

Eric D. Sun

Department of Biological Engineering, Massachusetts Institute of Technology
The Ragon Institute of MGH, MIT, and Harvard
edsun@mit.edu — (719) 568-4829

Education

Stanford University PhD, Biomedical Informatics	2020-2025
Harvard University SM, Applied Mathematics	2019-2020
Harvard University AB, Chemistry and Physics, <i>Summa Cum Laude</i>	2016-2020

Professional Appointments

Massachusetts Institute of Technology , Cambridge, MA Assistant Professor, Department of Biological Engineering Member, The Ragon Institute of MGH, MIT, and Harvard	January 2026 (incoming) January 2026 (incoming)
Stanford University (Zou & Brunet Labs), Stanford, CA Postdoctoral fellow, Department of Genetics Graduate research assistant, Department of Biomedical Data Science	2025 2020-2025
Harvard University (Mahadevan Lab), Cambridge, MA Undergraduate research assistant, Department of Physics and Applied Mathematics	2018-2020
Stanford University (Snyder Lab), Stanford, CA Summer research intern, Department of Genetics	2019
National Institute on Aging , Baltimore, MD Summer research intern, Human Genetics Unit	2018-2019
Radcliffe Institute for Advanced Study , Cambridge, MA Research partner, Zurzolo group Research partner, Lenormand group	2018-2019 2017-2018
Harvard Medical School (Sinclair Lab), Boston, MA Undergraduate research assistant, Department of Genetics	2017-2018
Icahn School of Medicine at Mount Sinai (Karr Lab), New York, NY Winter research intern, Department of Genetics	2017
Weizmann Institute of Science , Rehovot, Israel Summer Science Student, Department of Brain Sciences	2016
National Institute on Aging , Baltimore, MD Summer research intern, Image Informatics and Computational Biology Unit	2014

Honors and Awards

Rising Star - Genomic Press	2025
National Science Foundation (NSF) Graduate Research Fellowship	2022-2025
Knight-Hennessy Scholar	2020-2025
Bay Area Aging Meeting - Most Outstanding Poster Prize	2024
Paul & Daisy Soros Fellowship for New Americans	2020-2022
Sophia Freund Prize (highest rank graduate in Harvard Class of 2020)	2020
John Harvard Scholar (four-time)	2017-2020
Phi Beta Kappa (Harvard Senior 48)	2019
Harvard BioHackathon - First Place Eco-Sustainability	2018
Radcliffe Research Poster Contest Winner	2018
Amgen Scholar	2018
Detur Book Prize	2017
Harvard BioHackathon - First Place Computers and Life	2017
National Institute on Aging (NIA) Barbara A. Hughes Award of Excellence	2014

Publications

* denotes equal contribution

Select Primary Papers:

1. **Sun ED**, Zhou OY, Hauptschein M, Rappoport N, Xu L, Navarro Negredo P, Ling L, Rando TA, Zou J*, Brunet A*. [Spatial transcriptomic clocks reveal cell proximity effects in brain ageing](#). **Nature** (2025).
2. **Sun ED**, Ma R, Zou J. [SPRITE: improving spatial gene expression imputation with gene and cell networks](#). **Bioinformatics** 40, i521–i528 (2024).
3. **Sun ED**, Ma R, Navarro Negredo P, Brunet A, Zou J. [TISSUE: uncertainty-calibrated prediction of single-cell spatial transcriptomics improves downstream analyses](#). **Nature Methods** 21, 444–454 (2024).
4. **Sun ED**, Ma R, Zou J. [Dynamic visualization of high-dimensional data](#). **Nature Computational Science** 3, 86–100 (2023).
5. Buckley MT*, **Sun ED***, George BM, Liu L, Schaum N, Xu L, Reyes JM, Goodell MA, Weissman IL, Wyss-Coray T, Rando TA, Brunet A. [Cell type-specific aging clocks to quantify aging and rejuvenation in regenerative regions of the brain](#). **Nature Aging** 3, 121–137 (2023).
6. **Sun ED**, Qian Y, Oppong R, Butler TJ, Zhao J, Chen BH, Tanaka T, Kang J, Sidore C, Cucca F, Bandinelli S, Abecasis GR, Gorospe M, Ferrucci L, Schlessinger D, Goldberg I, Ding J. [Predicting physiological aging rates from a range of quantitative traits using machine learning](#). **Aging** 13, 23471–23516 (2021).
7. **Sun ED**, Dekel R. [ImageNet-trained deep neural networks exhibit illusion-like response to the Scintillating grid](#). **Journal of Vision** 21, 15 (2021).
8. **Sun ED***, Michaels TCT*, Mahadevan L. [Optimal control of aging in complex networks](#). **Proceedings of the National Academy of Sciences** 117, 20404–20410 (2020).

