Zhou (Joe) Lan

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Summary

I am a computational and statistical investigator at Brigham and Women's Hospital and Harvard Medical School with strong interests in biomedical data, particularly brain imaging, genetics, oncology, and cardiovascular research. My work spans the **full spectrum** of biomedical/clinical investigation, including (a) pre-clinical studies for biological discovery, (b) clinical trials for treatment evaluation, and (c) epidemiological real-world studies for assessing treatment effectiveness/safety.

As a leading biostatistics investigator, I have served as a lead author on more than 15 publications in leading journals such as *Technometrics, Biometrics, Journal of the Royal Statistical Society: Series A, Data Science in Science, Imaging Neuroscience, NeuroImage: Clinical, Bioinformatics*, and *JAMIA Open* with open codes and software available at `https://github.com/lanzhouBWH`. As a statistics consultant, I have co-authored over 50 collaborative papers in high-impact biomedical and clinical journals, including The *New England Journal of Medicine, Journal of the American Heart Association, Circulation*, and *Radiology*. Currently, my work is expanding to incorporate artificial intelligence to advance biomedical discovery and accelerate clinical translation. I also familiarize myself with FDA guidelines to prepare for opportunities in the pharmaceutical industry.

Work Experience

Brigham and Women's Hospital, Harvard Medical School Oct 2022 – present

Biostatistics Investigator; Instructor in Medicine

Center for Outcomes Research and Evaluation, Yale Medical School Jul 2020 – Sep 2022

Statistician Consultant

Pennsylvania State University Aug 2019 – Jul 2020

Bruce Lindsay Visiting Assistant Professor

Eli Lilly & Company May 2018 – Aug 2018

Ph.D. Statistics Intern

Ventana Medical Systems (Roche) May 2016 – Jul 2016

Imaging Scientist Intern

Education

North Carolina State University, Raleigh, North Carolina

Ph.D. in Statistics, July 2019

Georgia Institute of Technology, Atlanta, Georgia

M.S., Statistics (Mathematics), May 2015

Zhejiang University, Hangzhou, China

B.S., Biology, May 2012

Expertise

Programming	Python, R, C/C++, Bash, Slurm Workload Manager, SAS
Statistics & Machine Learning	Survival Analysis, Bayesian Modeling, Probabilistic Graphical Models, Quantile Regression, Spatial Statistics, Matrix-Variate Methods, High-Dimensional Data Analysis, Causal Inference
Computation	High-Performance Computing, Parallel Computing, Algorithm Development
Biomedical Applications	Radiology, Genetics, Neuroimaging, Diffusion MRI, Magnetic Resonance Spectroscopy

Main Projects

Pre-Clinical Studies for Biological Discovery

- **Project 1:** Fiber Microstructure Quantile (FMQ) Regression for Analyzing Brain White Matter Bundles (Lauren J. O'Donnell at Brigham and Women's Hospital,)

- Used the established imaging processing pipelines (*UKFTractography*: `https://github.com/pnlbwh/ukftractography` and *whitematteranalysis*: `https://github.com/SlicerDMRI/whitematteranalysis`) for Human Connectome Project-Young Adults to derive human's tractography data.
- Led development of statistical and computational methods for analyzing diffusion MRI tractography to address high dimensionality, spatial correlation, using quintile regression method, allowing analyzing diffusion MRI tractography from periphery to core.
  (Github Code: `https://github.com/lanzhouBWH/Fiber-Microstructure-Quantile-FMQ-Regression`)
- Representative Publications:
  * Zhou Lan, Yuqian Chen, Jarrett Rushmore, Leo Zekelman, Nikos Makris, Yogesh Rathi, Alexandra J. Golby, Fan Zhang, and Lauren J. O'Donnell, "Fiber Microstructure Quantile (FMQ) Regression: A Novel Statistical Approach for Analyzing White Matter Bundles from Periphery to Core", *Imaging Neuroscience* **3**, 11 (2025).(doi: 10.1162/imag_a_00569)
  * Legarreta, Jon Haitz, Zhou Lan, Yuqian Chen, Fan Zhang, Edward Yeterian, Nikos Makris, Jarrett Rushmore, Yogesh Rathi, and Lauren J. O'Donnell, "Towards an Informed Choice of Diffusion MRI Image Contrasts for Cerebellar Segmentation", *Human Brain Mapping* **46**, 11 (2025).(doi: doi.org/10.1002/hbm.70317)

