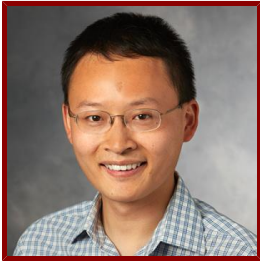


Stanford



James Zou

Associate Professor of Biomedical Data Science and, by courtesy, of Computer Science and of Electrical Engineering

Department of Biomedical Data Science

Bio

BIO

I am an Associate Professor of Biomedical Data Science and, by courtesy, of Computer Science and Electrical Engineering at Stanford University. I work on making AI more reliable, human-compatible and statistically rigorous, and am especially interested in applications in human disease and health. I received my Ph.D from Harvard in 2014, and was at one time a member of Microsoft Research, a Gates Scholar at Cambridge and a Simons fellow at U.C. Berkeley. I joined Stanford in 2016 and am excited to also be a Chan-Zuckerberg Investigator. We are also a part of the Stanford AI Lab. My research is supported by two Chan-Zuckerberg Biohub Investigator Awards, the Sloan Fellowship, the NSF CAREER Award, a Top Ten Clinical Achievement Award and faculty awards from Google, Adobe and Amazon.

ACADEMIC APPOINTMENTS

- Associate Professor, Department of Biomedical Data Science
- Associate Professor (By courtesy), Computer Science
- Associate Professor (By courtesy), Electrical Engineering
- Member, Bio-X
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Chan-Zuckerberg Investigator, CZ Biohub (2023)
- Sloan Research Fellowship, Sloan Foundation (2021)
- NSF CAREER Award, NSF (2020)
- RECOMB Best Paper, RECOMB (2019)
- Google Faculty Award, Google (2018)
- Chan-Zuckerberg Investigator, CZ Biohub (2017)
- Simons Research Fellow, Simons Foundation (2014)
- NSF GRFP, NSF (2008)
- Gates-Cambridge Scholar, Gates Foundation (2007)

LINKS

- My website: <https://www.james-zou.com/>
- Twitter: https://twitter.com/james_y_zou

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My group works on both foundations of statistical machine learning and applications in biomedicine and healthcare. We develop new technologies that make ML more accountable to humans, more reliable/robust and reveals core scientific insights.

We want our ML to be impactful and beneficial, and as such, we are deeply motivated by transformative applications in biotech and health. We collaborate with and advise many academic and industry groups.

Teaching

COURSES

2024-25

- Deep Learning in Genomics and Biomedicine: BIODS 237, BIOMEDIN 273B, CS 273B, GENE 236 (Spr)
- Foundation Models for Healthcare: BIODS 271, RAD 271 (Spr)

2023-24

- Biomedical Informatics Student Seminar: BIODS 201, BIOMEDIN 201 (Win)
- Critical Exploration of Topics in Biomedical Data Science: Generative AI: BIODS 290 (Aut)
- Deep Learning in Genomics and Biomedicine: BIODS 237, CS 273B (Spr)
- Foundation Models for Healthcare: BIODS 271, CS 277, RAD 271 (Win)

2022-23

- Deep Learning in Genomics and Biomedicine: BIODS 237, BIOMEDIN 273B, CS 273B, GENE 236 (Spr)
- Workshop in Biostatistics: BIODS 260B, STATS 260B (Win)

2021-22

- Value of Data and AI: CS 320 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Louis Blankemeier, Trang Le

Orals Chair

Omar Khattab

Postdoctoral Faculty Sponsor

Yiqun Chen, Siyu He, Sheng Liu, Pan Lu

Doctoral Dissertation Advisor (AC)

Joseph Boen, Yixing Jiang, Elana Simon, Eric Sun, Rahul Thapa, Kailas Vodrahalli, Eric Wu, Kevin Wu

Master's Program Advisor

Kathryn Garcia, Manoj Maddali, Ryan Park, Christopher Pondoc, Gaurav Rane, Daniel Schreck, Rohan Sikand, Jessy Song, Ori Spector, Ryan Zhao

Doctoral Dissertation Co-Advisor (AC)

Shirley Wu

Undergraduate Major Advisor

Nikhiya Shamsher

Doctoral (Program)

Jacob Chang, Karen Feng, Weixin Liang, Kyle Swanson, Nitya Thakkar, Haotian Ye, Mert Yuksekogonul

