Song, J., Lu, Q. Optimizing and benchmarking polygenic risk scores with GWAS summary statistics. *Genome Biology*, 25(1): 260, 2024.
- Miao, J., Wu, Y., **Sun, Z.**, Miao, X., Lu, T., Zhao, J., Lu, Q. Valid inference for machine learning-assisted genome-wide association studies. *Nature Genetics*, 56(11): 2361–2369, 2024.
- Xu, Y., **Sun, Z.**, Jonaitis, E. M., Deming, Y., Lu, Q., Johnson, S., Engelman, C. Mid-to-Late Life Healthy Lifestyle Modifies Genetic Risk for Longitudinal Cognitive Aging among Asymptomatic Individuals. *medRxiv* (preprint), 2024.
- Xu, Y., **Sun, Z.**, Jonaitis, E., Deming, Y., Lu, Q., Johnson, S., Engelman, C. Apolipoprotein E moderates the association between non-APOE polygenic risk score for Alzheimer’s disease and aging on preclinical cognitive function. *Alzheimer’s & Dementia*, 20(2): 1063–1075, 2024.
- Furuya, S., Liu, J., **Sun, Z.**, Lu, Q., Fletcher, J. The Big (Genetic) Sort? A Research Note on Migration Patterns and Their Genetic Imprint in the United Kingdom. *Demography*, 60(6): 1649–1664, 2023.
- Furuya, S., Liu, J., **Sun, Z.**, Lu, Q., Fletcher, J. Understanding Internal Migration: A Research Note Providing an Assessment of Migration Selection With Genetic Data. *Demography*, 60(6): 1631–1648, 2023.
- Amin, V., Fletcher, J., **Sun, Z.**, Lu, Q. Higher educational attainment is associated with longer telomeres in midlife: Evidence from sibling comparisons in the UK Biobank. *SSM–Population Health*, 17: 101018, 2022.
- Furuya, S., Fletcher, J., Zhao, Z., **Sun, Z.**, Lu, Q. Detecting genetic heterogeneities in response to trauma: The case of 9/11. *SSM–Mental Health*, 2: 100044, 2022.

## CONFERENCE PRESENTATIONS

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*Estimating Gene Regulatory Networks Using Perturb-seq Data.*

- Poster + Lightning Talk, American Causal Inference Conference (ACIC), 2025.

*Pervasive Biases in GWAS Using Family History of Alzheimer's Disease.*

- Poster, American Society of Human Genetics (ASHG), 2024.
- Talk, Integrating Genetics and the Social Sciences (IGSS), 2024.
- Talk, The Advances in Social Genomics Conference Series (TAGC), 2024.
- Poster, American Society of Human Genetics (ASHG), 2022.

**HONORS & AWARDS**

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- RECOMB 2026 Conference Travel Fellowship, 2026.
- Wisconsin Hilldale Undergraduate/Faculty Research Fellowship (advisor: Qiongshi Lu), 2022.

**PEER REVIEW**

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- Reviewer for *Alzheimer's Research & Therapy*, *BMC Medical Genomics*, *npj Aging*, *npj Dementia*, *Scientific Reports*.

**MENTORSHIP**

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- Mentored Qinwen Zheng (undergraduate, UW–Madison, 2022–2024) in computational and statistical methods for statistical genetics research. Qinwen is now a PhD student in Biostatistics at the University of North Carolina at Chapel Hill.