# Mark Bedaywi

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## Education

**University of Toronto** — Toronto, ON
Bachelors of Science *GPA: 3.96* — Sep 2020 - Jun 2024 (Expected)
Specialist in Computer Science and Major in Mathematics.
Recipient of $20,000 in scholarships and $8,000 in grants.

## Research Experience

**University of Toronto, Department of Computer Science** — Toronto, CA
*Undergraduate Researcher with Dr. Nisarg Shah* — May 2023 - August 2023

- Collaborated with Dr. Nisarg Shah to analyse and design new participatory budgeting voting rules with provable fairness guarantees

**Vector Institute** — Toronto, CA
*NSERC USRA with Dr. Amir-massoud Farahmand* — February 2023 - Present

- Collaborating with Dr. Amir-massoud Farahmand on accelerating reinforcement learning algorithms using ideas from control theory
- Building and managing a substantial code base, overseeing all aspects of its development and maintenance.

## Publications and Manuscripts

**The Distortion of Public-Spirited Participatory Budgeting**
Mark Bedaywi, Bailey Flanigan, Mohamad Latifian, Nisarg Shah.
Link to Paper

## Teaching

**Course Content Editor and Developer** — Toronto, CA
*Department of Computer Science, University of Toronto* — Summer 2021

- Assisted in the preparation and revision of course materials for blended offerings of introductory computer science courses.
- Coordinated with faculty instructors in the creation and editing of online content.

**Volunteer Mathematics and Science Tutor** — Mississauga, CA
*St. Marcellinus* — 2019 - 2020

- Assisted students with mathematics, physics, and chemistry.
- Planned tutoring sessions and monitored the growth of select students.

## Scholarships, Awards, and Honours

**Finalist, Outstanding Undergraduate Researcher Award** — 2023
Awarded by the Computing Research Association to the top undergraduate computer science researchers in North America. Finalist is awarded to the top 20.

**NSERC Undergraduate Student Research Award** — 2023
Awarded by the National Science and Engineering Research Council of Canada to

**Victoria University In-Course Scholarships** — 2021-2023
Awarded the Friends Of Victoria University Library Scholarship, the Louis R Charpentier Scholarship, and the Katherine St John Scholarship, all awarded on the basis of GPA.

**Three Time Dean's List Scholar** — 2021 - 2023
Awarded on the basis of GPA.

**University Of Toronto Scholar - Beatty** — 2022
Given to the top performing students in the University of Toronto's Faculty of Arts and Science.

**Entrance Scholarship: University of Toronto Scholar** — 2020
Given to the top 700 students entering the University of Toronto's Faculty of Arts and Science out of 7000.

## Community Service

President of the CS Undergraduate Theory Society — Fall 2023 - Present

## Programming Projects

**Curious Transformers On Rubik's Cubes** (Python, PyTorch, 2023)

An implementation of decision transformers, as well as an exploration into various novel variants of decision transformers that can take decisions and learn from feedback, essentially doing online RL, tested on Rubik's cubes.

**Traversing Game Trees Intelligently** (Python, Scikit-Learn, 2021)

Implementations of various algorithms to search through game trees of an assortment of games intelligently, including a minimax search with alpha-beta pruning, a MCTS with simulation, and a MCTS with a neural network that learns the value of moves through repeated self play.

**First Order Logic Theorem Verifier** (Racket, 2021)

A utilization of lispy metaprogramming to formally specify mathematical proofs in Racket.

**Analysis of Global Warming Sentiment on Social Media** (Python, Twitter API, Plotly, Pygame, 2020)

An application that aggregates over Twitter data and economic indicators to find relationships between public perception of global warming and government response.

**Julia Set Viewer** (JavaScript, p5.js, 2019)

A fractal viewer that finds and plots the fixed points of any inputted equation.

All projects are available at [github.com/Supermac30](github.com/Supermac30).

## Technical Skills

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| Programming Languages: | Python, C, Java, Javascript, Haskell, Racket |
| Python for ML and Data Visualisation: | PyTorch, Numpy, Matplotlib, Weights and Biases, Tensorboard, Scikit-Learn, Keras, Plotly |
| Tools | Unix, Slurm |
| Formatting | LaTeX, HTML, Markdown |