Postdoctoral Research Mentor

Ian Covert

Publications

PUBLICATIONS

- **BABEL enables cross-modality translation between multiomic profiles at single-cell resolution.** *Proceedings of the National Academy of Sciences of the United States of America*
Wu, K. E., Yost, K. E., Chang, H. Y., Zou, J.
2021; 118 (15)
- **Evaluating eligibility criteria of oncology trials using real-world data and AI.** *Nature*
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2021
- **How medical AI devices are evaluated: limitations and recommendations from an analysis of FDA approvals.** *Nature medicine*
Wu, E., Wu, K., Daneshjou, R., Ouyang, D., Ho, D. E., Zou, J.
2021
- **Integrating spatial gene expression and breast tumour morphology via deep learning.** *Nature biomedical engineering*
He, B., Bergenstrahle, L., Stenbeck, L., Abid, A., Andersson, A., Borg, A., Maaskola, J., Lundeberg, J., Zou, J.
2020
- **Video-based AI for beat-to-beat assessment of cardiac function.** *Nature*
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2020; 580 (7802): 252-256
- **How Much Does Your Data Exploration Overfit? Controlling Bias via Information Usage** *IEEE TRANSACTIONS ON INFORMATION THEORY*
Russo, D., Zou, J.
2020; 66 (1): 302–23
- **Fast and covariate-adaptive method amplifies detection power in large-scale multiple hypothesis testing.** *Nature communications*
Zhang, M. J., Xia, F., Zou, J.
2019; 10 (1): 3433
- **Large dataset enables prediction of repair after CRISPR-Cas9 editing in primary T cells.** *Nature biotechnology*
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2019
- **Making AI Forget You: Data Deletion in Machine Learning**
Ginart, A. A., Guan, M. Y., Valiant, G., Zou, J., Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2019
- **Interpretation of Neural Networks Is Fragile**
Ghorbani, A., Abid, A., Zou, J., AAAI
ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2019: 3681–88
- **Ensuring that biomedical AI benefits diverse populations.** *EBioMedicine*
Zou, J., Schiebinger, L.
2021: 103358

- **Data valuation for medical imaging using Shapley value and application to a large-scale chest X-ray dataset.** *Scientific reports*
Tang, S., Ghorbani, A., Yamashita, R., Rehman, S., Dunnmon, J. A., Zou, J., Rubin, D. L.
2021; 11 (1): 8366
- **How to evaluate deep learning for cancer diagnostics - factors and recommendations.** *Biochimica et biophysica acta. Reviews on cancer*
Daneshjou, R., He, B., Ouyang, D., Zou, J.
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- **TrueImage: A Machine Learning Algorithm to Improve the Quality of Telehealth Photos.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Vodrahalli, K., Daneshjou, R., Novoa, R. A., Chiou, A., Ko, J. M., Zou, J.
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- **Mouse aging cell atlas analysis reveals global and cell type-specific aging signatures.** *eLife*
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- **Variation in COVID-19 Data Reporting Across India: 6Months into the Pandemic.** *Journal of the Indian Institute of Science*
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- **Association of Rapid Eye Movement Sleep With Mortality in Middle-aged and Older Adults.** *JAMA neurology*
Leary, E. B., Watson, K. T., Ancoli-Israel, S., Redline, S., Yaffe, K., Ravelo, L. A., Peppard, P. E., Zou, J., Goodman, S. N., Mignot, E., Stone, K. L.
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- **Deep learning models to detect hidden clinical correlates** *LANCET DIGITAL HEALTH*
Ouyang, D., Zou, J.
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- **Deep learning models to detect hidden clinical correlates.** *The Lancet. Digital health*
Ouyang, D., Zou, J.
2020; 2 (7): e334-e335
- **Clinical Genetics Lacks Standard Definitions and Protocols for the Collection and Use of Diversity Measures.** *American journal of human genetics*
Popejoy, A. B., Crooks, K. R., Fullerton, S. M., Hindorf, L. A., Hooker, G. W., Koenig, B. A., Pino, N., Ramos, E. M., Ritter, D. I., Wand, H., Wright, M. W., Yudell, M., Zou, et al
2020
- **RNA-GPS predicts high-resolution RNA subcellular localization and highlights the role of splicing.** *RNA (New York, N.Y.)*
Wu, K. E., Parker, K. R., Fazal, F. M., Chang, H., Zou, J.
2020
- **Video-based AI for beat-to-beat assessment of cardiac function** *NATURE*
Ouyang, D., He, B., Ghorbani, A., Yuan, N., Ebinger, J., Langlotz, C. P., Heidenreich, P. A., Harrington, R. A., Liang, D. H., Ashley, E. A., Zou, J. Y.
2020
- **A benchmark of algorithms for the analysis of pooled CRISPR screens.** *Genome biology*
Bodapati, S., Daley, T. P., Lin, X., Zou, J., Qi, L. S.
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- **An online platform for interactive feedback in biomedical machine learning** *NATURE MACHINE INTELLIGENCE*
Abid, A., Abdalla, A., Abid, A., Khan, D., Alfozan, A., Zou, J.
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- **Deep learning interpretation of echocardiograms.** *NPJ digital medicine*
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- **LitGen: Genetic Literature Recommendation Guided by Human Explanations.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Nie, A. n., Pineda, A. L., Wright, M. W., Wand, H. n., Wulf, B. n., Costa, H. A., Patel, R. Y., Bustamante, C. D., Zou, J. n.

