KAI LI

CURRICULUM VITAE

Department of Applied Mathematics and Statistics, (626) 841-0005
College of Engineering and Applied Sciences, https://garylikai.github.io/
Stony Brook University, Stony Brook, NY kai.li@stonybrook.edu

EDUCATION

Ph.D. in Applied Mathematics and Statistics (Statistics Track) May 2026
Stony Brook University, Stony Brook, NY
Advanced Graduate Certificate in Operations Research December 2022
Advanced Graduate Certificate in Data and Computational Science May 2022
M.S. in Applied Mathematics and Statistics (Statistics Track) May 2022
Stony Brook University, Stony Brook, NY
B.S. in Mathematics (Theoretical Track) May 2020
The Ohio State University, Columbus, OH
Minors: Computer Information Science, Economics

RESEARCH EXPERIENCE

Enhanced Tic-Tac-Toe Applications in Reinforcement Learning August 2022 - Present
Department of Applied Mathematics and Statistics, Stony Brook University, Stony Brook, NY
Faculty Advisor: Wei Zhu
Faculty Coadvisor: Keli Xiao

- Investigating reinforcement learning algorithms for optimal strategy development in the game of tic-tac-toe.
- Employing advanced statistical methods and computer simulations for decision-making analysis.
- Collaborating in interdisciplinary research, integrating statistics, computer science, and game theory.
- Preparing academic papers, presenting research findings at group meeting, and contributing to software development.

Epidemiological Modeling September 2019 - April 2020
Mathematical Biosciences Institute, The Ohio State University, Columbus, OH
Faculty Mentor: Wasiur R. KhudaBukhsh

- Developed statistical methods to generate large-population samples from modeling epidemiological processes.
- Analyzed samples segregated into susceptible (S), infected (I), and recovered (R) compartments.

- Generated solutions using ordinary/partial differential equations, survival functions, or cumulative hazard functions.
- Computed the proportion of people susceptible or infected using computer software.
- Interpreted the awareness effect of spreading epidemics under Susceptible-Infected-Recovered (SIR) curves.

Analysis of Genome-Wide Association Studies July 2019 - August 2019
School of Mathematics, Sun Yat-sen University, Guangzhou, Guangdong, China
Faculty Mentor: Xiaobo Guo

- Researched summary statistics of individual phenotype from Genome-Wide Association Studies (GWASs).
- Learned materials and methods for data collection and analysis used in other researchers' papers.
- Utilized mathematical statistics (univariate and multivariate methods) to model and estimate the correlation of between-phenotypes.
- Calculated related measurements for both homogeneous and heterogeneous genetic effects on multiple phenotypes in GWAS.
- Revised experimental design methods and calculations for improvements.

ACADEMIC PAPERS

1. **Li, K.** Factors Affecting the Wage of Adult Civilians in the United States. ECO 521: *Econometrics*.
    - Final Draft. May 16, 2022.
    - First Draft. May 2, 2022.
    - Methodology. April 6, 2022.
    - Data. March 30, 2022.
    - Proposal. February 28, 2022.
2. **Li, K.** and Yao, P. F. Understanding Flight Delay. CSE 519: *Data Science Fundamentals*.
    - Final Report. December 2, 2021.
    - Progress Report. November 11, 2021.
    - Proposal. October 21, 2021.
3. **Li, K.** The One-Sixty-Fourth Fraction of the 2^{10} Factorial Design. AMS 582: *Design and Analysis of Experiments*. November 27, 2021.
4. **Li, K.** Multiple Regression Analysis of the Interaction Between Gene and Stress on the Risk of Depression. AMS 578: *Regression Theory*.
    - Final Report. May 3, 2021.
    - Preliminary Report. April 19, 2021.

5. **Li, K.**, Qi, Y. and Zhang, T. Data Analysis of the Study on the Efficacy of Nosocomial Infection Control (SENIC Project) Dataset. AMS 572: *Data Analysis*. December 1, 2020.

6. **Li, K.** Applications of Mathematics in Econometrics. AMS 510: *Analytical Methods for Applied Mathematics and Statistics*. November 23, 2020.

7. **Li, K.**, Wang, S. and Kang, Z. The Impact of Age, Education, Marital Status and Sex on Wage and Salary Income. ECON 4400: *Elementary Econometrics*. April 20, 2020.

PROJECTS

1. **Li, K.**, Du, W., Zhou, Z., and Dong, Z. Importance Sampling Techniques for Variance Reduction. AMS 553: *Simulation and Modeling*. December 13, 2022.

2. **Li, K.** Kaggle Challenge: Rossmann Store Sales - Data Integration and Modeling. CSE 519: *Data Science Fundamentals*. October 16, 2021.

3. **Li, K.** Kaggle Challenge: Microsoft Malware Prediction - Exploratory Data Analysis. CSE 519: *Data Science Fundamentals*. September 23, 2021.

4. **Li, K.** PMLi_1.0 `R` Package. AMS 597: *Statistical Computing*. May 5, 2021.

    - Source code, vignette, help files, warning messages, sample data, sample code.

5. **Li, K.** Scientific Computing of Euler's Number. AMS 595: *Fundamentals of Computing*. December 2, 2020.

