Jiangmei (Ruby) Xiong

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EDUCATION

Ph.D. Biostatistics, Vanderbilt University, Nashville, TN, USA 2020 - Aug 2025 (Expected)
Dissertation: Improvement of Medical Imaging Analysis through Statistics
Advisor: Simon Vandekar, Ph.D., Siyuan Ma, Ph.D.

M.A. Statistics, Columbia University, New York, NY, USA. 2018 - 2019

Bachelor, Actuarial Studies, Australian National University, Canberra, ACT, Australia 2015 - 2018

PROFESSIONAL EXPERIENCE

Graduate Research Assistant 2020 - present
Department of Biostatistics, Vanderbilt University, Nashville, TN

- Statistical single-cell imaging and R package
  - Conducted statistical imaging research with various imaging datasets, more than 100,000 data points.
  - Designed and implemented statistical algorithm in R for single-cell imaging marker gating pipeline.
  - Created interactive visualization tools to facilitate the quality control of marker gating.
  - Assessed method performance on multiplexed immunofluorescence(mIF) image data sets. Application includes colon cancer and ovarian cancer.
- Machine learning computer vision application
  - Applied machine learning image synthesis methods to fMRI and mIF images.
  - Conducted statistical inference analysis simulations on synthesized images from GANs and XGBoost.
- Statistical collaboration: neurology research
  - Performed data analysis for retrospective Autism Therapy dataset.
  - Collaborated in the study of Alzheimer's patient behavior.

Academic Contractor/Intern Summer 2024
Global PK/PD and Pharmacometrics, Eli Lily and Company, Indianapolis, IN
Project title: "Translation of ADC PK parameters from pre-clinical species to humans".

- Performed data collection of PK data for Antibody-Drug Conjugate (ADC).
- Examined allometric scaling index for ADC across different PK models with data collected.

Research Intern 2020
Department of Epidemiology, Columbia University Mailman School of Public Health, New York, NY

- Conducted research related to development of statistical genetic models for social and health outcomes in aging.
- Applied structural equation modeling to genome-wide association study (GWAS) data and genomic SEM; presented key findings in weekly research meetings.

Research Assistant 2019-2020
Computational Epidemiology Lab, Harvard Medical School, Remote

- Collected and cleaned large volume of social media text data (3000+ entries)

- Digital surveillance for monitoring environmental health threats
- Topic modeling and sentiment analysis for Alzheimer's disease caregiver mental health issues with LDA, BERT.

SOFTWARE PACKAGES

GammaGateR 2024
R package for the pipeline that can process multiple images and markers at once and provides interactive diagnostic plots for model outcomes. Published in Bioinformatics (2024)

cfGMM 2024
R package that fits closed-form Gamma mixture model, which significantly reduces the computational time. Published in in Bioinformatics (2024)

AWARDS

Distinguished Teaching Assistant 2023
Department of Biostatistics, Vanderbilt University, Nashville, TN
Awarded annually to one teaching assistant within the graduate program of biostatistics for excellence in teaching and a dedication to peer education

- Elected by students and evaluated by faculty committee

PROFESSIONAL SKILLS

Programming Languages
R (7+ years), Python (2+ years)

Technical Skills
Statistical Modeling, Clinical Data Analysis, R Package, GIT, Machine Learning, Spatial Modeling, Topic Modeling, High-Dimensional Data Analysis

TEACHING

Teaching Assistantship
Department of Biostatistics Vanderbilt University, Nashville, TN

- Contemporary Statistical Inference, Spring 2024
- Statistical Collaboration in Health Sciences, Fall 2023
- Regression Modeling Strategies, Spring 2023
- Advanced Concepts in Probability and Real Analysis for Biostatisticians, Fall 2022

SERVICE

Academic Journal Reviewer
Bioinformatics

Invited Conference Session Organized
PANEL: Collaboration 101: What a Scientist Seeks in a Statistician vs What a Statistician Seeks in a Scientist (Co-organizer for CENS) Mar 2025
ENAR Spring Meeting, New Orleans, LA
Recent Advances in Spatial Analysis of Single-cell Imaging May 2023
Statistical Methods in Imaging, ASA Statistics in Imaging Section, Minneapolis MN

Council Member, Council for Emerging and New Statisticians (CENS) 2024

Regional Advisory Board, Eastern North America Region International Biometric Society

- Advised and helped implement ideas to enhance the benefits of ENAR membership and to increase awareness of the benefits of ENAR membership to students
- Organized a CENS session at each ENAR Spring Meeting and Joint Statistical Meeting

Student Representative, Curriculum Review Committee 2024
Department of Biostatistics, Vanderbilt University, Nashville, TN

