Lan Luo

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Education

2016 - Present	University of Michigan Ph.D. Biostatistics (Advisor: Peter X.K. Song)	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

Methodology: online learning, streaming data analytics, change-point detection, correlated data analysis, optimization, high-dimensional regression

Applications: mobile health, human genetics, randomized controlled trial

Experience

Research Experience

2016 - Present **Doctoral Dissertation Research**, *Streaming Data Analytics and Real-time Regression Analysis*
Department of Biostatistics, University of Michigan Ann Arbor, MI

- Developed a new methodological framework of renewable estimation and incremental inference in generalized linear models, including an R package `RenewGLM`
- Developed a real-time regression analysis method for streaming cluster- or longitudinal-correlated data streams with possible abnormal data batches in quadratic inference functions (R package `RenewQIF`).
- Developing real-time regression with dynamic nonhomogeneous parameters in the context of state space models

2017 **Data Analyst**, *Mobile Health Data Analysis*
Department of Biostatistics, University of Michigan Ann Arbor, MI

- Pre-processing and modeling of high frequency basal body temperature measurements via Hidden Markov Model (HMM), as well as predicting time of ovulation with the incorporation of personal biorhythm information

Work Experience

2019 **Data Scientist Intern**, *Online A/B Testing with Valid Confidence Intervals*
Google LLC Mountain View, CA
- Investigated type I error control for the mixture sequential probability ratio test (mSPRT) in continuous monitoring of A/B testing results
- Submitted source code that passed review to Google's codebase
- Extended mSPRT to simultaneously monitor multiple metrics in Google's Rasta platform

2017-Present **Research Assistant**, *Black Women's Wellness Project*
Department of Health Behavior and Health Education, University of Michigan
Ann Arbor, MI
- Created a randomization scheme achieving balances between intervention and control groups by geographic location and age
- Data cleaning and statistical analysis of evaluating treatment effects

2015-2016 **Research Assistant**, *Effects of Contamination on DNA Sequencing Data*
Department of Biostatistics, University of Michigan Ann Arbor, MI
- Conducted genotype calling from contaminated DNA sequencing data, and assessed concordance between contaminated and true genotypes
- Designed simulations to assess effects of contamination, sequencing depth, minor allele frequency and quality score on genotype calling

2015 **CPHG Summer Intern**, *Solving Constrained Optimization Problems via ADMM*
Department of Biostatistics, University of Michigan Ann Arbor, MI
- Developed an ADMM (Alternating Direction Method of Multipliers) optimization procedure to obtain ℓ_1-regularized equality-constrained estimation in generalized linear models
- Developed an R package `glmADMM`

Publications

1. **Luo, L.** and Song, P.X.K. (2019). Renewable estimation and incremental inference in generalised linear models with streaming datasets. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* (accepted in October 2019). An earlier version of this paper "real-time regression analysis of streaming health datasets" won the 2019 ENAR Distinguished Student Paper Award.

2. **Luo, L.**, She, X.C., Cao, J.X., Zhang, Y.L., Li, Y.J., Song, P.X.K. (2019). Detection and prediction of ovulation time from body temperature measured by YONO earbud. *IEEE Transactions on Biomedical Engineering* (accepted, advanced online access, DOI: 10.1109/TBME.2019.2916823).

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

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

Manuscripts Submitted

5. **Luo, L.** and Song, P.X.K. (2019). Real-time regression analysis of streaming clustered data with possible abnormal data batches. *Journal of the American Statistical Association (Theory & Methods)* (submitted in September 2019).
6. Tran, L., **Luo, L.** and Jiang, H. (2019). *ECLasso*: Fitting equality-constrained, ℓ_1-penalized models with inexact ADMM to find gene pairs. *Bioinformatics* (submitted in October 2019).

Manuscripts In Preparation

7. **Luo, L.** and Song, P.X.K. Real-time regression analysis of dynamic nonhomogeneous streaming data in linear state space mixed model.
8. **Luo, L.** and Song, P.X.K. Understanding dynamics of p-values in incremental inference with streaming data.

Honors and Awards

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
2012	HUST Qiming Academy Outstanding Student Award & First Prize in Accomplishments
2011	China National Scholarship

Funding

2018	Rackham Travel Grants for ENAR & JSM
2015	Funding of genetics-related internships by CPHG

Software

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

Technical Skills

R, Rcpp, SAS, Python, SQL, Matlab, TeX

Hobbies

Yoga, hiking, Pipa (Chinese instrument), painting