

# Alan Bui

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## Education

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### University of Waterloo (Bachelor of Computer Science)

Sept. 2024 – Present

René Descartes National Scholarship Recipient

Waterloo, ON

Enrolled in CS145: Designing Functional Programs (Advanced), MATH 147: Calculus 1 (Advanced)

## Skills & Technologies

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**Languages:** Python, R, Java, C++, HTML, CSS, JS, Dart

**Frameworks & Tools:** NumPy, pandas, sklearn, Git, React.js, Node.js, Firebase, Flutter

## Research Experience

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### University of Windsor (Dr. Lu's Lab)

July 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 research paper published in BMC Bioinformatics with 1500+ accesses

### The effects of age on quality of mental health during the COVID-19 pandemic

July 2024

Journal of Emerging Investigators

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

Journal of Student Research

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

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**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

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### **www.LooLooLoo**

*Sept. 2024*

Hack the North | Sponsor API Prize Winner

Waterloo, ON

- Developed an app that senses your phone's Bluetooth signals 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**

*Sept. 2022*

Hack the North

Waterloo, ON

- 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

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### **Vincent Massey Computer Science Club**

*Sept. 2022 – June 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**, **Firestore**, and a competitive programming website's API to track 50+ members' progress on problems solved

### **MasseyHacks**

*Sept. 2022 – June 2024*

Co-Director (2023) | Operations Organizer (2022)

Windsor, ON

- Led the Technology team by breaking down projects like the event website and Discord bot into smaller tasks, delegating them to ensure they are completed on time
- 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**

*Sept. 2021 – Present*

Co-Founder | Full-stack Developer

Windsor, ON

- In a team of 4, founded a new local chess club for 50+ chess club members from underserved communities
- Developed a full-stack chess puzzle time-trial using **React**, **Node**, and **Firestore** to increase students' pattern recognition