- Organized meeting with students, present feedback results and facilitate discussion
- Provided student perspective in the committee meetings

Biostatistics Graduate Student Association
Vanderbilt University, Nashville, TN

- President (2024), Vice President(2023), Treasurer (2023)

Columbia Statistics Club
Columbia University, New York, NY

- Vice President (2019), Chair of Public Relations (2019), Social Media Board Member (2018)

PRESENTATIONS

Invited Oral Presentations

"GammaGateR: Semi-automated Marker Gating for Single-cell Multiplexed Imaging" Oct 2024
Cancer Systems Biology Consortium Image Analysis Working Group, NIH NCI
virtual presentation

"GammaGateR: Semi-automated Marker Gating for Single-cell Multiplexed Imaging" Sep 2024
Emory Network of Computational Omics Research (ENCORE), Emory University
Atlanta, Georgia (virtual presentation)

"GammaGateR: Semi-automated Marker Gating for Single-cell Multiplexed Imaging" May 2024
Statistical Methods in Imaging, American Statistical Association Statistics in Imaging Section
Indianapolis, IN

Oral Presentations

"Facilitating Valid Statistical Inference in Biomedical Image Synthesis" Mar 2025
Eastern North American Region Spring Meeting, ENAR. New Orleans, LA

"Image Imputation and Synthesis in Medical Imaging" Sep 2023
Vanderbilt Department of Biostatistics Student Journal Club, Nashville, TN

"Faster Estimation for Constrained Gamma Mixture Models Using Closed-Form Estimators" Aug 2022
Joint Statistical Meeting, American Statistical Association. Washington, DC

"Application of closed-form gamma mixture model in mxIF cell gating" Mar 2022
Eastern North American Region Spring Meeting, ENAR. Houston, TX

Poster Presentations

"Facilitating Valid Statistical Inference in Biomedical Image Synthesis" Aug 2024
Joint Statistical Meeting, American Statistical Association. Portland, OR

"Application of Closed-form Gamma Mixture Model in mxIF Cell Gating" May 2023
Statistical Methods in Imaging, ASA Statistics in Imaging Section. Minneapolis, MN

"Semi-Automated Marker Gating For Multiplexed Imaging Using Constrained Gamma Mixture Model" Mar 2023
Eastern North American Region Spring Meeting, ENAR. Nashville, TN

"Semi-Automated Marker Gating For Multiplexed Imaging Using Constrained Gamma Mixture Model" Mar 2023
NIH Junior Investigators Atlas Builders Meeting. New York, NY

PUBLICATIONS

Xiong J, Bao S, Vandekar S, Ma S. *Facilitating Valid Statistical Inference in Biomedical Image Synthesis.* In preparation. (2025)

Lee JL, **Xiong J**, Phan TX, Reeder JE, Keener LC, Tholen MG, Vandekar S, Zald DH, Darby RR. *Impaired Cooperation And Prosocial Learning During Trust Game In Dementia.* Under review at Journal of Alzheimer's Disease. (2025)

Xiong J, Lotspeich SC, Sherrill JB, Amorim G, Shepherd BE, Tao R. *sleev: Semiparametric Likelihood Estimation with Errors in Variables.* Under review at Journal of Open Source Software. (2025)

Xiong J, Kaur H, Heiser CN, McKinley ET, Roland JT, Coffey RJ, Shrubsole MJ, Wrobel J, Ma S, Lau KS, Vandekar S. *GammaGateR: Semi-automated Marker Gating for Single-cell Multiplexed Imaging.* Bioinformatics. (2024)

- *Featured in National Cancer Institute Center for Biomedical Informatics and Information Technology News Column: "GammaGateR Helps Decipher Imaging Data"*

Kang, K., Seidlitz, J., Bethlehem, R. A., **Xiong, J.**, Jones, M. T., Mehta, K., ... & Vandekar, S. *Study design features increase replicability in brain-wide association studies.* Nature. (2024)

Hswen Y, **Xiong J**, Hurley M, Nguyen T. *Experiences of Alzheimer's disease and related dementia family caregivers on Reddit communities: A topic modeling and sentiment analysis.* Artificial Intelligence in Health. (2024)

Smith JR, Hopkins CE, **Xiong J**, Luccarelli J, Shultz E, Vandekar S. *Use of ECT in Autism Spectrum Disorder and/or Intellectual Disability: a Single Site Retrospective Analysis.* Journal of Autism and Developmental Disorders. (2022)

Xiong J, Hswen Y, Naslund JA. *Digital Surveillance for Monitoring Environmental Health Threats: A Case Study Capturing Public Opinion from Twitter About The 2019 Chennai Water Crisis.* International Journal of Environmental Research and Public Health. (2020)