# Fangzheng Xie

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## EDUCATION

**Ph.D. in Applied Mathematics and Statistics**
Johns Hopkins University, Baltimore, MD — August 2020
Advisor: Yanxun Xu, Ph.D.

**M.A. in Applied Mathematics and Statistics**
Johns Hopkins University, Baltimore, MD — Spring 2016

**B.S. in Mathematics and Applied Mathematics**
South China University of Technology, Guangzhou, China — July 2014

## EMPLOYMENT

**Assistant Professor**
Department of Statistics — August 2020 - Present
Indiana University, Bloomington, IN

## RESEARCH INTERESTS

- High-dimensional statistics and network analysis
- Theory and methods for Bayesian nonparametrics
- Computer models and uncertainty quantification
- Bayesian methods development for electronic health/medical data and computational biology

## PUBLICATIONS

1. Gu, M., **Xie, F.**, and Wang, L., *A theoretical framework of the scaled Gaussian stochastic process in prediction and calibration.* **SIAM/ASA Journal on Uncertainty Quantification**, accepted for publication, 2022.
2. **Xie, F.** and Xu, Y., *Efficient Estimation for Random Dot Product Graphs via a One-step Procedure.* **Journal of the American Statistical Association: Theory & Methods**, accepted for publication, 2021.
3. **Xie, F.**, Xu, Y., Priebe, C.E., and Cape, J., *Bayesian Sparse Spiked Covariance Model With a Continuous Matrix Shrinkage Prior.* **Bayesian Analysis**, accepted for publication, 2021.
4. **Xie, F.** and Xu, Y., *Bayesian Projected Calibration for Computer Models.* **Journal of the American Statistical Association: Theory & Methods**, in press, 2020
5. **Xie, F.** and Xu, Y., *Optimal Bayesian Estimation for Random Dot Product Graphs.* **Biometrika**, 2020; 107 (4), 875-889..
6. **Xie, F.** and Xu, Y. *Adaptive Bayesian Nonparametric Regression using a Kernel Mixtures of Local Polynomials with Application to Partial Linear Models.* **Bayesian Analysis**, 2020; 15(1): 159-186..
7. Li, Y., Xu, Y., **Xie, F.**, Bandyopadhyay, D.,*BAREB: A Bayesian repulsive biclustering model for periodontal data.* **Statistics in Medicine**, 2020; 39(16): 2139-2151.
8. Wang, L., **Xie, F.**, and Xu, Y., *Simultaneous Learning the Dimension and Parameter of a Statistical Model with Big Data*, **Statistics in Biosciences**, accepted for publication, 2021.

9. **Xie, F.** and Xu, Y., *Bayesian Repulsive Gaussian Mixture Model.* **Journal of the American Statistical Association: Theory & Methods**, 2020; 115(529): 187-203. **(Winner of the O-Bayes 2017 Young Investigator Travel Award)**
10. **Xie, F.**, Jin, W., and Xu, Y., *Rates of Contraction with Respect to $L_2$-distance for Bayesian Nonparametric Regression.* **Electronic Journal of Statistics**, 2019, Vol. 13, No. 2, 3485-3512.
11. **Xie, F.**, Zhou, M., and Xu, Y., *BayCount: A Bayesian Decomposition Method for Inferring Tumor Heterogeneity using RNA-Seq Counts.* **Annals of Applied Statistics**, 2018, Vol. 12, No. 3, 1605-1627.

## WORKING PAPERS

1. **Xie, F.**, *Euclidean Representation of Low-Rank Matrices and Its Statistical Applications.* Technical report. arXiv:2103.04220.
2. **Xie, F.**, *Entrywise limit theorems of eigenvectors for signal-plus-noise matrix models with weak signals.* Under revision. arXiv:2106.09840.
3. **Xie, F.**, Wu, D., *Eigenvector-Assisted Statistical Inference for Signal-Plus-Noise Matrix Models.* Technical report. arXiv:2203.16688.
4. Wu, D., **Xie, F.**, *Statistical inference of random graphs with a surrogate likelihood function.* Technical report.
5. Yao, D., **Xie, F.**, Xu, Y. *Bayesian Sparse Gaussian Mixture Model in High Dimensions.* In Preparation, 2022+.

