Michael Hellstern

Seattle, WA

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Education

Ph.D. in Biostatistics

Seattle, WA

Thesis: Methods for Time Series Network Analyses — *Sep 2020 - Aug 2025*

Advised by Dr. Ali Shojaie

University of Washington

I'm broadly interested in using my statistical expertise to develop data-informed solutions that have a meaningful impact on complex, real-world problems.

Research interests: Statistical Machine Learning, time series network analyses, high-dimensional statistics

Coursework: Statistical Learning, Advanced Statistical Learning, Nonparametric Statistics, Advanced Regression Methods, Computational Molecular Biology

M.A. in Statistics

Seattle, WA

University of Washington — *Jun 2018 - Aug 2020*

B.A. in Economics

Williamstown, MA

Honors Thesis: Fatal attraction: health care agglomeration and its consequences — *Sep 2011 - Jun 2015*

Advised by Dr. Stephen Sheppard

Williams College

Skills

Python (advanced), PyTorch (advanced), R (advanced), C++ (intermediate)

Experience

University of Washington

Seattle, WA

Research Assistant — *Jun 2018 - Present*

- Developed and maintain the `netgsa` R package for network-based gene set analysis, with major improvements in computational efficiency. Computation is up to **40x faster** with no loss in power and was achieved through unsupervised clustering and `RcppEigen` integration. Work involved both methodological development and software implementation, enabling faster and more interpretable network-based analyses.

Analysis Group

Boston, MA

Senior Analyst — *Jul 2015 - May 2018*

- Worked with clients to conduct statistical analyses of large-scale health insurance claims and EMR data, including development of algorithms to identify treatment intensification in diabetes and characterization of treatment patterns and costs in schizophrenia and HIV. Work involved integrating methods across R, SAS, and SQL in real-world data contexts. Collaborations resulted in 10 publications.
- Member of R development team, designing core statistical tools such as survival analyses and bootstrapped restricted mean survival time (RMST) estimators for matching-adjusted indirect comparisons (MAIC), now widely used across case teams.

Publications / In preparation

[1] **Hellstern M**, Shojaie A. "Dynamic Deep Learning for Change-point Detection". *In preparation*.

[2] **Hellstern M**, Shojaie A. "Order Selection in Vector Autoregression by Mean Square Information Criteria". *In preparation*.

[3] **Hellstern M**, Kim B, Shojaie A. "Assumption-Lean Inference for Spectral Differential Network Analysis for High-dimensional Time Series". *In preparation*.

* Received a *Best Student Paper Award* from the ASA Statistical Learning and Data Science (SLDS) section. Presented at JSM 2025.

[4] **Hellstern M**, Kim B, Harchaoui Z, Shojaie A. "Spectral Differential Network Analysis for High-dimensional Time Series". *AISTATS (2025)*. DOI: 10.48550/arXiv.2412.07905

* Received a *Best Student Poster Honorable Mention* from the ASA Statistical Learning and Data Science (SLDS) Section.

[5] **Hellstern M**, Ma J, Yue K, Shojaie A. "netgsa: Fast computation and interactive visualization for topology-based pathway enrichment analysis". *PLOS Computational Biology 17.6 (2021): e1008979*. DOI: 10.1371/journal.pcbi.1008979

[6] Desai U, Kirson NY, Kim J, Khunti KK, King SB, Trieschman E, **Hellstern M**, Hunt PR, Mukherjee J. "Time to Treatment Intensification After Monotherapy Failure and Its Association With Subsequent Glycemic Control Among 93,515 Patients With Type 2 Diabetes". *Diabetes care 41.10 (2018): 2096-2104*. DOI: 10.2337/dc17-0662

Invited Talks

Assumption-Lean Inference for Spectral Differential Network Analysis of High-Dimensional Time Series

- Joint Statistical Meetings (JSM) *2025*
- Western North American Region of the International Biometric Society (WNAR) *2025*

Spectral Differential Network Analysis for High-Dimensional Time Series

- Western North American Region of the International Biometric Society (WNAR) *2024*
- Joint Conference on Computational and Financial Econometrics and Computational and Methodological Statistics (CFE-CMStatistics) *2024*

Honors & Awards

- *Best Student Paper Award* from the ASA Statistical Learning and Data Science (SLDS) Section *2025*
- *Best Student Poster Honorable Mention* from the ASA Statistical Learning and Data Science (SLDS) Section *2024*
- *Donovan J. Thompson Award* for best combined performance on qualifying exams in UW Biostatistics *2021*

Teaching

University of Washington *Seattle, WA*

Teaching Assistant *Fall 2020, 2021*

- Introduction to Biomedical Data Science (BIOST 544)

Service

- Reviewer for Journal of Machine Learning Research
- Reviewer for Journal of the Royal Statistical Society: Series B
- Reviewer for Journal of the American Statistical Association