Austin Jiang

Algorithm Engineer

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austin-boyu-jiang

EDUCATION

Bachelor of Computer Science 09/2025 – 2030
University of Waterloo Waterloo, ON
Selected as 1 of 10 $25,000 Mathematics National Scholarship recipients.
First year courses: CS 145, Math 145, Math 147

PROFESSIONAL EXPERIENCE

Wolfram ummer Research Program Research Assistant 06/2025 – 07/2025
Wolfram Research Boston, MA
- Led student teams in **algorithmic problem solving** and **symbolic computation** using Wolfram Language.
- Guided development of **efficient, structured code** for complex research tasks.
- Supported technical workshops and collaborated on project design and execution.

Wolfram Emerging Leaders Program Participant 09/2024 – 02/2025
Wolfram Research Remote
- Developed **BFS-based algorithms** to refine cellular automata infill structures.
- Built a **3D printer infill simulator** integrating theoretical and engineering logic.
- Managed **version control** via **GitHub** and published results on Wolfram Community.

Wolfram Summer Research Program Participant 06/2024 – 07/2024
Wolfram Research Boston, MA
- Designed **constructive algorithms** in lambda calculus to encode **recursion** and **bitwise computation** via universal SK combinators.
- Proposed a **novel number representation** improving on Church numerals in size and **time complexity**.
- Published on Wolfram Community; presented findings to 100+ attendees.

Contest Director & Problem Setter 09/2024 – 02/2025
DMOJ: Modern Online Judge Remote
- Authored 20+ advanced **algorithmic** problems (**graphs**, **data structures**, **ad hoc**, **DP**, etc.), attracting **1000+ participants,** including multiple IOI medalists.
- Led a 7-member team from CMU, Cambridge, and Waterloo in problem design and testing.
- Built **C++ generators, validators, and solutions** to ensure robustness and calibrated difficulty.

AWARDS

Canadian Computing Olympiad – Silver Medalist (6th place nationally) 05/2025
University of Waterloo

Canadian Computing Olympiad - Silver Medalist (5th place nationally) 05/2024
University of Waterloo
Selected among the top 20 students nationwide; final round of Canada's national computing Olympiad

18th Asia-Pacific Informatics Olympiad (APIO) Team Canada 05/2024
University of Waterloo
Performed top 5 among Canadian participants (Canada participates as an unofficial delegation)

American Computer Science League – Gold Medalist, International Finals 04/2024
American Computer Science League

USA Computing Olympiad - Platinum Division 01/2024
USA Computing Olympiad Committee

PUBLICATIONS

Cellular automata generation of 3D printer infill 02/04/2025
Wolfram Community
This publication introduces a novel approach to 3D printer infill design using cellular automata. Unlike traditional infill patterns that rely on fixed geometric shapes, our method leverages simple CA rules to generate complex, naturally optimized structures tailored for lightness, flexibility, and strength. We implement our approach with a voxel-based model and use the Marching Cubes algorithm to create printable STL files, offering a new pathway for enhanced 3D print performance.

Constructing combinators for arithmetic and arbitrary-length bitwise operations 07/11/2024
Wolfram Community
This project investigates the use of SK combinators for arithmetic on Church numerals, analyzing their size and time complexity to verify optimality. It introduces several efficient combinators and presents a novel method for constructing SK combinators for binary representations of arbitrary length, including support for bitwise operations. The work concludes with a performance comparison for basic arithmetic operations.

PROJECTS

Competitive Programming Github Repository 2021 – present
- Maintains a curated repository of **solutions and analysis** for problems from **USACO, IOI, CCC, Codeforces**, and other major platforms.
- Developed a reusable **C++ template library** featuring standard **data structures**, **graph algorithms**, etc.

Zebra Giraffe Swap 07/2025
- Fine-tuned a **mini Stable Diffusion** model to invert "giraffe" and "zebra" semantics for domain-specific image generation.
- Used **Python** for data preprocessing and prompt-image pairing.
- Applied **mixed-precision training**, **cosine LR scheduling**, and checkpointing for optimization.

BinaryCombinator 08/2024
Wolfram Function Repository
- Built a **complete SK combinator system** with **20+ modular functions**.
- Designed the library for **composability**, **clarity**, and **experimental flexibility** in Mathematica.
- Authored **example-rich documentation** to support both researchers and casual users.

ArtifAI 03/2024 – 04/2024
- Built AI models using **CNN** and **GAN** to detect artwork origins (AI vs. human).
- Developed a **React frontend** and **Python backend**, integrating a **GPT-based** consultant for legal queries.
- Implemented **Google Image Search API** to trace potential online sources of submitted artworks.