Bryan Zang

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Education

University of Waterloo — Bachelor of Mathematics Jun 2024
Majors in Honours Statistics and Honours Computational Mathematics
Minor in Computing

- **Relevant courses:** Probability, Computational Statistics, Neural Networks, Life History & Survival Analysis, Advanced Regression, Estimation & Hypothesis Testing, Stochastic Processes, Databases, Linear/Nonlinear Optimization, Generalized Linear Models
- **Extra Curricula:** Photography Club, Waterloo Rocketry, Data Science Club, Stats Club, Waterloo Blockchain

Skills

- **Programming:** `Python`, `SQL`, `R`, `Matlab`, `Julia`, `Java`, `JavaScript`, `LaTex`, `HTML/CSS`
- **Technologies:** `PySpark`, `Numpy`, `Pandas`, `sci-kit`, `TensorFlow`, Databricks, Excel, PowerBI, Jupyter, Git
- **Languages:** Mandarin Chinese, English

Work Experience

Research Analyst — *Bank of Canada, Financial Markets Dept., Debt Management* Jul 2025 – Present

- Monitored Canadian bond markets, including the primary and secondary markets, using datastreams from Bloomberg terminal or LSEG workspace in PowerBI via Triton DataCenter and Databricks.
- Analyzed financial and accounting datasets, such as daily repurchase operations (REPOs), to obtain insights used in monetary and financial policy decisions.
- Optimized and developed tools/metrics — i.e., weighted specialness of bonds — for efficient financial data analysis.

Projects

Implementing and Comparing Optimal Survival Tree Algorithm

- Compared the optimal survival tree algorithm (OST) with a traditional Cox proportional hazards regression model and a tree model resulting from random survival forest methods.
- Measured results using **Harrel's C Statistic**, **Area Under Curve (AUC)**, and **Dynamic AUC**.
- Computed Kaplan-Meier curves and life tables for explanatory data analysis (EDA).

Spatial Models for Canadian Temperature Inference

- Compared different spatial models to explain annual Canadian temperature for statistical inference.
- Built models using **spline-based regression**, **polynomial regression**, and **General Additive Models (GAMs)**.
- Measured results using Generalized Cross Validation score (GCV) and R-squared.

Graphify

- Utilized **matplotlib** and **OpenCV** for image processing and **networkx** and **numpy** to compute the graph characteristics.
- Applied graph theory concepts such as bipartition, trees, chromatic number, and planarity.

Simplex Implementation

- Implemented various theories and computations from *A Gentle Introduction to Optimization* (Guenin, Konemann, and Tuncel).
- Applied theories including **Simplex algorithm**, **Bland's Rule**, **two-phase Simplex**, and **duality theory**.

Tumor Modeling with HTCs and iNKT Cells

- Extended and analyzed a differential equations (DE) system describing interactions between tumor, helper T, and CD8+ cells.
- Conducted **phase plane analysis**, **Hopf Bifurcation**, and **apoptosis analysis**.
- Simulated results for computational analysis based on predator-prey physics.

Stock Trend Predictor

- Used SwiftUI to develop an iOS app that employs several APIs to search and retrieve stock information.
- Built a **RESTful API** using **AWS Gateway API** and a **Flask** framework to handle **HTTP** requests.
- Utilized **AWS Lambda** to download relevant stock data, run a prediction model trained using **machine learning (ML)** forecasting techniques, and store outputs in **AWS DynamoDB**.

Certifications

Microsoft Certified: Azure AI Fundamentals — *Microsoft*

- Recognized for fundamental knowledge of machine learning (ML) and artificial intelligence (AI) concepts and related Microsoft Azure services.
- Applied concepts towards natural language processing (NLP), facial recognition, object detection, and image classification.
- Familiarized with technologies such as Kubernetes and topics such as basic cloud concepts.