- **Project 2:** Neurometabolic network (NMetNet) for functional neurological disorder in children and adolescents (Collaborator: Alexander P. Lin at the Center for Clinical Spectroscopy at Brigham and Women's Hospital, Harvard Medical School)
  - Led the invention of NMetNet, which is a novel network-based statistical approach (Bayesian graphical lasso) in analyzing the alteration of metabolites between functional neurological disorders (FND) and controls.
  - Representative Publications:
    * Zhou Lan, Sheryl Foster, Molly Charney, Max van Grinsven, Katherine Breedlove, Kasia Kozlowska, Alexander Lin, "Neurometabolic Network (NMetNet) for Functional Neurological Disorder in Children and Adolescents", *NeuroImage: Clinical* **46**, (2025).(doi.org/10.1016/j.nicl.2025.103767)

- **Project 3:** Novel automated pipeline development to assess MR spectroscopy data quality (Collaborator: Alexander P. Lin at the Center for Clinical Spectroscopy at Brigham and Women's Hospital, Harvard Medical School)
  - Mentored an intern to develop an automatic MRS data processing pipeline using signal processing approaches, avoiding manual data quality control.
  - Representative Publications: Beroukhim B, McComas S, Joyce JM, Schuhmacher LS, Koerte I, Lan Z, Lin A, "A novel automated pipeline to assess MR spectroscopy quality control: Comparing current standards and manual assessment.", *J Neuroimaging* **35**, 1 (2025). (DOI: doi.org/10.1080/26941899.2024.2412017)

Clinical Trials for Treatment Evaluation

- **Project 1:** Apixaban for Extended Treatment of Provoked Venous Thromboembolism (HI-PRO Trial) (Brigham and Women's Hospital Thrombosis Research Group `https://thrombosisresearch.bwh.harvard.edu`)
  - Led development of the Statistical Analysis Plan (SAP), cohort derivation, and main analyses.
  - Contributed to statistical sections of the clinical manuscript.
  - Representative Publications:
    * Gregory Piazza, Behnood Bikdeli, Arvind K. Pandey, Darsiya Krishnathasan, Candrika D. Khairani, Antoine Bejjani, Ruth H. Morrison, Heather Hogan, Sina Rashedi, Mariana Pfeferman, Junyang Lou, John Fanikos, Nicole Porio, Lisa Rosenbaum, Piotr Sobieszczyk, Zhou Lan, Marie Gerhard-Herman, Umberto Campia, Samuel Z. Goldhaber, for the HI-PRO Trial Investigators, "Apixaban for Extended Treatment of Provoked Venous Thromboembolism (HI-PRO Trial)", *New England Journal of Medicine* **393**, (2025). (DOI: 10.1056/NEJMoa2509426)

Epidemiological Real-World Studies for Assessing Treatment Effectiveness/Safety

- **Project 1:** Using survival analysis and causal inference to the impact of therapies on cardiovascular outcomes in patients with diabetes.
  - Conducted analyses using propensity score weighting, mediation models, and competing-risks Cox regression.
  - Co-authored manuscripts and wrote statistical methods and results sections.
    * Shah, Nisarg, Zhou Lan, C. Justin Brown, Seth S. Martin, and Alexander Turchin, "Impact of Statin Nonacceptance on Cardiovascular Outcomes in Patients With Diabetes", *Journal of the American Heart Association* **14**, 11 (2025).(doi: https://doi.org/10.1161/JAHA.124.040464)

* C. Justin Brown, PharmD; Lee-Shing Chang, MD; Naoshi Hosomura, DDS, DMSc, MBA; Shervin Malmasi, PhD; Fritha Morrison, PhD; Maria Shubina, ScD; Zhou Lan, PhD; Alexander Turchin, MD, MS , "Assessment of Sex Disparities in Nonacceptance of Statin Therapy and Low-Density Lipoprotein Cholesterol Levels Among Patients at High Cardiovascular Risk", *JAMA Network Open* **6**, 2 (2023). (doi:10.1001/jamanetworkopen.2023.1047)