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- **NCI Workshop on Artificial Intelligence in Radiation Oncology: Training the Next Generation.** *Practical radiation oncology*
Kang, J. n., Thompson, R. F., Aneja, S. n., Lehman, C. n., Trister, A. n., Zou, J. n., Obcemea, C. n., El Naqa, I. n.
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- **Predicting target genes of noncoding regulatory variants with ICE.** *Bioinformatics (Oxford, England)*
Wu, Z. n., Ioannidis, N. M., Zou, J. n.
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- **PB-Net: Automatic peak integration by sequential deep learning for multiple reaction monitoring.** *Journal of proteomics*
Wu, Z. n., Serie, D. n., Xu, G. n., Zou, J. n.
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- **Beyond User Self-Reported Likert Scale Ratings: A Comparison Model for Automatic Dialog Evaluation**
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ASSOC COMPUTATIONAL LINGUISTICS-ACL.2020: 1363–74
- **RNA-GPS Predicts SARS-CoV-2 RNA Localization to Host Mitochondria and Nucleolus.** *bioRxiv : the preprint server for biology*
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- **RNA-GPS Predicts SARS-CoV-2 RNA Residency to Host Mitochondria and Nucleolus.** *Cell systems*
Wu, K. E., Fazal, F. M., Parker, K. R., Zou, J. n., Chang, H. Y.
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- **Deep profiling of protease substrate specificity enabled by dual random and scanned human proteome substrate phage libraries.** *Proceedings of the National Academy of Sciences of the United States of America*
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- **A single-cell transcriptomic atlas characterizes ageing tissues in the mouse.** *Nature*
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- **Deep learning interpretation of echocardiograms.** *NPJ digital medicine*
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- **Sex and gender analysis improves science and engineering.** *Nature*
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- **VetTag: improving automated veterinary diagnosis coding via large-scale language modeling.** *NPJ digital medicine*
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- **Modeling Spatial Correlation of Transcripts with Application to Developing Pancreas.** *Scientific reports*
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- **A large CRISPR-induced bystander mutation causes immune dysregulation.** *Communications biology*
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- **Multiaccuracy: Black-Box Post-Processing for Fairness in Classification**
Kim, M. P., Ghorbani, A., Zou, J., *Assoc Comp Machinery*
ASSOC COMPUTING MACHINERY.2019: 247–54
- **Contrastive Multivariate Singular Spectrum Analysis**
Dirie, A., Abid, A., Zou, J., *IEEE*
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- **Contingent Payment Mechanisms for Resource Utilization**
Ma, H., Meir, R., Parkes, D. C., Zou, J., *Assoc Comp Machinery*
ASSOC COMPUTING MACHINERY.2019: 422–30
- **Improving the Stability of the Knockoff Procedure: Multiple Simultaneous Knockoffs and Entropy Maximization**
Gimenez, J., Zou, J., Chaudhuri, K., Sugiyama, M.
MICROTOME PUBLISHING.2019
- **Knockoffs for the Mass: New Feature Importance Statistics with False Discovery Guarantees**
Gimenez, J., Ghorbani, A., Zou, J., Chaudhuri, K., Sugiyama, M.
MICROTOME PUBLISHING.2019
- **Towards Automatic Concept-based Explanations**
Ghorbani, A., Wexler, J., Zou, J., Kim, B., Wallach, H., Larochelle, H., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Garnett, R.
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- **The clinical imperative for inclusivity: Race, ethnicity, and ancestry (REA) in genomics.** *Human mutation*
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- **DeepTag: inferring diagnoses from veterinary clinical notes.** *NPJ digital medicine*
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- **DeepTag: inferring diagnoses from veterinary clinical notes** *NPJ DIGITAL MEDICINE*
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- **Integrative proteomics and bioinformatic prediction enable a high-confidence apicoplast proteome in malaria parasites.** *PLoS biology*
Boucher, M. J., Ghosh, S., Zhang, L., Lal, A., Jang, S. W., Ju, A., Zhang, S., Wang, X., Ralph, S. A., Zou, J., Elias, J. E., Yeh, E.
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- **Design AI so that it's fair** *NATURE*
Zou, J., Schiebinger, L.
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- **Exploring patterns enriched in a dataset with contrastive principal component analysis** *NATURE COMMUNICATIONS*
Abid, A., Zhang, M. J., Bagaria, V. K., Zou, J.
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- **Autowarp: Learning a Warping Distance from Unlabeled Time Series Using Sequence Autoencoders**

- Abid, A., Zou, J., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Embedding for Informative Missingness: Deep Learning With Incomplete Data**
Ghorbani, A., Zou, J. Y., IEEE
IEEE.2018: 437-45
 - **The Effects of Memory Replay in Reinforcement Learning**
Liu, R., Zou, J., IEEE
IEEE.2018: 478-85
 - **Diabetes reversal by inhibition of the low-molecular-weight tyrosine phosphatase** *NATURE CHEMICAL BIOLOGY*
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 - **Endovascular Repair With the Chimney Technique for Stanford Type B Aortic Dissection Involving Right-Sided Arch With Mirror Image Branching** *JOURNAL OF ENDOVASCULAR THERAPY*
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 - **Conversion of Human Fibroblasts to Functional Endothelial Cells by Defined Factors** *ARTERIOSCLEROSIS THROMBOSIS AND VASCULAR BIOLOGY*
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