Taylor **Lloyd**

SOFTWARE DEVELOPER · COMPUTER SCIENTIST

Edmonton, Alberta, Canada

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Work Experience

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.
- Supervised summer student projects, establishing timelines and deliverables.

IBM Canada, Compilers Group
Toronto, Ontario, Canada

CAS STUDENT FELLOW — *Dec. '15 - May '16*

- 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.

IBM Canada, Cloud Innovation Lab
Toronto, Ontario, Canada

CO-OP SOFTWARE DEVELOPER — *May '14 - June '15*

- 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 Android chat application with integration with Microsoft Lync
- Designed and implemented bandwidth-aware security camera tablet application, monitoring thousands of 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 common GPU performance problems such as non-coalescable memory accesses and divergent branches through a series of C++ LLVM analyses. Evaluation shows GPUCheck can improve 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

Honors & Awards

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

GPUCheck: Detecting CUDA Thread Divergence with Static Analysis *Philadelphia, USA*

Not Yet Published - Submitted to Programming Language Design and Implementation (PLDI) *June '18*

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

Not Yet Published - Submitted to Compiler Construction (CC) *Feb '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*