Lan Luo

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Education

2016 - 2020	University of Michigan Ph.D. Biostatistics	Ann Arbor, MI
2014 - 2016	University of Michigan M.S. Biostatistics	Ann Arbor, MI
2009 - 2013	Huazhong University of Science and Technology B.S. Biology	Wuhan, China

Research Interests

Online statistical inference, epigenetic clocks, transfer learning, mobile health, dynamic mediation analysis, longitudinal data analysis, causal inference, adaptive experimental design

Professional Appointments

2023 - Present	**Assistant Professor** Department of Biostatistics and Epidemiology School of Public Health Rutgers University	Piscataway, NJ
2020 - 2023	**Assistant Professor** Department of Statistics and Actuarial Science College of Liberal Arts and Science University of Iowa	Iowa City, IA

Teaching Experience

2023 - 2025 Fall	**Instructor**, *Biostatistics Theory I* Department of Biostatistics & Epidemiology, Rutgers University
2023 Spring	**Instructor**, *Applied Linear Regression* Department of Statistics & Actuarial Science, University of Iowa
2021 Fall	**Instructor**, *Introduction to Data Science (new course)* Department of Statistics & Actuarial Science, University of Iowa
2020 - 2022 Fall	**Instructor**, *Mathematical Statistics I* Department of Statistics & Actuarial Science, University of Iowa
2021 - 2023 Spring	**Instructor**, *Mathematical Statistics II* Department of Statistics & Actuarial Science, University of Iowa

Publications

1. Li, Y.[†], Goodrich, J., Peterson, K., Song, P.X.K. and **Luo, L.**[#] (2025). Uncertainty quantification in epigenetic clocks via conformalized quantile regression. *Genetic Epidemiology* (accepted).

2. Ghosh, J., Tan, A. and **Luo, L.** (2025). Online Bayesian variable selection and Bayesian model averaging for streaming data. *Stat*, **14**(1), e70044.

3. Liu, W., Li, G., Zhou, L. and **Luo, L.** (2025). High-dimensional large-scale mixed-type data imputation under missing at random. *Science China Mathematics* (accepted).

4. **Luo, L.***, Shi, C.*, Wang, J.*, Wu, Z. and Li, L. (2025). Multivariate dynamic mediation analysis under a reinforcement learning framework. *The Annals of Statistics*, **53**(1), 400–425.

5. Li, Z., **Luo, L.**, Wang, J. and Feng, L. (2024). Efficient quantile covariate adjusted response adaptive experiments. *The Journal of Econometrics* (accepted).

6. **Luo, L.**, Risk, M. and Shi, X. (2024). Online causal inference with application to near real-time post-market vaccine safety surveillance. *Statistics in Medicine*, **43**(14), 2734–2746.

7. Han, R.*, **Luo, L.***, Lin, Y. and Huang, J. (2024). Online inference with debiased stochastic gradient descent. *Biometrika*, **111**(1): 93–108.

8. Tran, L., Li, G., **Luo, L.** and Jiang, H. (2023). A fast solution to the lasso problem with equality constraints. *The Journal of Computational and Graphical Statistics*, **33**(3), 804–813.

9. **Luo, L.***, Han, R.*, Lin, Y. and Huang, J. (2023). Online inference in high-dimensional generalized linear models with streaming data. *Electronic Journal of Statistics*, **17**(2), 3443–3471.

10. Liu, W., **Luo, L.**$^\#$ and Zhou, L. (2023). Online missing value imputation for high-dimensional mixed-type data via generalized factor models. *Computational Statistics and Data Analysis*, **187**, 107822.

11. **Luo, L.**, Wang, J. and Hector, E.C. (2023). Rejoinder: 'Statistical inference for streamed longitudinal data'. *Biometrika*, **110**(4): 871–874.

12. **Luo, L.**, Wang, J. and Hector, E.C. (2023). Statistical inference for streamed longitudinal data. *Biometrika* **110**(4), 841–858. (Selected as a discussion paper.)

13. **Luo, L.**, Zhou, L. and Song, P.X.K. (2022). Real-time regression analysis of streaming clustered data with possible abnormal data batches. *Journal of the American Statistical Association (Theory & Methods)*, **118**(543), 2029–2044.

14. **Luo, L.** and Li, L. (2022). Online two-way estimation and inference via linear mixed-effects models. *Statistics in Medicine*, **41**(25), 5113–5133.

15. Hector, E.C.*, **Luo, L.*** and Song, P.X.K. (2022). Parallel-and-stream accelerator for computationally fast supervised learning. *Computational Statistics and Data Analysis*, **177**, 107587.

