Alan Bui

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Education

University of Waterloo (Bachelor of Computer Science) *Sep. 2024 – Present*
René Descartes National Math Scholarship Recipient Waterloo, ON
Enrolled in Advanced courses: CS145 (Designing Functional Programs), MATH 147 (Calculus 1)

Skills & Technologies

Languages: Python, R, Java, C++, HTML, CSS, JS, Racket, Dart
Frameworks & Tools: NumPy, pandas, sklearn, Git, React.js, Node.js, Firebase, Flutter

Research Experience

University of Windsor (Dr. Lu's Lab) *Jul. 2023 – Aug. 2023*
Research Assistant Windsor, ON

— Investigated the performance of GPT and LLaMA's embeddings of SMILES strings (a chemical notation) for molecular property prediction and drug-drug interaction prediction
— Developed tools in **Python** to perform 30+ statistical tests using **sklearn**, **NumPy**, and **pandas**
— Collaborated on a team to co-author a <u>research paper</u> published in BMC Bioinformatics with 1500+ accesses

The effects of age on quality of mental health during the COVID-19 pandemic *Jul. 2024*
<u>Journal of Emerging Investigators</u> Windsor, ON

— An investigation of the correlation between age and the prevalence of major depressive disorder and generalized anxiety disorder in Canada during the COVID-19 pandemic
— Analyzed and plotted linear regressions, Shapiro-Wilk tests, and Student's t-tests using **R**
— Found significant negative correlations between age and the prevalence of major depressive disorder and generalized anxiety disorder

The Effects of Obesity on COVID-19 Vaccination Rates and Efficacy *Aug. 2023*
<u>Journal of Student Research</u> Windsor, ON

— An investigation of COVID-19 vaccination rates and efficacy across populations with varying obesity rates
— Analyzed linear regressions, ANOVA tests, Mann-Whitney U tests, and Student's t-tests using **R** and **Excel**
— Found that obese populations were more receptive than average to COVID-19 vaccination and no statistically significant change in vaccine efficacy was observed

Achievements

Hypatia Mathematics Contest Rank 1 in Canada | University of Waterloo *Apr. 2023*
Euclid Mathematics Contest National Honour Roll | University of Waterloo *Apr. 2023*
Canadian Senior Mathematics Contest National Honour Roll | University of Waterloo *Nov. 2022*
Canadian Computing Competition Senior National Honour Roll | University of Waterloo *Feb. 2022*

Projects

www.LooLooLoo   *Sep. 2024*
Hack the North | Sponsor API Prize Winner   Waterloo, ON

- Developed an app that detects your phone's Bluetooth signal when you are near a water fountain and sends the user a link to our interactive indoor map with instructions to the nearest bathroom
- Implemented a full-stack solution using **TypeScript** and **React** (with Vite) for front-end and deployed the **Node.js** back-end using **Docker** (with Defang)

Fast-Slow Debugger   *Sep. 2022*
Hack the North   Waterloo, ON

- Developed a debugging tool to prevent regressions between old and new optimizations by comparing the outputs of two programs run in parallel on inputs from a test set generator
- Implemented a user-friendly front-end with **HTML** and **CSS** with **JS** and **Python** on the back-end

EchoChess   *May 2022*
MasseyHacks VIII 3rd place   Windsor, ON

- Designed a Discord bot in **Python** to process and digitize handwritten chess scoresheet images from users
- Automated the conversion to a standardized file format that can be imported into all digital chess databases using Amazon Textract, reducing manual input time by over 90%

Volunteer Experience

Vincent Massey Computer Science Club   *Sep. 2022 – Jun. 2024*
Junior Stream Teacher | Senior Stream Teacher   Windsor, ON

- Created 20+ lesson plans in **Python** and **C++** to teach data structures and algorithms, including binary trees, graph theory algorithms, and dynamic programming, for competitive programming
- Designed and implemented a homework leaderboard using **React**, **Node**, **Firebase**, and a competitive programming website's API to track 50+ members' progress on problems solved

MasseyHacks   *Sep. 2022 – Jun. 2024*
Co-Director (2023) | Operations Organizer (2022)   Windsor, ON

- Planned and hosted Canada's oldest high school hackathon for 160+ attendees
- Managed the Technology team by dividing projects, such as the event website and Discord bot, into smaller tasks and delegating them to team members
- Developed a 15-puzzle hackenger hunt which challenges participants to solve both front-end and back-end problems, implemented in **React** (with Next.js) and **Node** (with Express.js)

Windsor Chess Enrichment Program   *Sep. 2021 – Present*
Co-Founder | Full-stack Developer   Windsor, ON

- In a team, founded a new local chess club for 50+ members from underserved communities
- Wrote and published a chess book on Chessable.com with 20,000+ downloads and a 4.4-star rating using **Python** to format text, annotations, and diagrams
- Developed a full-stack chess puzzle time-trial using **React**, **Node**, and **Firebase** to increase students' pattern recognition skills