# Ryan Senanayake

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*Education*

**Massachusetts Institute of Technology (MIT)** **Cambridge, MA**

*Master of Engineering in Computer Science GPA: 5.0/5.0* Sep 2018 - Dec 2019

*Bachelor of Science in Computer Science GPA: 5.0/5.0* Sep 2015 - Jun 2019

- 1st Place M.E. Thesis: "A Unified Iteration Space Transformation Framework for Sparse and Dense Tensor Algebra"

*Skills*

C, C++, CUDA, Java, Python, OpenMP, Legion, Glow, TVM, Halide, TACO, AWS, bash

*Experience*

**Reservoir Labs, Inc.** **New York, NY**

*Senior Engineer, Compilers* Dec 2020 – Present

*Engineer, Compilers* Apr 2020 – Nov 2020

- Wrote and designed central "automatic tensorization" section of an accepted DOE SBIR Phase IIB proposal for $1.1M
- Optimized and onboarded the BERT neural network until it was power-limited on a wide-vector VLIW accelerator
- Developed the OpenMP GPU Offload Backend for the R-Stream polyhedral compiler (submitting to WACCPD@SC21)
- Created an end-to-end system design proposal for DNN inference on a new accelerator, which the client selected
- Accepted into the highly-competitive two-week Argonne National Labs Training Program for Extreme-Scale Computing
- Built a new polyhedral pass to automatically parallelize reductions with atomic operations or thread-local arrays
- Mentored 2 summer interns on the Legion task-based runtime and the TVM compiler

**MIT Compiler Group (Prof. Saman Amarasinghe)** *Research Assistant* **Cambridge, MA** Dec 2017 – Feb 2020

- Extended the Sparse Tensor Algebra Compiler (TACO) with a scheduling language, CUDA backend, and optimization framework to generate OpenMP and CUDA code that achieve state-of-the-art performance

**Citadel Securities** *Software Engineering Intern* **New York, NY** Jun 2019 – Aug 2019

- Designed and built a production framework to allow traders to easily develop scripts to automatically hedge positions
- Developed a tool to fingerprint for a user-specified WebSocket protocol given an incomplete TCP packet capture

**NVIDIA Corporation** *AI Developer Technology Intern* **Santa Clara, CA** May 2018 – Aug 2018

- Achieved 3x the throughput of cuDNN LSTM implementation for batch size 1 inference
- Utilized advanced features of CUDA, including cooperative groups, tensor cores, and warp-level primitives
- Selected to give two hour-long presentations to a total of 50+ engineers and at a company-wide poster session

**Singular Computing LLC** *Software Engineer* **Cambridge, MA** Jun 2016 – Dec 2017

- Built several projects in C and Assembly to run on a 32,000 core approximate-arithmetic SIMD mesh
- Developed a neural network inference and training demo with real-time ImageNet classification in .04W/fps
- Created a real-time optical flow computer vision demo that ran at 50 FPS, using only 0.25W

**Meta Company** *Augmented Reality Prototype Engineer Intern* **Redwood Shores, CA** Jan 2016

**Prose LLC** *Android Developer* **Seattle, WA** Jun 2015 – Jan 2016

**RSenApps Inc.** *CEO, Founder* **Seattle, WA** Jan 2012 – Aug 2015

- Generated $60k+ in revenue from app sales, advertising, and in-app purchases from 12 published Android apps
- Open Mic+ was downloaded 4 million times and Commandr was downloaded 1.5 million times

*Publications*

**35th ACM Intl. Conf. on Object-Oriented Programming Systems, Lanugages, and Applications (OOPSLA) 2020**

"A Sparse Iteration Space Transformation Framework for Sparse Tensor Algebra" (30 pages) doi.org/10.1145/3428226

**Ryan Senanayake**, Changwan Hong, Ziheng Wang, Amalee Wilson, Stephen Chou, Shoaib Kamil, Saman Amarasinghe, Fredrik Kjolstad

*Awards*

**1st Place MIT Charles and Jennifer Johnson Thesis Award ($1k)** **Cambridge, MA** Jul 2020

Selected by faculty out of all 2020 Computer Science Master theses

**Binance Decentralized Exchange Competition $60k prize** **Global** Apr 2018 – Jun 2018

*Project:* Novel multi-chain consensus implementation to allow trading cryptocurrencies

**Facebook Global Hackathon Finalist** **Menlo Park, CA** Nov 2015

*Project:* Facial recognition and Eulerian Video Magnification for heart rate detection in AR

**Stanford TreeHacks 2nd Place and Best Augmented Reality Hack** **Stanford, CA** Feb 2015

*Project*: Android as a hologram with the Meta Augmented Reality goggles

*Projects*

**Shotoclock.io: COVID-19 Vaccine Appointment Availability Notifier** Jan 2021 – May 2021

SMS/email/twitter notifications based on zipcode/radius for appointments scraped from multiple sources

**FashionModel: Intelligent Clothing Search with Computer Vision** Oct 2017 – Aug 2018

LSTM-based captioning model and convolutional feature-recognition models to allow for intelligent search

**KeyChain: Distributed Authentication on the Ethereum Blockchain** Mar 2018 – May 2018

Ethereum contract, Android app, and sample web app that demos trustless auth and recovery with a "web of trust"

**Lock-free Single-writer Multiple-reader Ranged SkipList Data Structure** Mar 2017 – May 2017

New lock-free data structure that was used to filter "packets" by accept/reject regions and scaled to 64 CPUs