Gemma E. Moran

Contact Information

475 Hill Center, 110 Frelinghuysen Road, Piscataway, NJ 08854
Primary email: gm845@stat.rutgers.edu
Secondary email: gem.e.moran@gmail.com
Website: https://www.gemma-moran.com
Phone: +1 (267) 304-4107

Employment

Statistics Department, Rutgers University — Piscataway, NJ, USA
Assistant Professor (tenure-track) — September 2023 - present

Data Science Institute, Columbia University — New York, NY, USA
Postdoctoral Research Scientist — August 2019 - July 2023
Supervisor: David Blei

Education

The Wharton School, University of Pennsylvania — Philadelphia, PA, USA
Ph.D. Statistics — August 2014 - May 2019
Thesis Title: "Bayesian Approaches for Modeling Variation"
Thesis Advisors: Edward George and Veronika Ročková

The University of Sydney — Sydney, NSW, Australia
B.Sc. Advanced Mathematics (First Class Honours) — March 2010 - November 2013
Majors: Mathematics, Statistics
Thesis Advisor: John Ormerod

Honors and Awards

- Rising Star in Data Science, University of Chicago — 2022
- Poster Award, International Society for Bayesian Analysis — 2022
- Donald S. Murray Prize for excellence in teaching, Statistics Department, Wharton — 2018
- Honorable Mention for Best Talk at the Bayesian Young Statisticians Meeting — 2018
- Wharton Doctoral Program Fellowship — 2014
- The George Allen Scholarship for Mathematical Statistics, the University of Sydney — 2013

Grants

- Cyberinfrastructure and AI for Science and Society (CASS) Seed Project Award (25K) — 2024
  - PI: Anandi Krishnan, Co-PIs: Gemma Moran, Waheed Bajwa

Selected Peer-Reviewed Publications

* indicates equal contributions

[1] **G. E. Moran**, D. M. Blei, and R. Ranganath. "Holdout predictive checks for Bayesian model criticism". In: *Journal of the Royal Statistical Society Series B: Statistical Methodology* (2023).

[2] R. Bai*, **G. E. Moran***, J. L. Antonelli*, Y. Chen, and M. R. Boland. "Spike-and-slab group lassos for grouped regression and sparse generalized additive models". In: *Journal of the American Statistical Association* 117.537 (2022), pp. 184–197.

[3] **G. E. Moran**, D. Sridhar, Y. Wang, and D. M. Blei. "Identifiable Deep Generative Models via Sparse Decoding". In: *Transactions on Machine Learning Research*. 2022.

[4] **G. E. Moran**, J. P. Cunningham, and D. M. Blei. "The Posterior Predictive Null". In: *Bayesian Analysis* (2022).

[5] **G. E. Moran**, V. Ročková, and E. I. George. "Spike-and-slab lasso biclustering". In: *The Annals of Applied Statistics* 15.1 (2021), pp. 148–173.

[6] **G. E. Moran**, V. Ročková, and E. I. George. "Variance prior forms for high-dimensional Bayesian variable selection". In: *Bayesian Analysis* 14.4 (2019), pp. 1091–1119.

[7] V. Rocková, **G. Moran**, and E. George. "Determinantal regularization for ensemble variable selection". In: *Artificial Intelligence and Statistics* (2016).

Manuscripts

[8] **G. E. Moran** and E. I. George. "Nonlinear factor analysis with Bayesian Additive Regression Trees". In preparation. 2022.

Collaborations

[9] S. F. Friedman, **G. E. Moran**, M. Rakic, and A. Phillipakis. "Genetic Architectures of Medical Images Revealed by Registration and Fusion of Multiple Modalities". In: *bioRxiv* (2023).

[10] V. Shekar, V. Yu, B. J. Garcia, D. B. Gordon, **G. E. Moran**, D. M. Blei, L. M. Roch, A. García-Durán, M. Ani Najeeb, M. Zeile, P. W. Nega, Z. Li, M. A. Kim, E. M. Chan, A. J. Norquist, S. Friedler, and J. Schrier. "Serendipity based recommender system for perovskites material discovery: balancing exploration and exploitation across multiple models". In: *ChemRxiv* (2022). DOI: 10.26434/chemrxiv-2022-l1wpf.