- **Project 2:** Impact of possible errors in natural language processing-derived data on downstream epidemiologic analysis
  - Conceived the idea to study possible errors in natural language processing-derived data on downstream epidemiologic analysis
  - Using High-performance computing to carry out Monte Carlo experiments for evaluation
  - Representative Publications:
    * Zhou Lan, Alexander Turchin, "Impact of Possible Errors in NLP-Derived Data on Downstream Epidemiologic Analysis", *JAMIA Open* **6**, 4 (2023). (DOI: 10.1093/jamiaopen/ooad111)
- **Project 3:** Clinical, molecular and radiological predictors for brain tumors
  - Constructed cohorts from EHR database for clinical investigation
  - Used predictive modeling and survival analysis approaches to identify predictors associated with brain tumor
  - Representative Publications:
    * Aleksandra B Lasica, Zhou Lan, Julie J Miller, Albert Jiao, Ian Pan, Loai Aker, Prem Prabhakar, Julia Japo, Alyssa Russ, Catharina Westergaard, Elisa Aquilanti, Ugonma Chukwueke, L Nicolas Gonzalez Castro, J Ricardo McFaline Figueroa, Eudocia Quant Lee, Lakshmi Nayak, Rameen Beroukhim, Tracy T Batchelor, Daniel P Cahill, Vihang Nakhate, Tyler Lanman, Juan Pablo Ospina, Natalie Stec, Ruchit V Patel, David M Meredith, Wenya Linda Bi, David A Reardon, Keith L Ligon, Raymond Y Huang, Patrick Y Wen, Gilbert Youssef, "Clinical, molecular and radiological predictors of prognosis in newly diagnosed astrocytoma, IDH-mutant, WHO grade 4", *Neuro-Oncology* **7**, 1 (2025).(doi: https://doi.org/10.1093/neuonc/noaf133)
    * Tyler A Lanman, Gilbert Youssef, Raymond Huang, Rifaquat Rahman, Matthew DeSalvo, Thomas Flood, Elmira Hassanzadeh, Min Lang, Jason Lauer, Christopher Potter, Albert Jiao, Ian Pan, Daniel P Cahill, Zhou Lan, Juan Pablo Ospina, Vihang Nakhate, Natalie E Stec, Diana Shi, Wenya Linda Bi, Samuel K McBrayer, Isabel Arrillaga-Romany, Eudocia Q Lee, Ugonma N Chukwueke, Lakshmi Nayak, Deborah A Forst, Elizabeth R Gerstner, Justin T Jordan, Jorg Dietrich, Julie Miller, Tracy T Batchelor, David A Reardon, Patrick Y Wen, L Nicolas Gonzalez Castro, "Ivosidenib for the Treatment of IDH1-mutant Glioma, Grades 2 to 4: Tolerability, Predictors of Response, and Outcomes", *Neuro-Oncology Advances* **7**, 1 (2025).(doi: https://doi.org/10.1093/noajnl/vdae227)

Selected Publications

Complete List of Published Work and Preprints in google scholar https://scholar.google.com/citations?user=fB87fIgAAAAJ

- **Informatics/Computational/Statistical Methodology**

Zhou Lan, Arkaprava Roy, "Spatial von-Mises Fisher Regression for Directional Data", *Technometrics* **Accepted**, (2025+).(doi.org/10.1080/00401706.2025.2519303)

Zhou Lan, Yuqian Chen, Jarrett Rushmore, Leo Zekelman, Nikos Makris, Yogesh Rathi, Alexandra J. Golby, Fan Zhang, and Lauren J. O'Donnell, "Fiber Microstructure Quantile (FMQ) Regression: A Novel Statistical Approach for Analyzing White Matter Bundles from Periphery to Core", *Imaging Neuroscience* **3**, imag_a_00569 (2025).(doi.org/10.1162/imag_a_00569)

Zhou Lan, Sheryl Foster, Molly Charney, Max van Grinsven, Katherine Breedlove, Kasia Kozlowska, Alexander Lin, "Neurometabolic Network (NMetNet) for Functional Neurological Disorder in Children and Adolescents", *NeuroImage: Clinical* **46**, (2025).(doi.org/10.1016/j.nicl.2025.103767)

