ROMINA MAHINPEI

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EDUCATION

M.S.E. in Computer Science   09/2024 – 05/2026
Princeton University
- **Research Interests**: Human-Centred AI, Social Computing, Educational Technologies.

B.Sc. in Honours Computer Science with a Mathematics Minor   09/2020 – 05/2024
University of British Columbia (UBC)   GPA: 4.0 / 4.0
- **Thesis**: *Mixed Precision Minimal Residual (MINRES) Method*. [pdf]
    - Developed two mixed precision variants of the MINRES method for solving sparse saddle-point linear systems, allowing users to adjust the precision of preconditioner solves and matrix-vector products.
    - Implemented these variants and a baseline version using CUDA C and conducted a comparative performance study on NVIDIA's GeForce RTX 3070 Ti, evaluating speed-up across three Maxwell and three Stokes saddle-point problems.
    - **Advisor**: Dr. Chen Greif – Department of Computer Science.
- **Relevant Courses**: Advanced ML, Human-Centred AI, Parallel Computation, Operating Systems, Relational Databases, Numerical Computation & Approximation, Computational Optimization, Linear Algebra, Probability.

PUBLICATIONS

Romina Mahinpei*, Iris Xu*, Steven Wolfman, and Firas Moosvi. 2024. **A Generalized Framework for Describing Question Randomization**. In Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2 (SIGCSE 2024). Association for Computing Machinery, New York, NY, USA, 1736-1737. [pdf]

* Both authors contributed equally to this work.

RESEARCH EXPERIENCE

Undergraduate Research Assistant | Systopia Lab, UBC   02/2022 – 01/2023
- Designed, implemented, and tested the Model Card package for Tribuo, Oracle's open-source Java ML library, to allow users to create partially automated documentation cards for various ML models.
- **Advisor**: Dr. Margo Seltzer – Department of Computer Science.

Undergraduate Research Assistant | Quantum Matter Institute, UBC   05/2021 – 08/2021
- Created heterostructures for collecting longitudinal resistance measurements and implemented the pipeline for the visualization and categorization of those measurements in IgorPro.
- **Advisor**: Dr. Joshua Folk – Department of Physics.

Undergraduate Research Assistant | Undergraduate Research Opportunities, UBC   10/2020 – 03/2021
- Coded a Python implementation of a recent deterministic model of weight loss and analyzed the simulated data to investigate the effects of restricted caloric intakes on body weight.
- **Advisor**: Dr. Leah Edelstein-Keshet – Department of Mathematics.

TEACHING EXPERIENCE

CPSC 313 – Hardware & Operating Systems | UBC   09/2023 – 04/2024
- Held weekly tutorials and implemented computer-based assessment questions on the PrairieLearn platform.

CPSC 210 – Software Construction & Development | UBC   09/2022 – 04/2023
- Held weekly labs, hosted weekly office hours, and graded midterms and final exams.

Science One – Differential & Integral Calculus | UBC   09/2021 – 04/2022
- Held review sessions, hosted weekly office hours, and graded midterms and final exams.

WORK EXPERIENCE

Software Engineering Intern | Xbox, Microsoft   **06/2024 – 08/2024**
- Implemented new Semantic Kernel plugins for an AI Copilot owned by one of Xbox's experimentation teams.
- Defined and implemented success metrics for evaluating the response quality of the AI Copilot in Power BI.

Software Engineering Intern | Xbox, Microsoft   **06/2023 – 08/2023**
- Defined new metrics to track the availability of core streams owned by one of Xbox's data engineering teams.
- Implemented the backend infrastructure, the Azure Data Factory pipelines, and the Power BI report to summarize and visualize the defined metrics.

Software Engineering & Product Management (Explore) Intern | Xbox, Microsoft   **06/2022 – 08/2022**
- Defined a new feature aimed at improving the user experience and conducted user interviews to collect feedback.
- Implemented and tested the data model, the backend infrastructure, and the API supporting the new feature.

HIGHLIGHTED PROJECTS

Leveraging Collaborative Filtering for Personalized Practice in Computer-Based Assessments [pdf]
- Explored collaborative filtering (CF)-based recommender systems for personalizing question selection in computer-based assessments by predicting student performance on new, unseen questions using past scores.
- Developed and evaluated six CF models against baseline model using Dietterich's 5×2 cross-validation method on two datasets from an undergraduate computer systems course and assessed model performance using Mean Absolute Error and Root Mean Squared Error, with statistical significance determined through a paired t-test.

Low Precision Training of Deep Learning Models [pdf]
- Analyzed the effects of four low precision training schemes on both the training time and classification accuracy of four deep learning models from the domains of image and text classification.
- Implemented these low precision variants and a baseline version using TensorFlow and conducted a comparative study on Google Colab's Tesla T4 GPU to evaluate the trade-offs in speed and accuracy for each model.

A Generalized Framework for Describing Question Randomization [pdf]
- Conducted a thematic analysis of computer-based assessment questions in undergraduate CS courses to investigate how instructors integrate randomization into their assessment questions.
- Developed a six-level framework to systematically categorize these randomization strategies and validated it by applying the framework to questions from an undergraduate data structures course ($N = 86$) and an undergraduate computer systems course ($N = 100$), assessing inter-rater reliability using Gwet's AC1 coefficient.

Enhancing Transparent Model Reporting with Automated Model Cards in Tribuo [pdf]
- Conducted semi-structured interviews with ML and data professionals from academia ($N = 6$) and industry ($N = 6$) to assess current workflows and explore how data provenance could streamline these processes.
- Identified ML model documentation as a key pain point for many participants and subsequently designed, implemented, and tested the Model Card package for Tribuo, Oracle's open-source Java ML library, to facilitate the creation of partially automated documentation cards for ML models.

HIGHLIGHTED AWARDS

Academic Award of Excellence | Department of Computer Science, UBC   **2024**
- Awarded to the student with the highest graduating average of the B.Sc. in Honours Computer Science.

Markus Meister Memorial Prize | Department of Computer Science, UBC   **2024**
- Awarded to the graduating student with the highest standing in the final year of the B.Sc. in Computer Science.

Trek Excellence Scholarship for Continuing Students | UBC   **2021, 2022, 2023**
- Awarded yearly to domestic undergraduate students in the top 5% of their year, faculty, and school.

Schulich Leader Scholarship | The Schulich Foundation   **2020**
- Four-year undergraduate STEM scholarship awarded every year to a total of 100 Canadian students based on academic performance, leadership potential, and community involvement.

Last Updated: August 2024.