16. **Luo, L.** and Song, P.X.K. (2021). Multivariate online regression analysis with heterogeneous streaming data. *The Canadian Journal of Statistics*. **51**(1), 111–133. (Top 10 most-cited article in 2022-2023.)

17. **Luo, L.** and Song, P.X.K. (2020). Renewable estimation and incremental inference in generalised linear models with streaming datasets. *Journal of the Royal Statistical Society:*

Series B (Statistical Methodology), **82**, Part1, 69–97. (An earlier version of this paper "real-time regression analysis of streaming health datasets" won the 2019 ENAR Distinguished Student Paper Award.)

18. **Luo, L.**, She, X., Cao, J., Zhang, Y., Li, Y. and Song, P.X.K. (2019). Detection and prediction of ovulation time from body temperature measured by an in-ear wearable thermometer. *IEEE Transactions on Biomedical Engineering*, **67**(2): 512–522.

19. Shen, R., **Luo, L.** and Jiang, H. (2017). Identification of gene pairs through penalized regression subject to constraints. *BMC Bioinformatics*, **18**: 466.

20. Yang, Y.*, **Luo, L.***, Xu, J.* et al. (2013). Novel EDA p.Ile260Ser mutation linked to non-syndromic hypodontia. *Journal of Dental Research*, **92**: 500–506.

Preprints

21. Benari, O., Ravona-Springer, R., **Luo, L.**, Hu, L., Mardor, Y., Lesman-Segev, O. H., Shekhtman, S. G., Livny, A., Harel, M., Almog, G., Bendlin, B. B., Sano, M., and Beeri, M. S. (2025). The effects of hyperbaric oxygen therapy on cognition and brain in older adults with type 2 diabetes and mild cognitive impairment: a randomized double-blind sham-controlled trial.

22. **Luo, L.**#, Shang, L., Goodrich, J., Peterson, K., and Song, P.X.K. (2025). Bridging the gap: Enhancing the generalizability of epigenetic clocks through transfer learning.

23. Zheng, S., Liu, W., **Luo, L.**, and Zhou, L. (2025). Online partial functional linear regression.

24. Han, R.*, **Luo, L.***, Luo, Y.*, Lin, Y., and Huang, J. (2024). Adaptive debiased lasso in high-dimensional generalized linear models with streaming data.

(∗: Co-first author; #: Corresponding author; †: Student author)

Grants

Active

1. Transfer learning and uncertainty quantification in epigenetic clocks
   - Role: Principal Investigator
   - Agency: NIH (R21AG083364)
   - Period: 09/30/2023 - 05/31/2025 (NCE: 06/01/2025 - 05/31/2026)
   - Amount: $327,576
   - Effort: 20% FTE

2. Network of Biostatisticians for RECOVER (Researching COVID to Enhance Recovery)
   - Role: Co-Investigator
   - PI: Jason Roy
   - Agency: SPH-Massachusetts General Hospital
   - Period: 09/03/2024 - 06/08/2027
   - Amount: $1,050,000
   - Effort: 15% FTE

3. Systemic and dietary advanced glycation end products in type 2 diabetes-related cognitive decline and incident dementia: effects on Alzheimer's pathology and cerebrovascular disease

Role: Co-Investigator
PI: Michal Beeri
Agency: NIH (R01AG061093)
Period: 12/1/2023 - 11/30/2025
Amount: $1,420,317
Effort: 15% FTE

4. Cognitive and brain imaging correlates of apathy-components in asymptomatic middle aged individuals at high ADRD-risk
   Role: Co-Investigator
   PI: Michal Beeri
   Agency: NIH (R21AG080827)
   Period: 3/1/2024 - 2/28/2026
   Amount: $364,709
   Effort: 10% FTE

5. Maternal inflammation in relation to offspring epigenetic aging and neurodevelopment
   Role: Co-Investigator
   PI: Stephanie Shiau
   Agency: NIH (R01HD111550)
   Period: 6/1/2023 - 5/31/2027
   Amount: $2,628,726
   Effort: 5% FTE

6. Improving glycemic control among underserved patients with insulin-treated type 2 diabetes through nurse-led, app-based behavioral intervention
   Role: Co-Investigator
   PI: Helen Chen
   Agency: NIH (K99NR020377)
   Period: 2/12/2025 - 6/30/2028

Pending

1. Addressing population and platform heterogeneity in epigenetic clocks via transfer learning and conformal prediction methods (percentile: 3%, impact score: 25)
   Role: Principal Investigator
   Agency: NIH (R01AG092615)
   Period: 12/01/2025 - 11/30/2030
   Amount: $2,690,110
   Effort: 30% FTE

