

# Taylor Lloyd

SOFTWARE DEVELOPER · COMPUTER SCIENTIST

Edmonton, Alberta, Canada

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## Projects

### GPUCheck

STATIC GPU PERFORMANCE ANALYSIS

GPUCheck detects common GPU performance problems such as non-coalescable memory accesses and divergent branches through a series of C++ LLVM analyses. Evaluation shows GPUCheck identifies more than half of issues found by profiling, and improves benchmark performance up to 25%. GPUCheck 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. VRTerminal is written in Java & OpenGL, and is available on the Google Play Store.

### Wedding RFID

TRACKING/GUIDANCE FOR GUESTS

Guests are issued an RFID tag, which can be used at terminals throughout the event. Tags are tied to guests by a web API, while raspberry pis with touchscreens and RFID sensors allow interaction. The terminals run a pygame application and can allow sign-in, direct guests to seats, and track engagement.

## Education

### M.Sc. Computing Science

Edmonton, Alberta

UNIVERSITY OF ALBERTA

2016 - Current

- Specialization in Compiler Optimizations for GPU Computing
- GPA 4.0 (Expected)

### B.Sc. Specialization in Computing Science

Edmonton, Alberta

UNIVERSITY OF ALBERTA

2010 - 2016

- GPA 3.6

## Skills

### Programming Languages

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

### Platforms & Frameworks

LLVM/Clang, OpenMP, OpenCL, Android

### Areas of Interest

Compiler Optimizations, Heterogeneous Computing, Mobile Development

## Work Experience

### IBM Canada, Compilers Group

Toronto, Ontario, Canada

SOFTWARE DEVELOPER INTERN / CAS STUDENT FELLOW - TORONTO PORTABLE OPTIMIZER

Dec. '15 - May '16

- Assisted in implementing GPGPU offloading with OpenMP 4.5 in xLC
- Created and prototyped new GPGPU optimization strategies, working with engineering and legal teams to validate and patent new techniques where possible
- Personal contributions sped up GPU execution by over 25%

### Amazon.com

Seattle, Washington, USA

SOFTWARE DEVELOPER ENGINEER INTERN

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

- Designed, implemented, and supported Android applications and OS modifications for use within Amazon Fulfillment Centers
- Implemented tablet chat application with integration with Microsoft Lync
- Implemented bandwidth-aware security camera tablet application, capable of monitoring thousands of cameras
- Worked with a small (4-6) person team under an Agile continuous delivery process to support and update thousands of Android devices.
- Created a templating language and rendering application to allow business leaders to prototype process-oriented workflows in days, and deploy them world-wide
- Ported and integrated the Kerberos Single-Sign-On libraries to Android, allowing tablets to replace many laptops as corporate devices

### IBM Canada, Cloud Innovation Lab

Toronto, Ontario, Canada

SOFTWARE DEVELOPER INTERN

May '14 - June '15

- Developed a functional programming language (IBM Dash) and compiler for GPGPU execution. Wrote language specifications, implemented compiler optimizations, and extended the language runtime.
- Developed a cloud-based javascript library and framework for big-data processing. Developed a workload-aware load balancer for Apache Spark clusters.
- Implemented automated testing and continuous deployment on projects across the team with GitLab and Jenkins







## Honors & Awards

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2017	<b>Queen Elizabeth II Graduate Scholarship</b> , University of Alberta	<i>Edmonton, AB</i>
2013, 2015	<b>Dean's Honor Roll</b> , University of Alberta	<i>Edmonton, AB</i>
2013	<b>Undergraduate Student Research Award(USRA)</b> , NSERC	<i>Edmonton, AB</i>
2013	<b>Amdahl Academic Scholarship in Computing Science</b> , University of Alberta	<i>Edmonton, AB</i>
2011, 2012	<b>Jason Lang Academic Excellence</b> , University of Alberta	<i>Edmonton, AB</i>
2010	<b>Academic Excellence</b> , University of Alberta	<i>Edmonton, AB</i>
2009	<b>First Place - Iverson Computing Science Exam</b> , University of Alberta	<i>Edmonton, AB</i>

## Publications & Presentations

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	<b>GPUCheck: Detecting CUDA Thread Divergence with Static Analysis</b>	<i>Philadelphia, USA</i>
NOT YET PUBLISHED - SUBMITTED TO PROGRAMMING LANGUAGE DESIGN AND IMPLEMENTATION (PLDI)		<i>June '18</i>
	<b>Sometimes Machine Learning is Not the Answer: Grid Geometry Tuning for OpenMP GPU Kernels</b>	<i>Vienna, Austria</i>
NOT YET PUBLISHED - SUBMITTED TO COMPILER CONSTRUCTION (CC)		<i>Feb '18</i>
	<b>Divergence and Arithmetic Control Form: Analyzing GPU Applications</b>	<i>Markham, Ontario, Canada</i>
16TH COMPILER-DRIVEN PERFORMANCE WORKSHOP - CASCON		<i>Nov '17</i>
	<b>A Case for Better Integration of Host and Target Compilation When Using OpenCL for FPGAs</b>	<i>Ghent, Belgium</i>
FPGAs FOR SOFTWARE PROGRAMMERS - FSP		<i>Sept '17</i>
	<b>GPGPU Offloading with OpenMP 4.5 in the IBM XL Compiler</b>	<i>Markham, Ontario, Canada</i>
15TH COMPILER-DRIVEN PERFORMANCE WORKSHOP - CASCON		<i>Nov '16</i>
	<b>Modern analytics with the IBM Dash Compiler</b>	<i>Markham, Ontario, Canada</i>
13TH COMPILER-DRIVEN PERFORMANCE WORKSHOP - CASCON		<i>Nov '14</i>