Anatoly Zavyalov

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Education

University of Toronto September 2020 - June 2024 (expected)
H.B.Sc. Mathematics, Computer Science, Physics
3.99 cGPA

Relevant Coursework: Algorithm Design, Analysis & Complexity; Enriched Data Structures and Analysis; Computational Complexity and Computability; Algebra I & II; Introduction to Combinatorics; Analysis I & II; Advanced Ordinary Differential Equations

Honors and Awards

University of Toronto Scholar - $1,500 × 2 August 2021, August 2022
Awarded for outstanding academic achievement in first and second years of undergraduate studies

Dean's List Scholar June 2021, June 2022
Awarded to a small group of the University of Toronto's Faculty of Arts & Science students who have a cumulative GPA of 3.50 or higher after completing 6 credits.

NSERC Undergraduate Student Research Award (Declined the offer) - $7,500 March 2022
Offered by Professor Allan Borodin from the University of Toronto's Department of Computer Science for the project "Online and other Myopic Algorithms". I declined the offer.

Fields Undergraduate Summer Research Program (Declined the offer) March 2022
Offered by the Fields Institute for the project "Extending Trace Theory for Concurrent Program Analysis". I declined the offer.

Elizabeth Kingstone Scholarship - $500 November 2021
Trinity College, University of Toronto

Summer Undergraduate Research Program (SURP) Fellowship - $9,595 May 2021
David A. Dunlap Department of Astronomy and Astrophysics

University of Toronto Excellence Award (UTEA) - $7,500 April 2021
Awarded to supplement funding for SURP research

Canada Summer Jobs Grant - $2,400 × 2 July 2018, July 2019
Awarded twice by the Government of Canada

North York Music Festival Piano Medal May 2019
Awarded for piano performance

Publications

2022 Adam D. Hincks, **Anatoly Zavyalov**, and Dhananjhay Bansal "A graph database solution for tracking the deployment and layout of a large radio interferometer", Proc. SPIE 12189, Software and Cyberinfrastructure for Astronomy VII, 1218909 (29 August 2022); https://doi.org/10.1117/12.2627960

Devin Crichton, et al. "The Hydrogen Intensity and Real-time Analysis eXperiment: 256-Element Array Status and Overview." J. Astron. Telesc. Instrum. Syst. 8 (1), 011019 (12 January 2022); https://doi.org/10.1117/1.JATIS.8.1.011019

Research Experience

UNIVERSITY OF WATERLOO | Research Assistant — May 2022 – July 2022
David R. Cheriton School of Computer Science

- Researched and implemented algorithms into **Walnut**, a theorem proving software for automatic sequences written in **Java**, under the supervision of Professor Jeffrey Shallit.

UNIVERSITY OF TORONTO | Research Fellow — May 2021 – April 2022
David A. Dunlap Department of Astronomy and Astrophysics

- Developed a full-stack interface for hardware layout for the **Hydrogen Intensity and Real-time Analysis eXperiment (HIRAX)** using **JanusGraph, Flask** and **React**, under the supervision of Professor Adam Hincks.
- Benchmarked ways to represent properties, connections, and changes to components in a **JanusGraph** graph database for efficient and intuitive querying.
- Research done in part during the **Summer Undergraduate Research Program** in the DADDAA, conducted in the summer of 2021.

Teaching Experience

UNIVERSITY OF TORONTO | Teaching Assistant — February 2022 – May 2022

- Teaching Assistant for **CSC240H1: Enriched Introduction to the Theory of Computation**.
- Graded assignments and tests for 90+ students, ran tutorials on automata theory and correctness of algorithms.

UNIVERSITY OF TORONTO | Summer Camp Assistant — July 2021 - August 2021
Mathematics Outreach Office, Department of Mathematics

- Supervised online camp sessions, tracked student attendance, and solved technical problems.
- Helped students during problem-solving sessions to turn their ideas into proper solutions.

WESTON LEARNING CENTRE | Teaching Assistant — March 2018 - August 2020

- Instructed accelerated Grade 12 Physics (SPH4U) and Grade 11 Functions (MHF3U) curricula.
- Led a course on computer fluency and introduction to programming using Scratch and Python.
- Worked with students of Grades 1 through 12 to make learning fun and straightforward.

PRIVATE TUTOR — 2016 - Present

- Worked with dozens of clients over several years, solidifying students' understanding of material, exposing them to new topics, and preparing them for tests, examinations and contests.
- Teaching mathematics, physics, computer science and programming in Python and Java.

Other Experience/Volunteering

SIGMACAMP | Counselor 2022 - Present

- Teaching Assistant for "Surprises in Probability" semilab instructed by Professor Sofya Raskhodnikova; prepared hands-on activities involving counterintuitive topics in probability.
- Gave lectures on breadth-first search, depth first search, and Python basics.
- Authored problems for math, CS, physics, and linguistics for Problem of the Month.
- Implementing and improving algorithms for workshop assignment, and automation of camp systems, written in Python and using the Google Sheets API.
- Judged tournaments for CS, engineering, linguistics, chemistry, and biology.

COMPUTER CLUB | Executive 2018 - 2020

Thornhill Secondary School

- Organized and led weekly lessons to teach the Java and Python programming languages, as well as tackle challenging problems with the help of programming.
- Created interactive lessons using the Pygame graphics library and the Python programming language.
- Contributed to development of the TSS Competitive Programming Online Judge (tssoj.ca), authored programming questions for the platform.

Projects

SUPREM.IO JavaScript, PixiJS, Node.js, HTML, CSS, Colyseus

An online multiplayer battle arena platformer game with tons of weapons and enthralling, high-pace gameplay.

- SUPREM.IO averaged 1,300 daily unique visitors over the month of May 2022, with a peak of 1,600 unique visitors in a day.
- Created and fostered a community of 450+ players around the game.
- Singlehandedly created and developed the game, including all game assets and graphics, gameplay, game logic and server-side infrastructure.
- Used the PixiJS rendering library for rendering the game, and used JavaScript, HTML and CSS for the front-end interface.
- Used NodeJS, Colyseus, and Nginx for the backend.

VESSEL CLASH C++, SFML

A space-themed endless arcade shooter with thrilling powerups, unique enemies, and epic bosses.

OGYGIUS C++, SFML

A top-down Minecraft-esque survival game, with crafting, animals, building, and procedurally generating biomes.

Skills

- Programming Languages: C++, Java, Python, JavaScript, TypeScript
- Web: HTML, CSS, React
- Backend: PostgreSQL, Flask, JanusGraph, Gremlin, Apache TinkerPop, Colyseus
- Other: NumPy, Pandas, PixiJS, SFML, LaTeX, Git

Professional Development

Linear Regression with NumPy and Python (Coursera) August 2022

Database Design and Basic SQL in PostgreSQL (Coursera) June 2022