# Lan Luo

University of Michigan

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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

2016 - Present

# Research Experience

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**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

Department of Biostatistics, University of Michigan Ann Arbor, MI

- Developed an ADMM (Alternating Direction Method of Multipliers) optimization procedure to obtain  $\ell_1$ -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)*, 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.
- 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*, **67**(2): 512–522.
- 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 In Revision

5. **Luo, L.** and Song, P.X.K. (2020+). Real-time regression analysis of streaming clustered data with possible abnormal data batches. *Journal of the American Statistical Association* (Theory & Methods) (invited revision).

## Manuscripts In Preparation

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

### Honors and Awards

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
2012	HUST Qiming Academy Outstanding Student Award & First Prize in Accom-
	plishments
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