Taylor **Lloyd**

SOFTWARE DEVELOPER · COMPUTER SCIENTIST

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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 Fullfillment 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

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*