2. Metabolomics in pregnancy and pathways to later cardiometabolic risk
   Role: Co-Investigator
   PI: Ellen Francis
   Agency: NIH
   Period: 04/01/2026 - 03/31/2031
   Amount: $3,971,591
   Effort: 10% FTE

3. Advancing autism risk prediction through AI-driven integration of environmental and administrative health data in a national birth cohort

Role:	Co-Investigator
PI:	Stefania Papatheodorou
Agency:	NIH
Period:	09/01/2025 - 08/31/2027
Amount:	$2,359,472
Effort:	25% FTE

Graduate Student Mentored

2025 - Present	PhD Students Advisor *Kexin Guo, Department of Biostatistics & Epidemiology, Primary advisor* *Kevin Eng, Department of Statistics, Project-specific mentorship*	Rutgers University
2024 - 2025	Student Research Assistant Advisor *Qilei Sheng (co-advised with Stephanie Shiau)*	Rutgers University
2024 - 2025	MS Student Academic Advisor *Alexandra Lopes Ferreira, Zixuan Le*	Rutgers University
2024 - 2025	MS Applied Practice Experience Advisor *Maria Pineda, Deen Sonbol, Tanisha Patel*	Rutgers University
2022 - 2023	MS Creative Component Advisor *Yilin Wang, Online statistical inference and conformal prediction with nonstationary streaming data*	University of Iowa
2023	PhD Dissertation Committee Member *Yoon Cho, Modeling association between wearable device metrics and health outcomes*	University of Iowa

Honors and Awards

2022	Old Gold Summer Fellowship
2020	Student Paper Competition Award for Statistical Learning and Data Science
2020	Winning Proposal in the 2020 Joint Shark Tank Retreat
2019	Excellence in Research Honorable Mention
2019	Rackham Predoctoral Fellowship for Academic Year 2019-2020
2019	The International Biometric Society Eastern North American Region's (ENAR) Distinguished Student Paper Award
2018	The Michigan Institute for Data Science (MIDAS) Annual Symposium Poster Award of Most Innovative Use of Data
2015	Outstanding Academic Performance First-Year Master's Program
2015	Certificate in Public Health Genetics (CPHG) Award
2013	HUST Excellent Graduate
2011	China National Scholarship

Presentations

Department - Colloquium

2024	*Uncertainty quantification in epigenetic clocks via conformalized quantile regression*, Data Management and Modeling Core meeting of ELEMENT study, School of Public Health, University of Michigan (virtual).

2024 *Online Statistical Inference in Streaming Data: Renewability, Dependence, and Dynamics*, Department of Mathematics and Statistics, Auburn University (virtual).

2024 *Adaptive experiments for learning quantile treatment effects*, Department of Biostatistics, University of Nebraska Medical Center (virtual).

2024 *Adaptive experiments for learning quantile treatment effects*, Collaborative Lecture Series, Rutgers School of Public Health/Cochin University of Science and Technology (virtual).

2023 *Online Statistical Inference with Streaming Data: Renewability, Dependence, and Dynamics*, Department of Statistics, North Carolina State University, Raleigh, NC, United States.

2022 *Online Statistical Inference in Streaming Data: Renewability, Dependence, and Dynamics*, Department of Biostatistics and Epidemiology, Rutgers University (virtual).

2022 *Online Statistical Inference in Streaming Data: Renewability, Dependence, and Dynamics*, Department of Statistics, North Carolina State University (virtual).

2022 *Online Statistical Inference with Dynamic and Dependent Streaming Data*, Data Mining Iowa Group, Business Analytics Department, University of Iowa, Iowa City, IA, United States.

2022 *Real-Time Regression Analysis with Dynamic Streaming Datasets*, StatScale seminars, Lancaster University, Bailrigg, Lancaster, United Kingdom (virtual).

2021 *Real-Time Regression Analysis with Streaming Health Datasets*, Department of Biostatistics, College of Public Health, University of Iowa, Iowa City, IA, United States (virtual).

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Statistics and Actuarial Science, University of Iowa, Iowa City, IA, United States.

2020 *Real-Time Regression Analysis with Streaming Health Datasets*, Public-Health Sciences – Biostatistics Program, Fred Hutchinson Cancer Research Center, Seattle, WA, United States.

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Statistics, UW Madison College of Letters & Science, Madison, WI, United States.

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Statistics and Data Sciences, College of Natural Sciences, The University of Texas at Austin, Austin, TX, United States.

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Statistics and Operations Research, The University of North Carolina at Chapel Hill, Chapel Hill, NC, United States.

2020 *Real-Time Regression Analysis with Streaming Health Datasets*, Department of Biostatistics, Fielding School of Public Health, University of California, Los Angeles, CA, United States.

