Lu Zhang

Curriculum Vitae

Division of Biostatistics
Department of Population and Public Health Sciences
University of Southern California
1845 N. Soto Street, Los Angeles, CA, 90089-9239, USA
☎ *+1 (313) 442 1812*
✉ *lzhang63@usc.edu*
🖰 *Homepage: https://luzhangstat.github.io/*

Employment

2022–current	**Assistant Professor**, *University of Southern California*, USA.
2020–2022	**Postdoctoral Researcher**, *Columbia University*, USA.
	Supervisor: Bob Carpenter, Andrew Gelman

Education

2014–2020	**Ph.D. in Biostatistics**, *University of California, Los Angeles*, USA.
	Advisor: Sudipto Banerjee
2010–2014	**B.S. in Mathematics and Applied Mathematics**, *Fudan University*, China.

Research Interests

Spatial analysis, Bayesian statistics, high dimensional inference, computational statistics and open-source software development

Papers (* co-first author, † students mentored by me)

Publications and Accepted Manuscripts

1. **Lu Zhang***, Wenpin Tang*, Sudipto Banerjee, Fixed-Domain Asymptotics Under Vecchia's Approximation of Spatial Process Likelihoods (2023). ***Statistica Sinica***. `http://www3.stat.sinica.edu.tw/ss_newpaper/SS-2021-0428_na.pdf`

2. **Lu Zhang**, Bob Carpenter, Andrew Gelman, Aki Vehtari (2022). Pathfinder: Parallel quasi-Newton variational inference. ***Journal of Machine Learning Research***. . `https://www.jmlr.org/papers/volume23/21-0889/21-0889.pdf`

3. **Lu Zhang** (2022). Applications of Conjugate Gradient in Bayesian computation. ***Wiley StatsRef-Statistics Reference Online.*** `https://doi.org/10.1002/9781118445112.stat08411`

4. Wenpin Tang*, **Lu Zhang***, Sudipto Banerjee (2021). On identifiability and consistency of the nugget in Gaussian spatial process models. ***Journal of the Royal Statistical Society Series B***, *(Statistical Methodology)*, `https://rss.onlinelibrary.wiley.com/doi/10.1111/rssb.12472`

5. **Lu Zhang**, Sudipto Banerjee, (2021) Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Misaligned Data. ***Biometrics***, *78(2), 560-573.*. `http://doi.org/10.1111/biom.13452`

6. **Lu Zhang**, Sudipto Banerjee, Andrew O. Finley (2021). High-dimensional multivariate geostatistics: A Bayesian matrix-normal approach. ***Environmetrics***, *32(4), e2675*. **Selected for the 2021 Wiley-TIES Best Paper Award** `https://onlinelibrary.wiley.com/doi/10.1002/env.2675`

7. Gregory L. Watson, Di Xiong, **Lu Zhang**, Joseph A. Zoller, John Shamshoian, Phillip Sundin, Teresa Bufford, Anne W. Rimoin, Marc A. Suchard, Christina M. Ramirez (2021). Pandemic velocity: forecasting COVID-19 in the US with a machine learning & Bayesian time series compartmental model. ***PLOS Computational Biology***, 17(3), e1008837.

8. Di Xiong*, **Lu Zhang***, Gregory L. Watson, Phillip Sundin, Teresa Bufford, Joseph A. Zoller, John Shamshoian, Marc A. Suchard, Christina M. Ramirez, (2020). Pseudo-likelihood based logistic regression for estimating COVID-19 infection and case fatality rates by gender, race, and age in California. ***Epidemics***, *33, 100418*. `https://www.sciencedirect.com/science/article/pii/S1755436520300396`

9. **Lu Zhang**, Abhirup Datta, Sudipto Banerjee. (2019). Practical Bayesian modeling and inference for massive spatial data sets on modest computing environments. ***Statistical Analysis and Data Mining: The ASA Data Science Journal***, *12(3), 197-209*. `https://onlinelibrary.wiley.com/doi/full/10.1002/sam.11413`

Preprints

10. **Lu Zhang**, Wenpin Tang, Sudipto Banerjee. Exact Bayesian Geostatistics Using Predictive Stacking, `https://arxiv.org/abs/2304.12414`

11. Shane Sparkes[†], **Lu Zhang**. Properties and Deviations of Random Sums of Densely Dependent Random Variables, `https://arxiv.org/abs/2310.11554`

12. Shengjie Liu[†], **Lu Zhang**. Deep Feature Gaussian Processes for Single-Scene Aerosol Optical Depth Reconstruction.

13. **Lu Zhang**, Andrew Finley, Arne Nothdurft, Sudipto Banerjee. Bayesian Modeling of Incompatible Spatial Data: A Case Study Involving Post-Adrian Storm Forest Damage Assessment, `https://arxiv.org/abs/2311.11256`

14. Shane Sparkes[†], Erika Garcia, **Lu Zhang**. The functional average treatment effect, `https://arxiv.org/abs/2312.00219`

Packages

1. **Lu Zhang** and Jun Yin (2018). *phase1PRMD: Personalized Repeated Measurement Design for Phase I Clinical Trials. R package version 1.0.2. CRAN:* `https://cran.r-project.org/web/packages/phase1PRMD/index.html`

2. Xiang Chen, **Lu Zhang**, Sudipto Banerjee (2018). *JAMAJniLite: A JAVA package providing a java interface for lapack and blas libraries and using the classes defined by JAMA Package Github:* `https://github.com/JAMAJni/JAMAJniLite`

3. **Lu Zhang**, LiZhen Nie, Sudipto Banerjee (2017). *JALAJni: A JAVA package providing a java interface for lapack and blas library Github:* `https://github.com/JaLAJni/JaLAJni`

