Xiangyu Zhang

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Education Background

University of Minnesota, Twin Cities **MN**

Ph.D., Statistics *Sep. 2020 - May. 2025 (Expected)*

University of Minnesota, Twin Cities **MN**

B.A., Mathematics, and Statistics, minor in Computer Science, with high distinction *Sep. 2016 - May. 2020*

Experience

Research Assistant ***Jun. 2021 - Present***

- **Spatial time series modeling for epidemic diseases**
  - Developed a new class of epidemiological spatial time series models for predicting the outbreaks and trends of epidemic diseases.
  - Utilizing sequential Monte Carlo (SMC) and Kalman filter for quicker surveillance than MCMC.
  - Achieved early prediction of past pandemics (e.g. COVID-19) based on wastewater data.
- **Distribution-free testing in linear parametric regression and goodness-of-fit tests**
  - Developed methods for testing mean function in a parametric regression setting when the distribution of the response/errors are unknown. Similar methods are implemented to efficiently assess the validity of any postulated models and provided corrections of the models if the test get rejected.
  - Constructed a new class of powerful test statistics whose inference is based on efficient implementations of parametric bootstrap rather than a fixed limiting gaussian process.
  - Discovered unknown astrophysical feathers on RT Cru star utilizing this method.

Consultant at Statistics Consulting Center, UMN ***Jun. 2022 - Aug. 2022***

- ***Wastewater analysis and prediction for epdemic disease surveillance***
  - Built pipeline transforming and combining metadata into required format, and storing data in lab MySQL database using Python.
  - Proposed a new prediction model using multi-class classification models (e.g. GLM, Tree-methods, XGBoosting). Achieved 0.15 increment of AUC in the predictive performance.

Instructor and Teaching Assistant ***Sep. 2020 - Present***

- Instructor for an introductory-level course in statistical analyzing tools (Hypothesis Testing, Anova, etc.).
- Teaching assistant for courses in machine learning, design of experiments, and statistical computing.

Publications

- ***A novel approach to detect line emission under high background in high-resolution X-ray spectra*** *2023*
- **Zhang X.**, Algeri S., et al. Monthly Notices of the Royal Astronomical Society (Top in Astronomy and Astrostatistics, Impact factor: 4.8).
- ***Exhaustive goodness-of-fit via smoothed inference and graphics*** *2022*
- Algeri S., **Zhang X**. Journal of Computational and Graphical Statistics. (Top in computational statistics, Impact factor: 1.884)
- ***Rare disease awareness and perspectives of physicians in China: a questionnaire-based study*** *2021*
- Li X., **Zhang X.**, et al. Orphanet Journal of Rare Diseases (Impact factor: 4.303).

Skills & Software

- Programming: R, Python, Pytorch, SAS, C, C++
- Database: MySQL
- Others: XGBoost, Unix, Git, R shiny
- *LPbkg, Python package: Implementation of the signal detection under background misspecification using the smooth test.*
- *LPsmooth, R package: A comprehensive framework for performing the smooth tests.*

Honors & Awards

- Summer Research Fellowship, a scholarship for statistics Ph.D. students, 2021
- Buehler Memorial Scholarship, a scholarship for top statistics undergraduate students, 2020
- Global Excellence Scholarship, a scholarship per year offered to excellent incoming students, 2016-2020