LINYING ZHANG

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EDUCATION

Columbia University 2018 - 2023
PhD in Biomedical Informatics
Advisors: George Hripcsak and David Blei
Thesis: Causal machine learning for reliable real-world evidence generation in healthcare.

Harvard University 2016 - 2018
MS in Computational Biology and Quantitative Genetics
Advisor: Giovanni Parmigiani
Thesis: Interactions between multiple myeloma cells and bone marrow stromal cells impact epigenetic profiles of multiple myeloma.

Boston University 2011 - 2014
BA with Honors (*Summa Cum Laude*) in Biochemistry and Molecular Biology
Advisor: Ulla Hansen
Thesis: Establishing hepatocellular carcinoma cell lines with inducible expression of degradable LSF to investigate LSF regulation in cell cycle.

APPOINTMENT

Washington University in St. Louis October 2023 - Present
Assistant Professor of Biostatistics
Institute for Informatics, Data Science, and Biostatistics (I2DB)

PUBLICATIONS

1. Cai CX, Nishimura A, Bowring MG, Westlund E, Tran D, Ng JH, Nagy P, Cook M, McLeggon JA, DuVall SL, Matheny ME, Golozar A, Ostropolets A, Minty E, Desai P, Bu F, Toy B, Hribar M, Falconer T, **Zhang L**, Lawrence-Archer L, Boland MV, Goetz K, Hall N, Shoaibi A, Reps J, Sena AG, Blacketer C, Swerdel J, Jhaveri KD, Lee E, Gilbert Z, Zeger SL, Crews DC, Suchard MA, Hripcsak G, Ryan PB. Similar risk of kidney failure among patients with blinding diseases who receive ranibizumab, aflibercept, and bevacizumab: an OHDSI Network Study. ***Ophthalmology Retina***, 2024.

2. **Zhang L**, Richter LR, Kim T, Hripcsak G. Evaluating and improving performance and racial fairness of algorithms for GFR estimation. ***IEEE International Conference on Artificial Intelligence × Medicine, Health, and Care (AIMHC)***, 2024.

3. **Zhang L**, Richter LR, Wang Y, Ostropolets A, Elhadad N, Blei DM, Hripcsak G. Causal fairness assessment of treatment allocation with electronic health records. ***Journal of Biomedical Informatics***, 2024. [Accepted]

4. Song W, Liu L, Rice H, Sainlaire M, Min L, **Zhang L**, Thai T, Kang MJ, Li S, Tejeda C, Lipsitz S, Samal L, Carroll D, Adkison L, Herlihy L, Ryan V, Bates D, Latham N, Dykes P. From traditional fall injury risk screening to a temporal machine learning-based approach: improving algorithm generalizability and clinical action. ***Journal of the American Geriatrics Society***, 2024.

5. Ostropolets A, Albogami Y, Conover M, Banda JM, Baumgartner WA Jr, Blacketer C, Desai P, DuVall SL, Fortin S, Gilbert JP, Golozar A, Ide J, Kanter AS, Kern DM, Kim C, Lai L.Y.H, Li C, Liu F,

Lynch K.E, Minty E, Ins Neves M, Ng DQ, Obene T, Pera V, Pratt N, Rao G, Rappoport N, Reinecke I, Saroufim P, Shoaibi A, Simon K, Suchard MA, Swerdel JN, Voss EA, Weaver J, **Zhang L**, Hripcsak G, and Ryan PB. Reproducible Variability: Assessing investigator discordance across nine research teams attempting to reproduce the same observational study. ***JAMIA***, 2023.

