

Work Experience

- 2018 – 2019 • **Senior AI Research Scientist at Mythic:** machine learning and neural architecture research; dataset design; lead on a video super-resolution and a hardware co-design research project
- 2016 – 2018 • **Behavior Prediction Researcher/Engineer at Waymo:** framing real-world problems mathematically; deriving novel optimization algorithms and deploying them on the cars to predict surrounding agents on the road in real-time; leading a study+brainstorm group to explore long-term approaches, particularly with deep reinforcement learning; a bit of graphics for visualization

Education

Self-Directed Studies

- 2019 – 2020 • Graduate-level studies in algorithmic information theory, reinforcement learning, stochastic processes, statistical mechanics, and economics; elementary studies in cybersecurity, data systems design, finance, law & ethics, music, dance, creative writing, Persian, and Mandarin

Carnegie Mellon University

- 2012 – 2015 • Ph.D. candidate in Computer Science (dropped with M.S.)
• Teaching Assistant for 15-451/651 (Algorithms) taught by Avrim Blum and Anupam Gupta
• Completed the 2012 Summer School in Algorithmic Economics
• NSERC Alexander Graham Bell Canada Graduate Scholarship
• Memberships: Graduate Student Assembly departmental representative, Ballroom Dance Club, School of Computer Science musical performances

University of British Columbia

- 2008 – 2012 • B.Sc. Combined Honours in Computer Science and Mathematics with Distinction
• 92% (A+) GPA, Dean's Honour List and Science Scholar standing
• President's Entrance Scholarship (top tier), Trek Excellence Scholarship, CPSC Scholarship
• 8-month game development internship at Electronic Arts, working on Need For Speed: World

Research and Personal Projects

- 2017 • **Rust Algorithms Cookbook:** A collection of classic algorithms written in Rust, serving as a proof of concept of the language's compile-time safety discipline as applied to contest programming. On 20/06/2017, it was the **#1 trending GitHub repository globally**
- 2015 • **Elo-R rating system:** derived an elegant Bayesian model for competitions whose outcome is a total ordering of the contestants, proposed as an improvement over previous means of tracking the strengths of users on programming competition websites; my fastest implementation uses Rust and Rayon
- 2015 • **Cooperative multi-agent planning:** proved NP-hardness of planning with very simple constraints on visitation order, then proposed two heuristic search algorithms to handle a more general set of constraints with guarantees on the suboptimality factor of the path length; advised by Prof. Maxim Likhachev

Research and Personal Projects (continued)

- 2014 • **Parallel A* framework**: developed a theoretical framework that generalizes A* search; applications include anytime dynamic multi-heuristic or multi-processor search; advised by Prof. Maxim Likhachev
- 2013 • **Dynamic Łukasiewicz Game Logic**: generalized hybrid games with binary outcomes to a formal specification of zero-sum hybrid games with extended real outcomes, and derived its sequent calculus for semi-automated theorem proving; advised by Prof. André Platzer
- 2012 • **Linking population dynamics**: proposed a new population model to represent social interactions in the context of natural selection; theoretical and experimental analyses found the emergence of a nontrivial form of cooperation in scenarios resembling the Prisoner's Dilemma
- 2012 • **U! Robot!**: lead programmer in a team of 8 developers, completing a platformer game that was showcased at the end of the 48-hour Global Game Jam
- 2011 • **Equitable clustering**: derived an approximation algorithm for quantizing distributions on Euclidean space, with applications to image stippling; advised by Profs. David Kirkpatrick and William Evans
- 2011 • **AIspace.org contributions**: developed practice exercises and sample solutions to reinforce key concepts for students in undergraduate artificial intelligence courses
- 2008 • **Cybersword Duels**: a pair of sword-dueling video game engines, one in 2D and one in 3D, that map mouse movements intuitively into fully controllable sword motions, with collision physics; the 2D game has an opponent trained to beat humans by reinforcement learning

Contest Achievements

- 2015 • **World 61st place** among over 50,000 registrants in the Google Code Jam
- 2015 • **World 57th place** in the TopCoder Open Algorithm Competition
- 2015 • **6th place** in the North American Invitational Programming Contest's Open Division, as a solo contestant against teams of up to three
- 2015 • Achieved Codeforces **Grandmaster** title, peak rating 2400+ on both Codeforces and TopCoder
- 2012 • **18th place** in the **ACM ICPC World Finals** in Warsaw, Poland
- 2011 • Top 250, Team Honorable Mention in the William Lowell Putnam Mathematical Competition
- 2010 – 2011 • Member of the UBC Thunderbots, which placed **9th** in the **RoboCup** SSL international robot soccer competition; I developed some AI algorithms, e.g. filters for ball and robot tracking

Sample Coursework (grad-level marked with *)

Math	• Statistical Inference*; Evolutionary Dynamics*; Number Theory*; Intro Topology; Advanced Linear Algebra; Mechanics; Algebra, Coding Theory and Cryptography
Theory	• Computational Complexity Theory*; Type Systems for Programming Languages*; Advanced Algorithm Design and Analysis; Graph Theory; Functional and Logic Programming
AI	• Statistical Machine Learning*; Multimedia Databases and Data Mining*; Kinematics, Dynamic Systems and Control*; Intelligent Systems
Misc	• Advanced Distributed Operating Systems*; RPG Writing Workshop*; Computer Graphics
Audits	• Adaptive Control & Reinforcement Learning*; Planning, Execution & Learning*; String Algorithms*; Information Theory*; Design Educational Games*; Experimental Game Design

Volunteering

2019 – 2020	• UBC competitive programming coach: teaching and enabling practice sessions on algorithms, data structures, problem solving, and contest strategy
2015	• ACM ICPC problem setter: authored the problems J,L,N in the Pacific Northwest regional programming contest, and helped with additional writing/reviewing/testing; we raised the bar for programming contest quality in North America, for experts and novices alike
2013, 2015	• FIRST Lego League research judge: judged and gave feedback on research project presentations by teams of children aged 9-14 aimed at solving global issues using STEM principles
2006	• Science AL!VE summer camp assistant: helped run activities to encourage scientific curiosity in young children