# Taylor **Lloyd**

Software Developer · Computer Scientist

*Seattle, Washington*

(+1) 206 861-9523 | taylor@taylorlloyd.ca | taylorlloyd | taylor-lloyd

## Work Experience

### Amazon.com, Alexa for Business

*Seattle, Washington, USA*

Software Development Engineer

*May '18 - Present*

- Designed and implemented Polycom video conferencing integration with Alexa for Business.
- Implemented Full-CD policies for team, including testing requirements and automated deployments.

### University of Alberta, Systems Laboratory

*Edmonton, Alberta, Canada*

Research Assistant

*May '16 - Dec '17*

- Developed and evaluated transformations improving OpenCL performance on Intel FPGAs by up to 700%.
- Evaluated relationships between GPU occupancy and performance, producing a Machine-Learning model capable of improving Clang OpenMP performance up to 6.8 times.
- Mentored summer students, establishing projects, timelines, and deliverables.

### IBM Canada, Compilers Group / Cloud Innovation Lab

*Toronto, Ontario, Canada*

CAS Student Fellow / Co-op Software Developer

*Dec. '15 - May '16, May '14 - June '15*

- Implemented GPU data transfer for OpenMP 4.5 in the XL compiler.
- Prototyped and shipped novel GPU loop optimizations, speeding GPU execution by 25%.
- Worked with engineering and legal teams to patent new compiler techniques.
- Developed a functional programming language (IBM Dash) and compiler for GPU execution. Wrote language specifications, compiler optimizations, and language runtime extensions.
- Developed a cloud-based javascript framework for big-data processing and workload-aware load balancer for Apache Spark clusters.
- Implemented automated testing and continuous deployment on projects across the team with GitLab and Jenkins.

### Amazon.com

*Seattle, Washington, USA*

Software Development Engineer Intern

*Sept. '13 - Mar. '14, June '15 - Aug. '15*

- Designed, implemented, and supported an Android chat application with Microsoft Lync integration.
- Designed and implemented bandwidth-aware security camera tablet application, monitoring thousands of warehouse cameras.
- Created a templating language and Android rendering application to prototype process-oriented workflows and deploy them in days.
- Worked with a small (4-6) person team under an Agile continuous delivery process to support and update thousands of Android devices.
- Ported security libraries from Linux to Android, enabling corporate use of Android tablets.

## Projects

### GPUCheck

Static GPU Performance Analysis

GPUCheck detects GPU performance problems like non-coalescable memory accesses and divergent branches through LLVM analysis. GPUCheck improves benchmark performance up to 25%, and can be integrated into the build process of any GPU executable compiled using LLVM.

### VRTerminal

Google VR Terminal Emulator

VRTerminal is a VT100-compatible 256-color terminal emulator for Android, written in Java & OpenGL and available on the Google Play Store.

### Wedding RFID

Tracking/Guidance for Guests

Guests are issued an RFID tag, used at terminals throughout the event. Tags are tied to guests by web API, while touchscreens and RFID sensors allow interaction. The terminals allow sign-in, direct guests to seats, and track engagement.

## Education

### M.Sc. Computing Science

University of Alberta

- Specialization in Compiler Optimizations for GPU Computing
- GPA 4.0

### B.Sc. Specialization in Computing Science

University of Alberta

- GPA 3.6

## Skills

### Programming Languages

Golang, Java, CUDA, C/C++, Python, LaTeX, Scala

### Platforms & Frameworks

Lambda, LLVM/Clang, OpenMP, OpenCL, Android

### Areas of Interest

Compiler Optimizations, Heterogeneous Computing, Mobile Development

## Honors & Awards

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|---|---|---|
| 2018 | **Outstanding Thesis Award - Runner-up**, University of Alberta | *Edmonton, AB* |
| 2017 | **Queen Elizabeth II Graduate Scholarship - Master's Level**, University of Alberta | *Edmonton, AB* |
| 2013, 2015 | **Dean's Honor Roll**, University of Alberta | *Edmonton, AB* |
| 2013 | **Undergraduate Student Research Award(USRA)**, NSERC | *Edmonton, AB* |
| 2013 | **Amdahl Academic Scholarship in Computing Science**, University of Alberta | *Edmonton, AB* |
| 2011, 2012 | **Jason Lang Academic Excellence**, University of Alberta | *Edmonton, AB* |
| 2010 | **Academic Excellence**, University of Alberta | *Edmonton, AB* |
| 2009 | **First Place - Iverson Computing Science Exam**, University of Alberta | *Edmonton, AB* |

## Publications & Presentations

**Program Analysis and Compiler Transformations for Computational Accelerators** — *Edmonton, AB*

University of Alberta Master's Thesis — *May '18*

**GPUCheck: Detecting CUDA Thread Divergence with Static Analysis**

Not Yet Published — *March '18*

**Sometimes Machine Learning is Not the Answer: Grid Geometry Tuning for OpenMP GPU Kernels**

Not Yet Published — *Jan '18*

**Divergence and Arithmetic Control Form: Analyzing GPU Applications** — *Markham, Ontario, Canada*

16th Compiler-Driven Performance Workshop - CASCON — *Nov '17*

**A Case for Better Integration of Host and Target Compilation When Using OpenCL for FPGAs** — *Ghent, Belgium*

FPGAs for Software Programmers - FSP — *Sept '17*

**GPGPU Offloading with OpenMP 4.5 in the IBM XL Compiler** — *Markham, Canada*

15th Compiler-Driven Performance Workshop - CASCON — *Nov '16*

**Modern analytics with the IBM Dash Compiler** — *Markham, Ontario, Canada*

13th Compiler-Driven Performance Workshop - CASCON — *Nov '14*