Arkaprava Roy, Zhou Lan , "Double Soft-Thresholded Model for Multi-Group Scalar on Vector-Valued Image Regression", *Bayesian Anal.* **Advance Publication**, (2025).(doi.org/10.1214/24-BA1483)

Beroukhim B, McComas S, Joyce JM, Schuhmacher LS, Koerte I, Lan Z, Lin A, "A novel automated pipeline to assess MR spectroscopy quality control: Comparing current standards and manual assessment.", *J Neuroimaging* **35**, 1 (2025).(doi.org/10.1080/26941899.2024.2412017)

Roy Arkaprava, Zhou Lan, and Zhengwu Zhang, "Nonparametric Modeling of Diffusion MRI Signal in Q-Space", *Data Science in Science* **6**, 4 (2024). (doi.org/10.1080/26941899.2024.2412017)

Zhou Lan, Alexander Turchin, "Impact of Possible Errors in NLP-Derived Data on Downstream Epidemiologic Analysis", *JAMIA Open* **6**, 4 (2023).(10.1093/jamiaopen/ooad111)

– **Biomedical/Clinical/Scientific Collaborations**

Gregory Piazza, Behnood Bikdeli, Arvind K. Pandey, Darsiya Krishnathasan, Candrika D. Khairani, Antoine Bejjani, Ruth H. Morrison, Heather Hogan, Sina Rashedi, Mariana Pfeferman, Junyang Lou, John Fanikos, Nicole Porio, Lisa Rosenbaum, Piotr Sobieszczyk, Zhou Lan, Marie Gerhard-Herman, Umberto Campia, Samuel Z. Goldhaber, for the HI-PRO Trial Investigators, "Apixaban for Extended Treatment of Provoked Venous Thromboembolism (HI-PRO Trial)", *New England Journal of Medicine* , (2025). (DOI: 10.1056/NEJMoa2509426)

Shah, Nisarg, Zhou Lan, C. Justin Brown, Seth S. Martin, and Alexander Turchin, "Impact of Statin Nonacceptance on Cardiovascular Outcomes in Patients With Diabetes", *Journal of the American Heart Association* **14**, 11 (2025).(doi: https://doi.org/10.1161/JAHA.124.040464)

Tyler A Lanman, Gilbert Youssef, Raymond Huang, Rifaquat Rahman, Matthew DeSalvo, Thomas Flood, Elmira Hassanzadeh, Min Lang, Jason Lauer, Christopher Potter, Albert Jiao, Ian Pan, Daniel P Cahill, Zhou Lan, Juan Pablo Ospina, Vihang Nakhate, Natalie E Stec, Diana Shi, Wenya Linda Bi, Samuel K McBrayer, Isabel Arrillaga-Romany, Eudocia Q Lee, Ugonma N Chukwueke, Lakshmi Nayak, Deborah A Forst, Elizabeth R Gerstner, Justin T Jordan, Jorg Dietrich, Julie Miller, Tracy T Batchelor, David A Reardon, Patrick Y Wen, L Nicolas Gonzalez Castro, "Ivosidenib for the Treatment of IDH1-mutant Glioma, Grades 2 to 4: Tolerability, Predictors of Response, and Outcomes", *Neuro-Oncology Advances* **7**, 1 (2025).(doi: https://doi.org/10.1093/noajnl/vdae227)

Hassanzadeh, Elmira, Alyssa Ailion, Masoud Hassanzadeh, Alena Hornak, Noam Peled, Dana Martino, Simon K. Warfield, Zhou Lan, Taha Gholipour, and Steven M. Stufflebeam, "Imaging and Anesthesia Protocol Optimization in Sedated Clinical Resting-State fMRI", *American Journal of Neuroradiology* **49**, 5 (2025+).(doi: https://doi.org/10.3174/ajn

Patents

Chukka Srinivas, Zhou Lan, "System and Method for Color Deconvolution of a Slide Image to Assist in the Analysis of Tissue", , US20200167965A1 (Priority Date: 2017/08/04; Publication Date: 5/28/2020).