Steven Winter

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EDUCATION

PhD in Statistical Science **Sept. 2021 - May 2025 (expected)**
Duke University, Durham, NC, USA

- Alexander Graham Bell Canada Graduate Scholarship (2023 - 2025)

Master's in Statistical Science **Sept. 2019 - May 2021**
Duke University, Durham, NC, USA

- Duke Statistical Science MS Fellowship (2019 - 2021)

Bachelor of Science, Honours Mathematics **Sept. 2014 - May 2019**
University of Alberta, Edmonton, AB, Canada

- 3x NSERC Undergraduate Research Award (*Representation Theory of the Heisenberg Group* (2016), *Representation Theory of Quantum Groups* (2017), *Conjectures in Banach Lattices* (2018))

RESEARCH PAPERS

Sequential Gibbs Posteriors | (in preparation) **June 2022 - Present**

- Extended assumption-free Bayesian modelling to multiple estimation problems.
- Established the first theorem under which a wide class of geometric models have correctly calibrated uncertainty (Bernstein-von Mises on manifolds).
- Invented an algorithm for accurately calibrating uncertainty which is 200x faster than the previous state-of-the-art.

Identifying Vulnerable Brain Networks | (submitted) **Feb. 2023 - Sept. 2023**

- Collaborated with experts to identify how genes related to Alzheimer's may influence brain structure.
- Ensured reproducibility of results despite extremely high-dimensional data ($p = 55,000$) using an analogue of false discovery rate control.

Staf-GATE Autoencoder | arxiv.org/abs/2210.05672 **Sept. 2021 - Oct. 2022**

- Designed a variational autoencoder for predicting brain function from brain structure. Up to 35% more accurate than previous state-of-the-art and 45x faster.
- Invented a fast interpretable algorithm for extracting and validating the most important subnetworks.

Multi-Graph PCA | arxiv.org/abs/2010.02332 **Sept. 2019 - Oct. 2020**

- Developed and implemented a novel extension of principal component analysis for summarizing brain networks collected under multiple imaging protocols.

EXPERIENCE

Statistics Research Assistant **May 2019 - Aug. 2019**
University of Alberta, Edmonton, AB, Canada

- **Project A:** Developed, implemented, and validated a linear regression model leveraging sparse covariance estimators to improve prediction stability. DOI: 10.1007/978-3-030-63591-6_14
- **Project B (concurrent):** Investigated methods to resolve class imbalances for rare disease data.

Particle Physics Research Assistant **May 2018 - April 2019**
University of Alberta, Edmonton, AB, Canada

- Analyzed and prepared reports summarizing massive neutrino datasets.
- Developed scalable maximum likelihood methods for reconstructing terabytes of neutrino paths.

SKILLS

Languages	Python (NumPy, Pandas, scikit-learn), R (tidyverse, ggplot2), MATLAB.
Specializations	High-dimensional data analysis, network analysis, hierarchical modeling, uncertainty quantification, data visualization, Bayesian computation, cluster computing.
Teaching	Intro to Data Science, Regression Analysis, PhD Bayesian Statistical Modeling and Data Analysis, Statistics Master's Bootcamp Instructor