6. **Li, K.** The Game of Life in MATLAB. AMS 595: *Fundamentals of Computing*. September 18, 2020.

7. Flanagan, P., **Li, K.**, Bao, C. and Fang, W. Online Bookstore Information Management System and Database. CSE 3241: *Introduction to Database Systems*. April 20, 2020.

8. **Li, K.** Kruskal's Algorithm Project. CSE 2331: *Foundations II: Data Structures and Algorithms*. April 14, 2019.

9. **Li, K.** Binary Tree Project. CSE 2331: *Foundations II: Data Structures and Algorithms*. March 15, 2019.

10. **Li, K.** Triplet Sum Hashing Project. CSE 2331: *Foundations II: Data Structures and Algorithms*. February 19, 2019.

PRESENTATIONS

1. **Li, K.** Using Randomization to Break the Curse of Dimensionality. AMS 556: *Dynamic Programming*. December 1, 2022
2. Li, S., **Li, K.** and Suh, J. H. Time Series Forecasting of Store Sales: ARIMA, RNN, LSTM, and GRU Time Series Modeling. AMS 580: *Statistical Learning*. April 25, 2022.
3. Matsibekker, R., **Li, K.**, Hugo, C. S. and Green, T. Google Ngrams. AMS 586: *Time Series*. December 6, 2021.
4. **Li, K.** Research in Applied Mathematics and Statistics and How the Research Relates to Life. JRN 503: *Foundations of Science Communication II*. May 4, 2021.
5. **Li, K.**, Hyland, B., Yabor, V., Gueli, C. and Yao, P. F. Quasi-likelihood Estimation. AMS 573: *Categorical Data Analysis*. May 3, 2021.
6. **Li, K.** Story of Science in Applied Mathematics and Statistics. JRN 501: *Foundations of Science Communication I*. September 19, 2020.
7. **Li, K.** Boeing 737 Max Crashes, Software's Role. CSE 2501: *Social, Ethical, and Professional Issues in Computing*. November 14, 2019.

RESEARCH INTERESTS

Statistics and Data Analysis, Regression Analysis Applications (Cross-Sectional, Time Series and Panel Data), Statistical Learning, Statistical Computing, Visualization, Econometric Analysis

TEACHING EXPERIENCE

Instructor, Department of Applied Mathematics and Statistics, Stony Brook University, NY

AMS 394 (Statistical Laboratory) - 70 students	Fall 2023
AMS 412 (Mathematical Statistics) - 35 students	Spring 2023
AMS 394 (Statistical Laboratory) - 69 students	Fall 2022

- Designed and delivered engaging lectures on statistics, intermediate data analysis, and statistical inference.
- Developed course materials, assignments, and assessments for an average class size of 52 students.
- Guided students in hands-on R programming for improved learning outcomes.
- Offered personalized support through office hours, resulting in enhanced student understanding and performance.

- Received consistent positive feedback through course evaluations from students for effective teaching methods and ability to explain complex statistical concepts in an understandable manner.

Teaching Assistant, Education First (EF), Guangzhou, China July 2018 - August 2018
Supervisor: Xuyi Huo

- Developed leadership skills by establishing a positive relationship with students within the program and served as a role model.
- Collaborated with a team of faculty, including Progress Assistant and instructors, at weekly meetings and actively contributed new ideas on teaching.
- Improved student participation in the classroom by integrating creative role-playing exercises and peer review sessions.
- Balanced student workload with teaching workload.
- Confronted inappropriate behavior and maintained standards of classroom behavior.

MENTORING EXPERIENCE

Math Peer Mentor August 2018 - April 2020
Department of Mathematics, The Ohio State University, Columbus, OH, USA
Supervisor: William Husen

- Identified possible barriers that students may have on personal, academic, or other problems during the first year to avoid transition issues and adjustment to university life.
- Provided one-on-one tutoring sessions to help students strengthen mathematical understanding.
- Conducted workshops on study strategies, time management, and preparation for exams.
- Collaborated with faculty to ensure a cohesive and comprehensive understanding of course material.

HONORS, AWARDS & MEMBERSHIPS

Thank-a-Teacher: 2023 Award August 2023
Department of Applied Mathematics and Statistics, Stony Brook University, Stony Brook, NY

Excellence in Student Teaching Spring 2023
Department of Applied Mathematics and Statistics, Stony Brook University, Stony Brook, NY

Outstanding Academic Excellence in Applied Mathematics and Statistics May 2022
Department of Applied Mathematics and Statistics, Stony Brook University, Stony Brook, NY

Dean's List Autumn 2018, Spring 2019, Autumn 2019, Spring 2020
Department of Mathematics, The Ohio State University, Columbus, OH, USA

SCHOLARSHIPS & MENTORSHIPS

Grad Tuition & Fee Scholarship, GSEU Fee Mitigation Fund Fall 2022 - Present
Department of Applied Mathematics and Statistics, Stony Brook University, Stony Brook, NY

Tumbleson Fund Autumn 2018
Department of Mathematics, The Ohio State University, Columbus, OH
Supervisor: Vitaly Bergelson