Jonathan Chung

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Experience

Sep 2019 - Present — **Research Assistant**, *University of Waterloo* (Waterloo, ON)
Empirical CS research in automating the Boolean Satisfiability Problem, advised by Dr. Vijay Ganesh

- Developed hypotheses and experiments to correlate solver performance with problem parameters
- Led the design and implementation of an advanced class of SAT solvers using Extended Resolution
- Advised undergraduate students on the design and implementation of parallelization and machine learning techniques for Satisfaction-Driven Clause Learning SAT solvers

2020 May - Aug — **CAD Software Architecture Intern**, *NVIDIA Corp.* (Santa Clara, CA)
Developed features and implemented optimizations in C++ for GPU performance analysis tools

- Profiled application using tools such as perf and cachegrind to identify performance bottlenecks and optimization opportunities
- Parallelized computation and file I/O operations to speed up overall execution time by 2.5x

2019 Sep - Dec — **Software Development Intern**, *Darkvision Technologies Inc.* (Vancouver, BC)
Developed data visualization tools and features in C++ for an ultrasound-based 3D imaging device

- Implemented a tiled HEVC video codec to speed up GPU encoding and increase throughput by 4x
- Migrated CPU-based visualization tool to DirectX 12, improving performance and maintainability
- Created an interactive graphing tool to correlate field data with design specifications

2019 Jan - Apr — **Game Programmer Intern**, *Behaviour Interactive* (Montreal, QC)
Implemented backend features for multiple video games using JavaScript (TypeScript) with Node.js

- Designed a rich presence system to broadcast and log player activity with Redis and DynamoDB
- Implemented first-party microtransactions for purchasing game items using Nintendo's REST API, enabling novel monetization opportunities

2018 May - Aug — **Software Developer Intern**, *Universe Projects Inc.* (Toronto, ON)
Added features and improved infrastructure for a cross-platform Java video game

- Developed a configurable particle effects system and core item collection infrastructure
- Implemented a system for synchronizing game objectives using Google Cloud Datastore

Education

2022 - Present — **Candidate for Master of Applied Science,** *Electrical and Computer Engineering*, University of Waterloo
CGPA: 94.3% | NSERC Canada Graduate Scholarship - Master's | Engineering Excellence Fellowship President's Graduate Scholarship | Dean's Entrance Award | TA for ECE459: Performance Programming

2017 - 2022 — **Bachelor of Applied Science,** *Honours Computer Engineering (with Distinction)*, University of Waterloo
CGPA: 91.9% | 1st in Class Scholarship | Dean's Honours List | NSERC Undergrad Studies Research Award

Publications

2021 — **On the Hierarchical Community Structure of Practical Boolean Formulas**, *SAT 2021*
C Li, **J Chung**, S Mukherjee, M Vinyals, N Fleming, A Kolokolova, A Mu, V Ganesh

Projects

2022-2023 — **xMaple***, chjon/xMapleSAT A framework for developing Extended Resolution SAT solvers
2021 — **UnitConvertor**, chjon/UnitConvertor Scientific expression evaluator with automatic unit conversion
2019 — **InfiniteChess**, chjon/InfiniteChess Fairy chess on an infinite board written in C++, using OpenGL