

College of Arts and Sciences Faculty Vitae

| Name | Department | Date |
|-------------|----------------------------|-------------|
| Li Li | Mathematics and Statistics | 8/20/2019 |

Educational History

- Ph.D. in Statistics, May, 2014, University of South Carolina, Columbia, SC. “Applications of Bayesian Nonparametrics to Reliability and Survival data;” Major advisor: Timothy E. Hanson.
- B.S. in Statistics, June, 2009, Wuhan University, Wuhan, Hubei, P.R.China.

Employment History Part I

- Assistant Professor, August, 2014- , Department of Mathematics and Statistics, University of New Mexico, Albuquerque, NM.
- Associate member, August, 2016- , Comprehensive Cancer Center, University of New Mexico, Albuquerque, NM.

Employment History Part II

- Teaching and Research assistant, August, 2009- August, 2012, Department of Statistics, University of South Carolina, Columbia, SC.
- Statistical consultant, August, 2012- May, 2013, Department of Statistics, University of South Carolina, Columbia, SC.

Professional Recognition and Honors

- Travel grant, 2017, Annual Kliakhandler Conference “Bayesian Inference in Statistics and Statistical Genetics”, Michigan Technological University. Houghton, Michigan.
- Travel grant, 2016, Latent variable 2016 conference, University of South Carolina, Columbia, SC.
- Outstanding graduate student research award, 2013, Department of Statistics, University of South Carolina, Columbia, SC.
- Dean’s dissertation fellowship, 2013, University of South Carolina, Columbia, SC.
- Outstanding graduate student in academics, 2011, Department of Statistics, University of South Carolina, Columbia, SC.
- Outstanding first-year student award, 2010, Department of Statistics, University of South Carolina, Columbia, SC.

Short Narrative Description of Research, Teaching and Service Interests

I am interested in both methodological and applied statistical research. My methodological interests remain in my Ph.D. dissertation on Bayesian reliability and survival analysis but have expanded to include complex lifetime data modeling, causal inference, and missing data problems. These areas have many open research questions that are meaningful and practice driven. For example, in modeling lifetime data that consists of times at which cancer reoccurs, two widely used assumptions for the process that generates the data are Poisson process and renewal process. These two processes assume that any interventions at a cancer relapse would bring the biological system to either the same level as right before the relapse or to the level when the observations were begun. So far, there has been limited work that is flexible enough to accommodate a wider spectrum of effectiveness than those implied by the Poisson process and renewal process. In addition to the challenge of precise modeling of interventions effects, we face time-varying treatments, time-dependent treatment effects, and accumulative effects of treatments, which are all important issues in comparing a treatment regimen's effectiveness. The investigation of intervention' effects is complicated when using observational data due to confounding effects from other variables (covariates). My new interest in causal inference inspired my research on how to incorporate confounding-related covariate information into lifetime data modeling. A new era of casual inference has opened the door to science-driven analytics where questions often include exploring mechanisms behind complex phenomenon. I am very excited about the research potential of causal inference and excited for the opportunity to share these developments with my students.

My application work has been largely motivated by collaborations with researchers in UNM Comprehensive Cancer Center Superfund program. The application work I am involved with encompasses a wide range of investigations related to human health science including heavy metals' effects on children's' neurodevelopment, diagnostic issues of neuro-developmental instruments, and also comet assay image processing. Through collaboration work, I realized the importance of causal inference, dealing with missing data and with data below detection limits. I expect this application work will continue to shape my methodological research interests and give me important practical examples to share with students.

Besides research, I have a love of teaching and I am committed to teaching both undergraduate and graduate classes to best of my ability. In the past five years, I have been observing my students while exploring different teaching strategies and improving my teaching materials. For example, I have noted that my students in STAT 345 (Elementary Probability and Statistics) have vast differences in their backgrounds. Students might lose interest if all examples were at one level. In response to this challenge, I came up with the following strategies: (1) provide easy, medium, and hard examples for every new concept; (2) make the hard example application oriented or otherwise connect it with applied methods in which the concept will be used; (3) skillfully weave in repetitions of important concepts. In teaching graduate classes, I seek to select the most useful concepts and methods, giving an in-depth delivery of the subject matter, and providing good examples. Recognizing my challenges, I find new resources, take on the task of learning the most up to date results, and improve my course materials each time I teach. It has been very rewarding to expand my own knowledge of the field, as well as to best equip my students in their education.

