Alexander He

Curriculum Vitae

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Education

- **University of Toronto - St. George Campus**
  Honors Bachelor of Science; cGPA: 3.72/4.00 *September 2022 – May 2026*
  - **Economics and Mathematics Specialist** (ASSPE2599), **Specialist in Statistical Sciences; Theory and Methods** (ASSPE2290)
  - **Dean's List Scholar; Summer 2024, Winter 2025**: Recent GPA: 3.94/4.00

Quantitative Coursework

- **Topology**: Compactness, continuity, separability axioms, connectedness, fundamental groups, covering spaces, categories, functors, fixed point theorems
- **Real Analysis**: Convergence, metric spaces, function spaces, compactness, connectedness, completeness, continuity, contraction mappings
- **Partial Differential Equations**: Heat equation, wave equation, boundary value problems, Fourier transform
- **Nonlinear Optimization**: Convex optimization, descent algorithms, constrained optimization (Lagrange, Kuhn-Tucker), duality, calculus of variations, isoperimetric problems, holonomic problems
- **Probability Theory**: Sequences and series, probability axioms, asymptotic distribution theory, Poisson processes
- **Machine Learning**: Regularization, descent algorithms, logistic regression, discriminant analysis, Naïve Bayes, unsupervised learning, neural networks, deep learning
- **Mathematical Statistics**: L^p spaces, Lebesgue measure, geometry of data, distribution theory, characteristic functions, stochastic convergence, GLMs, Radon-Nikodym Theorem

Research Experience

- **University of Toronto Data Sciences Institute** Professor Elizabeth Dhuey
  Summer Undergraduate Data Sciences Internship Program, Research Assistant *May 2025 - Feb 2026*
  - $7,200 funding award from the Data Sciences Institute at the University of Toronto from May to August 2025
  - Research assistant in data science for AI text classification task for early childhood education documents, analyzing disability and inclusion related content via LLMs (OpenAI API in Python)
  - Wrote Python scripts for parsing CSVs from LLM output, optimizing LLM pipelines, hallucination mitigation; average performance metrics around 80% on pilot data
- **University of Toronto Research Opportunity Program** Professors Daniel Gregory, Andrei Swidinsky
  Research Opportunities Course: ESS299, Research Assistant *Apr 2024 - Mar 2025*
  - Statistics and geoscience research position under the Department of Earth Sciences, using Convolutional Neural Networks (With the graduate team) and government legacy data to predict orogenic gold deposits in the Yukon region
  - Finalists for Prospector's and Developer's Association of Canada (PDAC) Frank Arnott NGEA Challenge 2025
  - Studying machine learning techniques including Principal Component Analysis and clustering in R
  - Geospatial analysis in OSM and QGIS, mapping municipalities, power lines, legally protected areas and geophysical survey data

Volunteering Experience

- **Kensington Gardens Volunteer - Kensington Health**
  Friendly Visitor *May 2025 - Present*
  - Providing weekly companionship and visiting to residents, assisted in reporting resident status and safety
  - Completed 2 month rigorous training modules on resident rights, volunteer responsibilities, ethics, grief and bereavement, communication, infection control, workplace safety, psychosocial support and more

Skills

- **Python, RStudio, STATA, Excel, QGIS, Geoscience ANALYST, ioGAS**