Other Primary Papers:

9. Liu T, Hao M, **Sun ED**, Markov Y, Ying R, Zhang L, Zhao H. [BrainBridge characterizes key factors affecting Alzheimer’s disease and associated phenotypes](#). In preparation
10. Alber S*, Chen B*, **Sun ED**, Markov Y, Isakova A, Wilk AJ, Zou J. [CellVoyager: AI CompBio agent generates new insights by autonomously analyzing biological data](#). Under review
11. Su Y, Zhou Y, Wang L, Gullapalli R, **Sun ED**, Sun Y, Zhang M, Hu P, Nauen D, Brunet A, Ming G, Song H. [Transcriptomic age clocks of glial cell types in the human hippocampus across the postnatal lifespan](#). Under review

12. Miklas JW, Papsdorf K, **Sun ED**, Haseley NR, Medoh UN, Tsenter A, McCarthy F, Artiles KL, Hims A, Levina A, Zhou OY, Elias JE, Abu-Remaileh M, Brunet A. [Quantitative characterization of the aging intestine secretome reveals novel secreted proteins that act in the extracellular space to regulate lifespan](#). In revision
13. Negredo PN, Hauptschein M, Richard D, Abhiraman G, Ramirez-Matias J, Zhou O, Malacon K, Buckley M, **Sun ED**, Xu L, Picton L, Saxton R, Fernandes R, Garcia K, Brunet A. [Targeting immune cells in the aged brain with engineered proteins](#). In revision
14. Ruetz TJ, Pogson AN*, Kashiwagi CM*, Gagnon SD, Morton B, **Sun ED**, Na J, Yeo RW, Leeman DS, Morgens DW, Tsui CK, Li A, Bassik MC, Brunet A. [CRISPR-Cas9 screens reveal regulators of ageing in neural stem cells](#). **Nature** 634, 1150–1159 (2024).
15. Xu L, Ramirez-Matias J, Hauptschein M, **Sun ED**, Lunger JC, Buckley MT, Brunet A. [Restoration of neuronal progenitors by partial reprogramming in the aged neurogenic niche](#). **Nature Aging** 4, 546–567 (2024).
16. Ma R, **Sun ED**, Donoho D, Zou J. [Is your data alignable? Principled and interpretable alignability testing and integration of single-cell data](#). **Proceedings of the National Academy of Sciences** 121, e2313719121 (2024).
17. Yeo RW*, Zhou OY*, Zhong BL, **Sun ED**, Negredo PN, Nair S, Sharmin M, Ruetz TJ, Wilson M, Kundaje A, Dunn AR, Brunet A. [Chromatin accessibility dynamics of neurogenic niche cells reveal defects in neural stem cell adhesion and migration during aging](#). **Nature Aging** 3, 866–893 (2023).
18. Ma R, **Sun ED**, Zou J. [A spectral method for assessing and combining multiple data visualizations](#). **Nature Communications** 14, 780 (2023).
19. Chakrabarti A*, Michaels TCT*, Yin S, **Sun ED**, Mahadevan L. [The cusp of an apple](#). **Nature Physics** 17, 1125–1129 (2021).
20. Lenormand T, Fyon F, **Sun ED**, Roze D. [Sex chromosome degeneration by regulatory evolution](#). **Current Biology** 30, 3001-3006.e5 (2020).

Review Papers:

21. **Sun ED***, Nagvekar R*, Pogson AN*, Brunet A. [Brain aging and rejuvenation at single-cell resolution](#). **Neuron** 113, 82–108 (2025).

Presentations

Seminars and talks:

- Invited presentation for mathematics topics group at Theis Lab. July 2025
- Invited speaker at 2025 International Neural Regeneration Symposium Series Webinar. June 2025
- Invited talk at STATGEN 2025 Session on Recent Developments in Computational Methods for Single-Cell Omics Integration and Modeling. May 2025
- Invited panelist at ISTAART Basics Webinar. March 2025. “Immunity and Neurodegeneration: The Basics of Which Immune Cells are in the Brain and How do we Identify Them? A Single Cell Analysis Primer”
- Invited seminar for Statistics for Spatial Genomics at Vanderbilt University Medical Center (virtual). October 2024. “Uncertainty-calibrated imputation for imaging-based spatial transcriptomics”
- Invited presentation at Gordian Biotechnology and Age1. October 2024. “Spatial mapping and modeling of the aging brain”
- Invited seminar at Sunbelt Spatial Omics Seminar Series. October 2024. “Uncertainty-aware imputation of spatial transcriptomics with applications to brain aging”
- Proceedings talk at Intelligent Systems for Molecular Biology Conference. July 2024. “SPRITE: improving spatial gene expression imputation with gene and cell networks”