Finally, I find fulfillment in serving the department, college, and professional community. I take an active part in service, functioning according to my calls and talents. My main roles are advising students at both the undergraduate and graduate levels and participating in various department committees. I also serve the broader community by collaborating with scientists in the UNM Comprehensive Cancer Center and reviewing manuscripts for statistical journals. I will continue serving in those areas and also seek to serve

on other professional platforms, for example, participating in reviewing panels. I dedicate myself to each task I perform and stay in excellent communication with co-workers.

Scholarly Achievements

Articles Published in Refereed Journals

- Li, L. McLouth, C., Delaney, H. (2019). Analysis of Covariance with Heterogeneity of Regression and a Random Covariate: The Variance of the Estimated Treatment Effect at Selected Covariate Values. Revision submitted to *Multivariate Behavioral Research*.
- Nozadi, S., Li, L., Clifford, J., Du, R., Murphy, K., Chen, L., Seanez, P., Burnette, C., MacKenzie, D., Lewis, J. (2019). Use of Age & Stages Questionnaire (ASQ) in a Navajo Population: comparison with the U.S. normative dataset. *Child: Care, Health and Development*, to appear. <https://doi.org/10.1111/cch.12704>
- Li, L., Lee, J., Sutton, S., Simmons, V., Brandon, T. (2019). A Bayesian transition model for missing longitudinal binary outcomes and an application to a smoking cessation study. *Statistical Modelling*, to appear. <https://doi.org/10.1177/1471082X18821489>
- Li, L., Jara, A., Garcia-Zattera, M.J., and Hanson, T.E. (2019). Marginal Bayesian semiparametric modeling of mis-measured multivariate interval-censored data. *Journal of the American Statistical Association*, 114, 129-145. <https://doi.org/10.1080/01621459.2018.1476240>
- Li, L. and Lee, J. (2017). Latent promotion time cure rate model using dependent tailfree mixtures. *Journal of the Royal Statistical Society: Series A*. 180, 891-905. <https://doi.org/10.1111/rssa.12226>
- Li, L., Hanson, T.E., and Zhang, J. (2015). Spatial extended hazard model with application to Prostate Cancer Survival. *Biometrics*, 71, 313-322. <https://doi.org/10.1111/biom.12268>
- Li L., Hanson, T.E., Damien, P., and Popova, E. (2014). A Bayesian nonparametric test for minimal repair. *Technometrics*, 56, 393-406. <https://doi.org/10.1080/00401706.2013.842934>
- Li, L. and Hanson, T.E. (2014). A Bayesian semiparametric regression model for reliability data using effective age. *Computational Statistics and Data Analysis*, 73, 177-188. <https://doi.org/10.1016/j.csda.2013.11.015>

Works in Progress

In preparation

- Li, L. (2019). A Bayesian model for the effectiveness of interventions for recurrent events. In preparation for *Technometrics*.

Invited Presentations at Professional Meetings

- Marginal Bayesian semiparametric modelling of mismeasured multivariate interval-censored data. American Statistical Association Women in Statistics and Data Science, October, 2018, Cincinnati, Ohio.
- Marginal Bayesian semiparametric modelling of mismeasured multivariate interval-censored data. Annual Kliakhandler Conference, August, 2017, Michigan Technological University, Houghton, Michigan.

Contributed Oral Presentations at Professional Meetings

- Latent promotion time cure rate model using dependent tailfree mixtures. Latent variable 2016 conference, October, 2016, Columbia, SC.
- Latent promotion time cure rate model using dependent tailfree mixtures. Joint Statistical Meeting, August, 2016, Chicago, IL.

- Bayesian semi-parametric applications to reliability and survival data. ASA New Mexico chapter meeting, April, 2015, Santa Fe, NM.
- Spatial extended hazards model with application to a cancer registration data. ENAR Spring Meetings, March, 2014, Baltimore, MD.
- A Bayesian semiparametric fit for the extended hazards model. ENAR Spring Meetings, March, 2013, Orlando. FL.
- Bayesian modeling of virtual age process for recurrent events. ENAR Spring Meetings poster session, March, 2012, Washington, DC.
- Bayesian Nonparametric Test for Minimal Repair. SC--ASA Palmetto Symposium, April, 2012, Columbia, SC.
- Modeling Decision-dependent Reliability via Bayesian Nonparametric Priors. ENAR Spring Meetings, March, 2011, Miami, FL.