Presentations

Invited Seminars

- "Identifiable variational autoencoders via sparse decoding."
  - Biostatistics/Biomedical Informatics/Big Data (B3D) Seminar, Harvard, April 2023.
  - Data Science Seminar, University of Chicago, February 2023.
  - Econometrics and Statistics Seminar, Chicago Booth, February 2023.
  - Biotatistics Seminar, Columbia University, February 2023.
  - Statistics Seminar, Rutgers, February 2023.
  - Statistics Seminar, University of Connecticut - Storrs, February 2023.
  - Data Science and Operations Seminar, USC Marshall, February 2023.
  - Statistics Seminar, Boston University, January 2023.
  - Statistics Seminar, Duke University, January 2023.
  - Statistics Seminar, University of Michigan, January 2023.
  - Statistics Seminar, University of Wisconsin - Madison, January 2023.
  - Machine Learning Seminar, Microsoft Research New England, December 2021.
  - Math and Data Seminar, New York University, October 2021.

Conferences

- "Identifiable Deep Generative Models via Sparse Decoding." First Workshop on Causal Representation Learning at the Conference on Uncertainty in Artificial Intelligence (UAI), Eindhoven, Netherlands. August 2022. **Invited Speaker**

- "The Posterior Predictive Null." (Poster) International Society for Bayesian Analysis World Meeting, Montreal, Canada. June 2022. **Poster Award (top 10% of posters)**
- "Identifiable deep generative models via sparse decoding." (Invited Talk) International Chinese Statistical Association Applied Statistics Symposium, Gainesville, FL. June 2022.
- "Identifiable variational autoencoders via sparse decoding." (Invited Talk) CMStatistics, London, UK. December 2021.
- "Spike-and-Slab Lasso Biclustering." Joint Statistical Meetings, Vancouver, BC, Canada. August 2018.
- "Spike-and-Slab Lasso Biclustering." Bayesian Young Statisticians Meeting, University of Warwick, UK. July 2018. **Honorable Mention for Best Talk**
- "On variance estimation for Bayesian variable selection." (Poster) International Society for Bayesian Analysis World Meeting, Edinburgh, Scotland. June 2018.
- "Independence Variance Priors for Penalized Likelihood Variable Selection." Joint Statistical Meetings, Baltimore, MA. July 2017.

Software

- `SSLB` (R Package) **Moran, G. E.** [gemoran/SSLB]
- `SSLASSO` (R Package) Ročková, V. and **Moran, G. E.** [CRAN.R-project.org/package=SSLASSO]
- `EMVS` (R Package) Ročková, V. and **Moran, G. E.** [CRAN.R-project.org/package=EMVS]

Professional Activities

- Co-Organizer (2016, 2017) Annual Women in Business Academia Conference, Philadelphia, PA
- Board member (2015-2017), Wharton Society for the Advancement of Women in Business Academia
- External Reviewer for *Journal of the American Statistical Association, Bayesian Analysis, AISTATS (Selected as a "Top Reviewer" in 2022), NeurIPS, ICML, International Statistical Review, Statistical Methods in Medical Research, Briefings in Bioinformatics*

Teaching

Instructor

Rutgers University

- MSDS534: Statistical Learning for Data Science (Fall 2023)

Teaching Assistant

Columbia University

- STCS6701: Probabilistic Models and Machine Learning (Fall 2022)

The Wharton School, University of Pennsylvania

- STAT621: Accelerated Regression Analysis for Business (Fall 2018)
- STAT613: Regression Analysis for Business (Fall 2017, Fall 2018)
- STAT422: Predictive Analytics (Spring 2017)
- STAT101: Introductory Business Statistics (Fall 2016)
- STAT102: Introductory Business Statistics (Spring 2019)

Recitation Instructor

The Wharton School, University of Pennsylvania

- STAT111: Introductory Statistics (Spring 2018). Rating: 3.1/4

The University of Sydney

- MATH1015: Biostatistics (Semester 1, 2013)
- MATH1005: Statistics (Semester 2, 2013)

Lecturer

Wharton Moneyball Academy (Summer 2017, 2018)

Contributed to and taught course on data analysis in R as part of summer program in statistics and sports for high school students