6. **Zhang L**, Wang Y, Schuemie MJ, Blei DM, and Hripcsak G. Adjusting for indirectly measured confounding using large-scale propensity score. ***Journal of Biomedical Informatics***, 2022.
7. Richter LR, Albert BI, **Zhang L**, Ostropolets A, Zitsman JL, Fennoy I, Albers D, Hripcsak G. Data assimilation on mechanistic models of glucose metabolism predicts glycemic states in adolescents following bariatric surgery. ***Frontiers in Physiology***, 2022.
8. Song W, **Zhang L**, Liu L, Sainlaire M, Karvar M, Kang M, Pullman A, Lipsitz S, Massaro A, Patil N, Jasuja R, Dykes PC. Predicting hospitalization of COVID-19 positive patients using clinician-guided machine learning methods. ***JAMIA***, 2022.
9. Song W, Kang MJ, **Zhang L**, Jung W, Song J, Bates DW, Dykes PC. Predicting pressure injury using nursing assessment phenotypes and machine learning methods. ***JAMIA***, 2021.
10. Ostropolets A, **Zhang L**, and Hripcsak G. A scoping review of clinical decision support tools that generate new knowledge to support decision making in real time. ***JAMIA***, 2020.
11. Ostropolets A, Chen R, **Zhang L**, and Hripcsak G. Characterizing physicians information needs related to a gap in knowledge unmet by current evidence. ***JAMIA Open***, 2020.
12. **Zhang L**, Wang Y, Ostropolets A, Mulgrave JJ, Blei DM, and Hripcsak G. The medical deconfounder: Assessing treatment effects with electronic health records. ***Machine Learning for Healthcare Conference (MLHC)***, 2019.
13. Gottesman O, Johansson F, Meier J, Dent J, Lee D, Srinivasan S, **Zhang L**, Ding Y, Wihl D, Peng X, Yao J, Lage I, Mosch C, Lehman L.H, Komorowski M, Faisal A, Celi L, Sontag D, and Doshi-Velez F. Evaluating reinforcement learning algorithms in observational health settings. ***arXiv preprint***, 2018.

CONFERENCE ABSTRACTS (PEER-REVIEWED)

1. **Zhang L**, Jiang X, Natarajan K, Hripcsak G. Building causally explainable fair learning health system. In ***Symposium on Artificial Intelligence in Learning Health Systems (SAIL)***, 2024. [Poster]
2. **Zhang L**, Jiang X, Natarajan K, Hripcsak G. Explaining Treatment Disparities from a Causal Perspective with EHRs. In ***AMIA Annual Symposium***, 2023. [Presentation]
3. Schuemie M, Suchard MA, Nishimura A, **Zhang L**, Hripcsak G. Evaluating confounding adjustment when sample size is small. In ***OHDSI Global Symposium***, 2023. [Poster]
4. Sena AG, Reps J, Kim C, Brewster J, Black A, **Zhang L**, Cook M, Phuc PH, Suchard MA. Save Our Sisyphus Challenge: Lessons learned from Strategus execution on the OHDSI Network. In ***OHDSI Global Symposium***, 2023. [Presentation]
5. Song W, Liu L, Sainlaire M, Cho S, Furlong D, Gilles-Fowler W, Herlihy L, Kang M.J, Lipsitz S, Melanson B, Massaro J, Martel T, Wolski P, **Zhang L**, Dykes P. An EHR-based Comparative Analysis of the Distribution of Pressure Injury Anatomical Locations and Stages and Associated Disparities Across a Large Healthcare System. In ***AMIA Annual Symposium***, 2023. [Presentation]
6. **Zhang L**, Richter LR, Wang Y, Ostropolets A, Elhadad N, Blei DM, and Hripcsak G. A Bayesian causal inference approach for assessing fairness in clinical decision-making. In ***Algorithmic Fairness through the Lens of Causality and Privacy Workshop, NeurIPS***, 2022. [Poster]