Research

Research Funding

Project title: UNM metal exposure toxicity assessment on tribal lands in the Southwest (METALS) Superfund Research Program.

- Funding period: 07/01/2017- 03/31/2022.
- Annual direct costs: \$1,600,000.
- Principal investigator: Johnnye Lewis.
- Funding organization: NIH/NIEHS.
- Role: Co-Investigator.
- Effort: 15%.
- Related work in progress: investigating methods that can build a causal model for the primary outcomes (e.g., DNA damage and immunology biomarkers as surrogate outcomes) with multiple heavy metal exposures.

Project title: Bayesian Transition Event Model for Binary Longitudinal Outcomes.

- Funding period: 09/01/2017- 09/01/2018.
- Funding amount: \$10,000.
- Principle investigators: Ji-Hyun Lee, Li Li.
- Funding organization: UNMCCCC Research Program Pilot Grant Award Program.
- Related paper published: Li L., Lee, J., Sutton, S., Simmons, V., Brandon, T (2018). A Bayesian transition model for missing longitudinal binary outcomes and an application to a smoking cessation study. *Statistical Modelling*. <https://doi.org/10.1177/1471082X18821489>.

Travel grant, Annual Kliakhandler Conference “Bayesian Inference in Statistics and Statistical Genetics”.

- Funding period: 08/16/2017- 08/20/2017.
- Funding amount: \$500.
- Funding organization: Michigan Technological University.
- Presentation given: Marginal Bayesian semiparametric modelling of mismeasured multivariate interval-censored data.

Travel grant, Latent variable 2016 conference.

- Funding period: 10/12/2016- 10/14/2016.
- Funding amount: \$500.
- Funding organization: University of South Carolina.
- Presentation given: Latent promotion time cure rate model using dependent tailfree mixtures.

Pending Research Funding

Project title: Applying an exposome-wide approach to CMD among participants of the Southern Community Cohort Study.

- Anticipated starting date: 9/20/2019.
- Requested amount: \$3,175,980.
- Principle investigators: Juarez, Paul D., Lima, Maria F.
- Funding organization: NIH/NCI, NHLBI, NIAMS, NIDDK, NINDS, NIMHD.
- Role: Co-Investigator.
- Effort: 10%.
- Objective of the project: to study the effects of individual and multiple exposures on CMD (coronary microvascular dysfunction), to assess cumulative risk and risk stratification, and to develop models and simulations of CMD onset, progression, and outcomes.

Attempts to Secure Extramural Funding As PI

Project title: Bayesian promotion time cure rate model with adjustment.

- Application date: 01/30/2018.
- Requested amount: \$93,817.
- Co-Principle investigator: Ji-Hyun Lee.
- Funding organization: NIH.
- Effort: 15%.

Project title: Innovative spatial survival model allowing short and long-term cancer survivors.

- Application date: 10/14/2014.
- Requested amount: \$70,337.
- Co-Principle investigators: JiaJia Zhang, Timothy. E. Hanson.
- Funding organization: NIH.
- Effort: 15%.

Teaching

Doctoral Advisement

- Xin Gao, Expected December 2020, “Bayesian survival mediation analysis with its application to genetic data.” Role: co-advisor with Dr. Luo in the UNM Comprehensive Cancer Center. Department of Mathematics and Statistics, UNM.

Masters Advisement

- Christina Marie Deffenbaugh, Expected December 2019, “Belief/plausibility measures and its application in safety factors.” Role: advisor. Department of Mathematics and Statistics, UNM.
- Paul-Yvann Djamen, MS, Graduated December 2018, “A Comparison of Variable Selection Methods Using Bootstrap Samples from Environmental Metal Mixture Data.” Role: advisor. Department of Mathematics and Statistics, UNM.
- Jocelyn Noelle Gonzales, MS, Graduated May 2017, “The Effects of Different Teaching Methods on Student Attitude and Achievement in Calculus Recitations and Related Strategies for TA Training.” Role: co-advisor with Dr. Nakamaye. Department of Mathematics and Statistics, UNM.

