Ravleen Bajaj

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Education

Simon Fraser University *Sept 2024 – Present*
MS in Statistics
- **Supervisor:** Dr. David Stenning
- **Coursework:** Machine Learning, Statistical Theory, Statistical Computing, Measure Theory, GLMs

University of Delhi — BS in Statistics *July 2021 – July 2024*

Skills / Technologies

Programming: Python, R, Julia **Frameworks:** PyMC, NumPyro, JAX **Tools:** Git, Slurm, LaTeX

Projects

Emulation and Calibration using Gaussian and Deep Gaussian Processes (MSc Research) *2024 - Present*
- Bayesian computer model emulation and calibration using (deep) Gaussian Processes (GPs).
- We examine tradeoffs between modular and non-modular approaches when doing calibration (i.e., inference).
- To efficiently incorporate the high-dimensional and non-stationary simulator response surface, we fit a DeepGP emulator on simulated stellar evolution data. We use Vecchia approximation for faster computation.
- We adopt a multi-stage, modular approach to both emulation and calibration, allowing for pragmatic inference while retaining uncertainty quantification.

Annealed SMC for Breast Cancer Detection *2025*
- Implemented annealed Sequential Monte Carlo (SMC) for Bayesian logistic regression in Julia.
- Applied the method to the Wisconsin Breast Cancer dataset to classify malignant vs. benign tumours.
- Estimated and visualized posterior distributions of model coefficients and credible intervals.
- Analyzed feature importance and algorithm diagnostics (ESS, MCMC acceptance rates) to assess performance. Interaction plots on selection probabilities.

Reduction of Small-Sample Bias of GLM Parameter Estimates *2025*
- Investigated the problem of small-sample bias in maximum likelihood estimation (MLE) of GLM parameters. Implemented and compared three bias-reduction techniques: asymptotic bias correction, Firth's penalized likelihood method, and Bayesian-inspired log-F priors.
- Conducted extensive simulation studies in R to evaluate estimator bias, efficiency, and coverage probabilities across varying sample sizes and model scenarios. Demonstrated that Firth's method and log-F priors offer improved stability and reduced bias in small-sample settings relative to classical MLE.
- Co-authored a technical report summarizing theoretical derivations, methodological comparisons, and practical implementation guidance.

Experience

Research Assistant *Burnaby, BC*
Simon Fraser University *Jan 2026 – Present*
- Provide statistical consulting services to clients by designing experiments, implementing data analyses, developing statistical and computational models, and creating reproducible workflows in R/Python.

Graduate Teaching Assistant *Burnaby, BC*
Simon Fraser University *Sep 2024 – Present*
- **STAT 350:** Weekly **lecture-style** tutorials. TA in the STAT workshop, a drop-in facility for students.
- Resolving queries, helping students build concepts along with discussing issues with marking and understanding exam solutions. Marking assignments, quizes, exams and invigilating tests.

Part-Time Tutor *Coquitlam, BC*
Rootmaths Learning Center, Freelance *Feb 2024 – Present*

- Tutor for undergraduate-level statistics, algebra and calculus courses. One-on-one and group tutoring for high school and middle school students for statistics, mathematics and pre-calculus.

Analyst Intern *New Delhi, IN*
Perfora *Aug 2023 – Oct 2023*

- Created a web scraping model to regularly record product placement on website and give suggestive product placements to boost and monitor product-wise sales and performance of individual products and combos.
- Regularly monitored inventory and failed orders using Power BI and Excel to identify any flaws or errors.
- Assessed sales data per day-to-day goals and requirements including new product launches and special sales.

Data Science Intern *New Delhi, IN*
DMI Finance *June 2022*

- Prepared end-to-end model reports for Data Science team and documentation of model interpretation for stakeholders. Restructured model code and mapped model documentation for efficiency.
- Interpreted and comprehended models based on algorithms like XGBoost and logistic regression.

Awards

2025 Graduate Fellowship - 7000 (CAD)
2026 Graduate Fellowship - 7000 (CAD)

Talks and Posters

Canadian Statistics Student Conference (CSSC) *2026*
Emulation and Bayesian Calibration of Stellar Evolution Models Using Deep Gaussian Processes

Canadian Celebration of Women in Computing West (CAN-CWiC West) *2025*
Introduction to Gaussian Processes for Emulation and Calibration

Organizing & Scientific Committee

President: Department of Statistics Graduate Caucus *2025-Present*
Co-Organizer: 2025-2026 SFU-UBC Joint Statistics Seminar *2025*
Co-Organizer: 2025-2026 SFU-UBC Joint Statistics Seminar *2026*

Volunteering

Management Lead *New Delhi, IN*
Google Developer Student Club *2021-2022*

- Optimized events around the year and worked on reports, events, sessions, competitions and hackathons.
- Delivered "Data Science 101", a talk designed to familiarize community members with basics using Python.

Changemaker Program Volunteer, Analytics Volunteer *New Delhi, IN*
Pratisandhi *Sep 2021-June 2022*

- Worked on analysis of surveys and drew relevant inferences. Curated reports for pre and post survey analysis.
- Cleaned data, performed EDA and conducted analysis on surveys conducted internally and on-ground.

Eco Commander *New Delhi, IN*
Paryavaran Sanrakshan Gatividhi (Govt. of India Initiative) *Oct 2021*

- Achieved "platinum" certification where I educated 100+ individuals about sustainable homes and lifestyle.
- Adopted sustainable practices and educated community members about creative sustainable measures.

Certifications

Institution	Course	Status/Grade
HarvardX	Data Science: R Basics	Grade: **100%**
HarvardX	Data Science: Visualisations	Grade: **100%**
University of Delhi	Data Science Using Python (Certification Course)	Grade: **A+**