## SOFTWARES

1. R package `BayProjected`: A package for calibrating computer models with observational data from physical system using the Bayesian projected calibration method (available at `https://fangzheng-xie.github.io./`).
2. R package `BayCount`: A package for inferring transcriptional tumor heterogeneity through RNA-Seq counts using a Bayesian matrix decomposition method built upon the negative binomial factor analysis model (available at `https://fangzheng-xie.github.io./`).

## HONORS AND AWARDS

- Acheson J. Duncan Fund for the Advancement of Research in Statistics Travel Award 2017-2019
- O-Bayes 2017 Young Investigator Travel Award 2017
- Rufus P. Isaacs Graduate Fellowship, Johns Hopkins University 2017-2020

## TEACHING EXPERIENCE

- Instructor (Indiana University):
  - STAT-S 722 Advanced Statistical Theory II Spring 2022
  - STAT-S 721 Advanced Statistical Theory I Fall 2021
  - STAT-S 520 Introduction to Statistics Spring 2021, Fall 2020
- Teaching Assistant (Johns Hopkins University):
  - EN.553.733 Advanced Topics in Bayesian Statistics Spring 2019
  - EN.550.420 Introduction to Probability Spring 2016
  - EN.550.620 Probability Theory I Fall 2015
- Guest Lecturer (Johns Hopkins University):

– EN.553.733 Advanced Topics in Bayesian Statistics Spring 2019
– EN.553.733 Statistical Uncertainty Quantification Fall 2018

## ACADEMIC PRESENTATIONS

Central limit theorems for spectral estimators and their one-step refinement for sparse random graphs
*Department of Statistics, University of Pittsburgh* October 2021
*Department of Bioinformatics and Biostatistics, University of Louisville* September 2021

Euclidean Representation of Low-Rank Matrices and Its Statistical Applications
*International Chinese Statistical Association Applied Statistics Symposium 2021* September 2021

One-step Refinement of Spectral Methods for Low-rank Random Graphs
*Luddy School of Informatics, Computing, and Engineering, Indiana University* February 2021

Global and Local Estimation of Low-rank Random Graphs using Likelihood-based Methods
*Department of Statistics, Rutgers, the State University of New Jersey* February 2020
*Department of Data Sciences and Operations, USC Marshall School of Business* February 2020
*Department of Statistics, University of California, Santa Cruz* February 2020
*Department of Statistics, Indiana University* January 2020
*Department of Statistics, University of Virginia* January 2020
*Department of Statistics, University of British Columbia* January 2020
*School of Statistics, University of Minnesota* January 2020
*Department of Statistics and Actuarial Science, University of Waterloo* January 2020
*Department of Statistics, Florida State University* January 2020
*Department of Statistics, University of Illinois* November 2019
*Department of Applied Mathematics and Statistics, Johns Hopkins University* October 2019

Bayesian Projected Calibration of Computer Models
*Joint Statistical Meeting (JSM) 2019 (Poster Session), Denver, CO* July 2019
*Johns Hopkins University, Baltimore, MD* February 2019

Bayesian Estimation of Sparse Spiked Covariance Matrices in High Dimensions
*Johns Hopkins University, Baltimore, MD* September 2018

A Theoretical Framework for Bayesian Nonparametric Regression
*Joint Statistical Meeting (JSM) 2018 (Speed Session), Vancouver, BC, Canada* July 2018
*Johns Hopkins University, Baltimore, MD* February 2018

Bayesian Repulsive Gaussian Mixture Model
*International Workshop on Objective Bayes Methodology (Poster Session), Austin, TX* December 2016
*Johns Hopkins University, Baltimore, MD* November 2017

BayCount: A Bayesian Decomposition Method for Inferring Tumor Heterogeneity using RNA-Seq Counts
*Johns Hopkins University, Baltimore, MD* October 2016

## STUDENT ADVISING

Dingbo Wu (PhD advisee and Data Analysis Project Advisee)
John Koo (PhD thesis committee)

## PROFESSIONAL SERVICE

Referee for Journal of the American Statistical Association, Journal of Econometrics, Journal of Computational and Graphical Statistics, Bayesian Analysis, IEEE Transactions on Pattern Analysis and Machine Intelligence, Test, Journal of Statistical Planning and Inference.