Masters' thesis committees

- Alvaro Emilio Ulloa, Graduated May, 2016, "Synthetic Structural Magnetic Resonance Image Generator Improves Deep Learning Prediction Of Schizophrenia." Major advisor: Erik B. Erhardt. Department of Mathematics and Statistics, UNM.
- Mina Lee, Graduated May, 2016, "Application of Model Selection Techniques and Measures of Agreement to Advertising Data." Major advisor: James Degnan. Department of Mathematics and Statistics, UNM.
- Yingzhe Cheng. Graduated December, 2016, "What Affects Parents' Choices of Milk? an Application of Bayesian Model Averaging." Major advisor: Gabriel Huerta. Department of Mathematics and Statistics, UNM.

Doctoral dissertation committees

- Christopher McLouth, Graduated December, 2018, "Analysis of Covariance, with Heterogeneity of Regression and a Random Covariate." Major advisor: Harold Delaney. Department of Psychology, UNM.
- Huan Jiang, graduated May, 2017, "Modeling Trait Evolutionary Processes with More Than One Gene." Major advisor: James Degnan. Department of Mathematics and Statistics, UNM.

Classroom Teaching (the normal teaching load is 2-2)

- 2014; Fall; Elements of Mathematical Statistics and Probability; Stat 345; 37 students.
- 2015; Spring; Elements of Mathematical Statistics and Probability; Stat 345; 46 students.
- 2015; Spring; Introduction to Time series with its applications; Stat 581/481; 11 students.
- 2015; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 2; 44 students.
- 2015; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 3; 41 students.
- 2016; Spring; Introduction to Time series with its applications; Stat 581/481; 16 students.
- 2016; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 2; 43 students.
- 2016; Fall; Spatial Statistics and its Biostat application; Stat 579; 6 students.
- 2017; Spring; Elements of Mathematical Statistics and Probability; Stat 345, section 2; 52 students.
- 2017; Spring; Introduction to Bayesian modeling; Stat 477/577; 11 students.
- 2017; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 2; 52 students.
- 2017; Fall; Introduction to Time series with its applications; Stat 581/481; 11 students.
- 2018; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 2; 52 students.
- 2018; Fall; Introduction to Time series with its applications; Stat 581/481; 11 students.
- 2019; Spring; Elements of Mathematical Statistics and Probability; Stat 345, section 3; 46 students.
- 2019; Spring; Biostatistical methods: Survival analysis and Logistic regression; Stat 474/574; 8 students.
- 2019; Spring; Reading and Research; Stat 650; 1 student.
- 2019; Fall; Elements of Mathematical Statistics and Probability; Stat 345, section 1; 61 students.
- 2019; Fall; Statistical Computing; Stat 590; 15 students.

Services to UNM

Committee services to the Mathematics and Statistics Department

- Hiring committee for an Assistant Professor in Statistics, Fall 2019.
- Undergraduate committee, Spring 2018- present.
- Colloquium committee, Fall 2016- present.
- Hiring committee for a senior statistics lecturer, Summer 2019.
- Graduate committee, Fall 2017.
- Undergraduate thesis Honors committee, Fall 2015- Spring 2016.

Other services to the Mathematics and Statistics Department

- Writing and grading statistics qualifier exams each semester.
- Advising 5-8 undergraduate students each semester.
- Participating in department and statistics group meetings.
- Interviewing job candidates.

University wide services

- Collaborating with research groups in the UNM Comprehensive Cancer Center.
- Reviewing job applications and interviewing job candidates for the UNM Comprehensive Cancer Center.
- Reviewing promotion files for the UNM Comprehensive Cancer Center.

Reviewing for journals

- *Bayesian Analysis*, 3 manuscripts.
- *Statistics in Medicine*, 1 manuscript.
- *The American Statistician*, 1 manuscript.
- *Operations Research Perspectives*, 1 manuscript.
- *Journal of Applied Statistics*, 1 manuscript.
- *Technometrics*, 1 manuscript.
- *Statistical Modelling*, 2 manuscript.
- *PLOS ONE*, 2 manuscripts.
- *Test*, 1 manuscript.
- *Biometrics*, 1 manuscript.