- Spotlight talk at Stanford AI for Health and Data Science Applications Workshop. April 2024. “Machine learning for mapping brain aging and rejuvenation”
- Research talk at Simons Collaboration on Plasticity and the Aging Brain (SCPAB) Annual Meeting. October 2023. “Tracking brain aging with spatial transcriptomics”
- Research talk at Stanford Genetics Retreat. September 2023. “Spatial transcriptomics profiling of the aging brain”
- Spotlight talk at ICML Computational Biology Workshop (**Top 10% of submissions**). July 2023. “Graph reinforcement and smoothing for improved spatial gene expression prediction”
- Research talk at Simons Collaboration on Plasticity and the Aging Brain (SCPAB) Annual Meeting. April 2022. “Cell type-specific aging clocks to quantify aging and rejuvenation in neurogenic regions of the brain”
- Research talk at SENS SRF Summer Symposium. September 2019. “Identifying age-related changes in gene and protein expression”
- Oral presentation at American Physical Society March Meeting. March 2019. “Optimal control of aging in complex networks”

Posters:

- Simons Collaboration on Plasticity and the Aging Brain (SCPAB) Annual Meeting. October 2024. “Spatial aging clocks reveal cell type proximity effects of brain aging and rejuvenation”
- Cold Spring Harbor Laboratory Mechanisms of Aging. September 2024. “Spatial aging clocks reveal cell type proximity effects of brain aging and rejuvenation”.
- Bay Area Aging Meeting (BAAM). May 2024. “Spatial aging clocks reveal cell type proximity effects of brain aging and rejuvenation”. **Most Outstanding Poster Prize**
- Stanford DBDS Fest. May 2023. “Uncertainty-aware imputation of single-cell spatial transcriptomics improves downstream analyses”
- Stanford DBDS Fest. May 2022. “Dynamic visualization of high-dimensional data”
- Bay Area Aging Meeting (BAAM). May 2022. “Cell type-specific aging clocks to quantify aging and rejuvenation in regenerative regions of the brain”
- Stanford Biomedical Data Science Retreat. September 2021. “Aging clocks based on single-cell RNAseq data and immunofluorescence images”
- Radcliffe Institute Research Day. April 2018. “Polygenic model for the evolution of sex chromosome regulation”. **Best Poster Prize**

Interviews:

- Invited interview. [Eric Sun: Understanding brain aging at spatial and single-cell resolution with machine learning](#). Genomic Psychiatry
- Invited interview. The Single-cell and Spatial Playbook. Frontline Genomics

Teaching Experience

Workshop in Biostatistics (BIODS 260B): Guest Lecturer, Winter 2023

- Invited lecture titled “Meta-algorithms for high-dimensional data visualization”

Biomedical Data Science (BIOMEDIN 202): Teaching Assistant, Winter 2023

- Helped design new course, developed problem set for data fusion, lectured, held office hours, graded.

Data Science for Medicine (BIOMEDIN 215): Teaching Assistant, Fall 2021

- Assisted with in-class activities, held office hours, graded assignments.

Nonlinear Dynamical Systems (APMTH 108): Teaching Assistant, Spring 2019 & 2018

- Facilitated in-class activities, graded assignments, held office hours, taught exam review sessions.

Mentorship Experience

Foundation model for spatial transcriptomics, Rotation Student, Winter 2025

- Mentored through Zou group

Spatial transcriptomic profiling of corpora amylacea during aging, Rotation Student, Fall 2024

- Jointly mentored with Dr. Daniel Heinzer (Brunet lab)

Pre-training for epigenetic aging clocks, Post-bac, 2024-Present

- Top 5 model on public Biomarkers of Aging Challenge (2024)

Quantifying heterogeneity in late-life mortality deceleration, Undergraduate, 2019-2020

- Oral presentation at 2019 SIAM Applied Math Symposium
- Poster presentation at 2019 American Physical Society April Meeting
- Poster presentation at 2019 National Collegiate Research Conference

Service

Invited Peer Review: Bioinformatics, Computational and Structural Biotechnology Journal, Mechanisms of Ageing and Development, npj Aging

Collaborative Peer Review: Aging Cell, Cell, Nature, Nature Aging, Science

Past & Current Society Memberships: International Society for Computational Biology (ISCB), American Physical Society (APS)

Outreach

Stanford Science Penpals: November 2022 - May 2023

- Science outreach to minority, at-risk, and low-income students in Texas through letters

ADVANCE Undergraduate Institute (AUI): April 2023

- Mentorship program for diverse sophomores and juniors interested in graduate school

Pueblo Programming Workshops: 2015-2021

- Organized free public computer programming workshops in the greater Pueblo area (Colorado). From 2015-2017, annual workshops were held at the library and comprised of seven two-hour sessions taught by 3-8 instructors. From 2020-2021, workshops were virtual.

References

Anne Brunet (thesis co-adviser)

Michele and Timothy Barakett Professor

Department of Genetics

Stanford University

abrunet1@stanford.edu

James Zou (thesis co-adviser)

Associate Professor

Department of Biomedical Data Science

Stanford University

jamesz@stanford.edu

Rong Ma (collaborator)

Assistant Professor

Department of Biostatistics

Harvard T.H. Chan School of Public Health

rongma@hsph.harvard.edu