

Rachel Longjohn

Website: rlongjohn.github.io Email: rlongjoh@gmail.com LinkedIn: [@rachel-longjohn](https://www.linkedin.com/in/@rachel-longjohn)

Interests

I'm interested in addressing problems at the intersection of statistics and AI/ML, with a focus on improving how they're applied in practical, real-world settings. Key areas of interest include testing and evaluation practices, ethics and governance, and uncertainty quantification.

Education

Ph.D. in Statistics

Expected 2025

University of California, Irvine (Advisor: Padhraic Smyth)

Thesis: Likelihood Ratios for Categorical, Sequential, and Text Data in Criminal Justice Applications

M.S. in Statistics

Jun 2021

University of California, Irvine (GPA: 4.00/4.00)

B.S. in Applied and Computational Mathematics

May 2019

University of Southern California (GPA: 3.96/4.00)

Work Experience

Statistical Sciences Intern

Jun 2023 - Sep 2023

Los Alamos National Laboratory

- Investigated statistical approaches for the testing and evaluation of foundation models for multimodal data, including image, text, and seismic data.
- Developed methods of uncertainty quantification for aggregate machine learning performance metrics for holistic model evaluation.

Graduate Student Researcher

Sep 2019 - Present

University of California, Irvine

- Investigated statistical and ML methodology for criminal justice applications that support rigorous evidence data analysis.
- Created and implemented probabilistic models for categorical, sequential, and text data in the context of forensic science problems.

Machine Learning Intern

May 2018 - Aug 2019

Obsidian Security

- Constructed generalizable data representations for modeling cybersecurity insights and interfacing with data from a variety of APIs for enterprise SaaS environments, including Box, Dropbox, GSuite, AWS, Office 365, Slack, and Salesforce.
- Engineered a property-based code testing suite in Python for testing ETL pipelines.

Skills

- | | | | |
|----------|--------------|----------------|----------|
| • Python | • PyTorch | • scikit-learn | • JAGS |
| • R | • pandas | • R Tidyverse | • git |
| • SQL | • matplotlib | • STAN | • quarto |

Publications

Longjohn, R., Nelson, K., & Smyth, P. (2025). Score-based likelihood ratios using authorship embeddings. (Under Review).

Longjohn*, R., Kelly*, M., Singh, S., & Smyth, P. (2024). Benchmark data repositories for better benchmarking. *NeurIPS*. <https://arxiv.org/abs/2410.24100>

Longjohn*, R., Gopalan*, G., & Casleton, E. (2024). Statistical uncertainty quantification for aggregate task-performance metrics in ML benchmarks. *NeurIPS Workshop on Statistical Frontiers in LLMs and Foundation Models*. <https://arxiv.org/abs/2501.04234>

Longjohn, R., & Smyth, P. (2024). Likelihood ratios for changepoints in categorical event data with applications in digital forensics. *Journal of Forensic Sciences*. <https://doi.org/10.1111/1556-4029.15512>

Longjohn, R., Smyth, P., & Stern, H. S. (2022). Likelihood ratios for categorical count data with applications in digital forensics. *Law, Probability and Risk*. <https://doi.org/10.1093/lpr/mgac016>

Invited Talks and Presentations

Longjohn*, R., Gopalan*, G., & Casleton, E. (2024). Statistical uncertainty quantification for aggregate task-performance metrics in ML benchmarks. *NeurIPS Workshop on Statistical Frontiers in LLMs and Foundation Models*. <https://arxiv.org/abs/2501.04234>

Longjohn, R., & Smyth, P. (2023a). Bayes factors for the existence of changepoints in categorical sequences within digital forensics. *Joint Statistical Meetings*.

Longjohn, R., & Smyth, P. (2023b). A likelihood ratio approach for detecting behavioral changes in device usage over time. *Annual Meeting of the American Academy of Forensic Sciences*.

Longjohn, R., & Smyth, P. (2022b). Tutorial on likelihood ratios with applications in digital forensics. *NIST Center for Statistics and Applications in Forensic Evidence Summer Webinar Series*.

Longjohn, R., & Smyth, P. (2022a). Likelihood ratios for categorical evidence with applications to digital forensics. *Joint Statistical Meetings*.

Longjohn, R., Smyth, P., & Stern, H. (2022). Likelihood ratios for categorical evidence with applications in digital evidence. *Annual Meeting of the American Academy of Forensic Sciences*.

Service and Teaching

Workshop Organizer The Future of Machine Learning Data Practices and Repositories, ICLR	2025
Data Curator and Librarian UCI Machine Learning Repository	2020-25
Reviewer NeurIPS, Datasets and Benchmarks	2022-24
Teaching Assistant Inferential Statistics (2019, 2024), Data Analysis (2018-19)	2018-24
Editor-in-Chief, Viterbi Conversations in Ethics University of Southern California	2018-19

Awards and Fellowships

• Rose Hill Foundation Science and Engineering Fellowship	2024
• Robert Newcomb Graduate Award in Statistics Honorable Mention	2020
• Summa Cum Laude Honors	2019
• Phi Beta Kappa Honor Society	2017-19
• Dean's List	2015-19