Grants

| 03/2023-03/2024 | **Principal Investigator**, *Assessing Particulate Matter Exposures Based On Multi-Source Satellite Data Using Scalable Gaussian Process Models*, Southern California Environmental Health Sciences Center (P30ES007048) Pilot Projects Program. Total Direct Costs $47,500 |

Teaching Experience

Instructor at USC

| Fall 2023 | PM 569: **Spatial Statistics** |

Graduate Teaching Assistant at UCLA

2015-2020	Biostat 100A: **Introduction to Biostatistics**
	(Summer 2015, Fall 2015, Spring 2016, Summer 2017, Fall 2019)
2016-2020	Biostat 100B: **Introduction to Biostatistics**
	(Winter 2016, Winter 2017, Winter 2018, Winter 2020)
Fall 2016	Biostat 200A: **Basic Biostatistics**
Spring 2017	Biostat 411: **Analysis of Correlated Data**
Fall 2017	Biostat 255A: **Advanced Topics & Probability in Biostatistics**
Winter 2017	Biostat 255B: **Advanced Topics & Probability in Biostatistics**
Spring 2018	Biostat 257: **Statistical Computing**
Spring 2019	Biostat 241: **Spatial modeling**
Fall 2019	Public Health 200: **Foundations in Public Health**
Spring 2020	Biostat 214: **Finite Population Sampling**

Working Experience

| Jun. - Sep. 2018 | **Internship in Biostatistics**, *Mayo Clinic*, Rochester, Minnesota USA, Sponsor: Yin Jun, Ph.D. |

- Statistical consultation to Physicians
- Experimental design (clinical trial design)
- Software development (develop R package)

Selected Awards

2020	**Dean's Outstanding Student Award in Biostatistics**, Department of Biotatistics, UCLA
2018	**Celia G. and Joseph G. Blann Fellowship**, Department of Biotatistics, UCLA
2016	**Graduate Summer Research Mentorship,** Department of Biotatistics, UCLA

Talks

Invited

| Aug. 2023 | **Bayesian Predictive Stacking Under Spatial Process Settings**. JSM, Toronto, Ontario, Canada |

May. 2023	**Pathfinder: A Parallel Quasi-Newton Algorithm for Reaching Regions of High Probability Mass**. IRSA's 2023 conference, Institute for Research in Statistics and its Applications at University of Minnesota, Minneapolis, MN, USA
Apr. 2023	**Bayesian inference for high-dimensional latent spatial model: Why we should and how to avoid random walk in MCMC**. DMS Colloquium, Department of Mathematics and Statistics at Auburn University, Auburn, AL, USA
Mar. 2023	**Pathfinder: A Parallel Quasi-Newton Algorithm for Reaching Regions of High Probability Mass**. Bayes Comp 2023, Levi, Finland
Jan. 2023	**Bayesian inference for high-dimensional latent spatial model: Why we should and how to avoid random walk in MCMC**. Purdue Research Colloquium, Statistics at Purdue University, West Lafayette, IN, USA
Sep. 2022	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Massive Spatial Data with Missing Observations**. SIAM, Conference on Mathematics of Data Science, San Diego, CA, USA
Aug. 2022	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Massive Spatial Data with Missing Observations**. JSM, Washington, DC, USA
Apr. 2022	**Pathfinder: A parallel quasi-Newton algorithm for reaching regions of high probability mass**. SIAM Conference on Uncertainty Quantification (UQ22), Atlanta, Georgia, U.S.
Nov. 2021	**Pathfinder: Parallel quasi-Newton variational inference**. Broad Institute, Remote
Sep. 2021	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Massive Spatial Data with Missing Observations**. Mathematics and Applied Mathematics at Fudan University, Shanghai, China
Sep. 2021	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Massive Spatial Data with Missing Observations**. School of Statistics and Management at Shanghai University of Finance and Economics, Shanghai, China
Jun. 2021	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Massive Spatial Data with Missing Observations**. Biostatistics at Columbia University, New York, New York, USA
Dec. 2020	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Mis-aligned Data**. Johns Hopkins University BLAST working group, Baltimore, Maryland, USA
Mar. 2020	**High-dimensional Multivariate Geostatistics: A Bayesian Matrix-Normal Approach**. ENAR, Nashville, Tennessee, USA

Contributed

Aug. 2022	**Bayesian Predictive Stacking Under Spatial Process Settings**. IMSI Workshop, Chicago, IL, USA
Aug. 2021	**Pathfinder: A Parallel Quasi-Newton Algorithm for Reaching Regions of High Probability Mass**. Joint Statistical Meetings
Aug. 2020	**Spatial Factor Modeling: A Bayesian Matrix-Normal Approach for Misaligned Data**. Bernoulli-IMS One World Symposium 2020
Jul. 2019	**Bayesian Linear Model of Coregionalization (BLMC) for Large Scale Datasets with Accelerated Posterior Sampling Algorithm**. Joint Statistical Meetings, Colorado, USA, poster presentation
Aug. 2017	**Practical Bayesian Inference Based on Nearest Neighbor Gaussian Processes Model for Massive Spatial Data**. Joint Statistical Meetings, Baltimore, Maryland, USA

Referee Experience

Journal of the Royal Statistical Society: Series B (1)

Biometrics (1)

Journal of Computational and Graphical Statistics (4)

Annals of Applied Statistics (1)

Bayesian Analysis (1)

Nature Communications (1)

Statistical Science (1)

Environmetrics (1)

Professional Memberships

American Statistical Association

Eastern North American Region

International Chinese Statistical Association