7. **Zhang L**, Richter LR, Blei DM, Wang Y, Ostropolets A, Elhadad N, and Hripcsak G. Assessing racial fairness of dialysis allocation in end-stage renal disease. In ***OHDSI Global Symposium***, 2022. [Presentation]
8. **Zhang L**, Richter LR, Hripcsak G. Assessing the impact of race on glomerular filtration rate (GFR) prediction. In ***OHDSI Global Symposium***. 2021. [Presentation]
9. Song W, **Zhang L**, Sainlaire M, Karvar M, Kang M, Pullman A, Massaro A, Patil N, Jasuja R, Dykes PC. Predicting hospitalization of COVID-19 positive patients using machine learning methods. In ***AMIA Annual Symposium***. 2021. [Presentation]
10. **Zhang L**, Wang Y, Ostropolets A, Chen R, Blei DM, and Hripcsak G. The Multi-Outcome Medical Deconfounder: Assessing Treatment Effects on Multiple Renal Measures. In ***AMIA Annual Symposium***. 2020. [Poster]
11. **Zhang L**, Wang Y, Ostropolets A, Chen R, Blei DM, and Hripcsak G. The multi-outcome medical deconfounder: assessing treatment effects on multiple renal measures. In ***OHDSI Global Symposium***. 2020. [Poster]
12. Chen R, Schuemie M, Suchard M, Ostropolets A, **Zhang L**, Ryan P, Hripcsak G. Evaluation of large-scale propensity score modeling and covariate balance on potential unmeasured confounding in observational research. In ***AMIA Annual Symposium***. 2020. [Poster]
13. **Zhang L**, Wang Y, Ostropolets A, Mulgrave JJ, Blei DM, and Hripcsak G. The medical deconfounder: assessing treatment effects with electronic health records. In ***Women in Machine Learning (WiML) Workshop***. Vancouver, Canada. 2019. [Poster]
14. **Zhang L**, Wang Y, Ostropolets A, Mulgrave JJ, Blei DM, and Hripcsak G. The medical deconfounder: assessing treatment effects with electronic health records. In ***Machine Learning for Health Workshop***. Vancouver, Canada. 2019. [Poster]
15. Ostropolets A, **Zhang L**, Mulgrave JJ, Hripcsak G. Investigating female-male differences in risk factors for myocardial infarction using OHDSI tools. In ***AMIA Annual Symposium***. 2019. [Poster]
16. Song W, **Zhang L**, E. Gill, J.Z. Liu, A. Wright. Personalized treatment for type 2 diabetes using weighted k-nearest neighbors. In ***AMIA Annual Symposium***. 2019. [Poster]
17. Szalat R, Samur MK, Ott CJ, Lawlor M, Epstein C, Abraham BJ, Lin CY, **Zhang L**, Prabhala R, Farrell N, Wes K, Tai YT, Fulciniti M, Parmigiani G, Young RA, Anderson KC, and Munshi NC. Integrative oncogenomic analysis combining whole genome, transcriptome and epigenome identifies altered chromatin accessibility landscape in multiple myeloma. In ***American Society of Hematology Annual Meeting***. 2018. [Presentation]
18. **Zhang L**, Samur MK, Szalat R, Epstein CB, Prabhala R, Fulciniti M, Munshi NC.*, Parmigiani G.*. Interactions between multiple myeloma cells and bone marrow stromal cells impact epigenetic profiles of multiple myeloma. In ***Program in Quantitative Genomics Conference***. Boston, MA. 2017. [Poster]
19. **Zhang L**, Samur MK, Szalat R, Epstein CB, Prabhala R, Fulciniti M, Munshi NC.*, Parmigiani G.*. Interactions between multiple myeloma cells and bone marrow stromal cells impact epigenetic profiles of multiple myeloma. In ***Dana-Farber/Harvard Cancer Center Celebration of Junior Investigators***. Boston, USA. 2017. [Poster]

AWARDS

- Edward H. Shortliffe Doctoral Dissertation Award Nominee 2024

- Symposium on Artificial Intelligence in Learning Health Systems (SAIL) Travel Award 2024
- OHDSI Best Community Contribution Award in Methodological Research 2022
- Women in Machine Learning Travel Award 2019
- Senior Book Award Boston University Department of Biology. 2014
- Dean's List. Boston University College of Arts and Sciences. 2011,2012,2013, 2014