2020 *Real-Time Regression Analysis with Streaming Health Datasets*, Department of Biostatistics, University of Minnesota, Minneapolis, Minnesota, United States.

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Mathematics and Statistics, McGill University, Montreal, Quebec, Canada.

2020 *Renewable Estimation and Incremental Inference with Streaming Health Datasets*, Department of Statistics and Actuarial Science, University of Waterloo, Waterloo, ON, Canada.

Conference Presentation

2025 *Online statistical inference in streaming data: renewability, dependence, and dynamics*. 2025 ISU-NISS Conference on Statistics in AI, Ames, IA, United States.

2025 *Online statistical inference with dynamic and dependent streaming data*. 2025 ENAR Spring Meeting, New Orleans, LA, United States.

2024 *Adaptive experiments for learning quantile treatment effects*. The Fifth International Workshop on Statistical Analysis of Multi-Outcome Data (SAM 2024), Salzburg, Austria.

2023 *Sequential Monitoring and Near Real-Time Post-Market Vaccine Safety Surveillance*. 2023 ICSA Applied Statistics Symposium, Ann Arbor, MI, United States.

2022 *Multivariate Online Regression Analysis with Heterogeneous Streaming Data*. Joint Statistical Meetings, Washington D.C., United States.

2022 *Multivariate Online Regression Analysis with Heterogeneous Streaming Data*. The Fifth ICSA-Canada Chapter Symposium, Banff, Canada.

2021 *Multivariate Online Regression Analysis with Heterogeneous Streaming Data*. International Chinese Statistical Association (virtual).

2021 *Sequential Monitoring and Near Real-Time Post-Market Vaccine Safety Surveillance*. International Chinese Statistical Association (virtual).

2020 *Real-Time Regression Analysis of Streaming Clustered Datasets*. Joint Statistical Meetings (virtual).

Software

R packages: `glmADMM`, `RenewGLM`, `RenewQIF`, `OnlineCausal`, `OnlineDSGD` (available on `https://github.com/luolsph`)

Professional Activities and Service

Editorial Positions

2024 - Present Associate Editor, Biometrics

Journal Referee

Journal of the Royal Statistical Society: Series B, Nature Communications, Journal of the American Statistical Association, Biometrika, Journal of Econometrics, Journal of Machine Learning Research, Journal of Royal Statistical Society: Series A, Annals of Applied Statistics, Statistical Sinica, Biometrics, Statistics in Medicine, Electronic Journal of Statistics, Journal of Computational and Graphical Statistics, Technometrics, Journal of Nonparametric Statistics, Statistics and Its Interface, Scandinavian Journal of Statistics, Computational Statistics and Data Analysis, Statistical Analysis and Data Mining, IEEE Transactions on Neural Networks and Learning Systems, International Journal of Biostatistics

Grant Reviews

2023 Department of Defense, Biostatistical Reviewer

Department & University

2025	Biostatistics Tenure-Track Faculty Search Committee, Member, Rutgers School of Public Health
2025	Data Safety & Monitoring Committee, Biostatistician, Bright IDEAS research study, Rutgers Cancer Institute
2024 - Present	Seminar Committee, Co-chair, Department of Biostatistics and Epidemiology, Rutgers University
2023 - Present	Statistical Health for AI Committee, Member, Department of Biostatistics and Epidemiology, Rutgers University
2024	Rutgers Cancer Institute of New Jersey (CINJ) Faculty Search Committee, Member
2023	Colloquium Committee, Member, University of Iowa
2022 - 2023	Executive Committee, Member, University of Iowa
2021 - 2022	Graduate Minor Exam Committee, Member, University of Iowa
2020 - 2023	Computer Committee, Member, University of Iowa
2020 - 2022	Social Committee, Chair, University of Iowa

Member

2021 - Present	International Chinese Statistical Association
2018 - Present	American Statistical Association
2017 - Present	International Biometric Society, ENAR

Conference service

2024	JSM 2024, Session Chair, *New Methods for Correlated Data*
2024	SAM 2024, Session Chair, *Joint Modeling of Complex Survival Data*
2024	SAM 2024, Session Organizer, *Analysis of data with multiple treatments and mixed outcomes*
2024	SAM 2024, Committee Member on Junior Researcher Award
2023	ICSA Applied Statistics Symposium, Session Organizer and Chair, *Causal inference in observational studies and adaptive experiments*
2023	ICSA Applied Statistics Symposium, Student Paper Competition Committee
2023	Joint Statistical Meetings, Statistical Learning and Data Science (SLDS) Student Paper Competition Committee
2022	Joint Statistical Meetings, Session Organizer and Chair, *Recent advances in streaming data analytics*