INVITED TALKS

Washington University in St. Louis 2024
Institute for Informatics, Data Science, and Biostatistics
Reliable real-world evidence with EHR

International Chinese Statistical Association (ICSA) International Conference 2023
Adjusting for indirectly measured confounding using large-scale propensity score

University of Colorado School of Medicine 2023
Department of Biomedical Informatics
Improving the Reliability of Real-World Evidence Generation from Large-Scale Observational Data

Ohio State University College of Medicine 2023
Department of Biomedical Informatics
Improving the Reliability of Real-World Evidence Generation from Large-Scale Observational Data

Vanderbilt University 2023
Department of Biomedical Informatics
Improving the Reliability of Real-World Evidence Generation from Large-Scale Observational Data

Washington University in St. Louis 2023
Institute for Informatics, Data Science, and Biostatistics
Improving the Reliability of Real-World Evidence Generation from Large-Scale Observational Data

Northeastern University 2023
Department of Health Sciences
Improving the Reliability of Real-World Evidence Generation from Large-Scale Observational Data

OHDSI Global Symposium 2022
When does statistical equality meet health equity: developing analytical pipelines to compare associational and causal fairness in their application to EHR data.

OHDSI Global Symposium 2022
Health Equity Work Group
Evaluating and improving performance and racial fairness of algorithms for GFR estimation.

OHDSI Global Symposium 2022
Population-Level Estimation Work Group
Adjusting for indirectly measured confounding using large-scale propensity score.

Columbia University 2021
Department of Biomedical Informatics
Algorithmic fairness in medicine: A case study in glomerular filtration rate (GFR) prediction.

OHDSI Health Equity Work Group Monthly Meeting 2021
Assessing the impact of race on glomerular filtration rate (GFR) prediction.

Columbia University 2020
Department of Biomedical Informatics
Adjusting for unobserved confounding using large-scale propensity score.

AMIA Annual Symposium 2020
Causal Inference Panel
The medical deconfounder: assessing treatment effects with electronic health records.

University of Pennsylvania School of Medicine 2020
SC-TRM Working Group Meeting
The medical deconfounder: assessing treatment effects with electronic health records.

PROFESSIONAL ACTIVITIES

Conference & Workshop Organizing

- Co-chair, I2BD Annual Symposium 2024
- Committee member, IEEE Conference on AI x Medicine, Health, and Care (AIMHC) 2024
- Session chair, Machine Learning for Health (ML4H) Symposium 2023
  Causality in Health AI Research Roundtable
- Session chair, AMIA Symposium 2023
  Precision Medicine and Disease Subtyping

Grant Reviewing

- Reviewer, Patient-Centered Outcomes Research Institute (PCORI) 2024-Present

Journal & Conference Reviewing

- JAMIA Open. 2024-Present
- Journal of Biomedical Informatics (JBI). 2023-Present
- Journal of Medical Internet Research (JMIR). 2023-Present
- Health Informatics Journal. 2022-Present
- Applied Clinical Informatics Journal. 2022-Present
- Machine Learning for Healthcare (MLHC). 2020, 2022
- AMIA Annual Symposium. 2022
- International Conference on Machine Learning (ICML). 2020
- Women in Machine Learning (WiML) Workshop. 2019
- Machine Learning for Health (ML4H) Workshop. 2019, 2020

Mentoring & Volunteering

- Mentor, AMIA Annual Symposium Career Development for Women Event. 2022
- Mentor, Columbia DBMI Summer Research Program. 2022
- Volunteer, OHDSI Global Symposium. 2022
- Volunteer, NeurIPS. 2022

TEACHING EXPERIENCE

Computational Methods. *Columbia University.*	Spring 2020
Computer Applications in Health Care and Biomedicine. *Columbia University.*	Fall 2019
Principles of Biostatistics I&II. *Harvard T.H.Chan School of Public Health.*	Summer 2017
General Physics I&II. *Boston University.*	2012-2013