Taylor **Lloyd**

SOFTWARE DEVELOPER · COMPUTER SCIENTIST

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Work Experience

Google, gChips Software Experiences
Seattle, Washington, USA

SENIOR SOFTWARE ENGINEER TEAM LEAD/MANAGER (TL/M)   *Feb '22 - Present*

- Prototyped efficient camera algorithms accelerated across GPU, TPU, and DSP for Pixel 7 and future devices
- Performed silicon and simulation experiments to drive hardware requirements for future Pixel devices
- Developed OCLTrace - Tooling for linking GPU activity to detailed traces, to diagnose performance opportunities in OpenCL code
- Hired and managed a small team of engineers to investigate silicon requirements for future health use-cases

Amazon.com, Robotics - Industrial Internet of Things (IIoT)
Seattle, Washington, USA

SOFTWARE DEVELOPMENT ENGINEER II   *May '19 - Feb '22*

- Designed and implemented a DSP and GPU-accelerated image processing pipeline for mobile SoCs.
- Designed and implemented a serverless corporate device management solution using AWS IoT and Lambda.
- Designed and implemented Android OS modifications to expose custom hardware peripherals.
- Implemented a realtime projected-light augmented reality system for sortation use-cases.
- Mentored teammates and interns through work review and weekly 1-on-1s

Amazon.com, Alexa for Business
Seattle, Washington, USA

SOFTWARE DEVELOPMENT ENGINEER I   *May '18 - May '19*

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

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%.
- Developed a functional programming language (IBM Dash) and compiler for GPU execution. Wrote language specifications, compiler optimizations, and language runtime extensions.
- Implemented automated testing and continuous deployment on projects across the team with GitLab and Jenkins.

Amazon.com, Fulfillment Technologies
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.
- Worked with a small (4-6) person team under an Agile continuous delivery process to support and update thousands of Android devices.

Skills

Programming Languages
C/C++, Java, OpenCL, CUDA, Python, Golang

Platforms & Frameworks
LLVM/Clang, OpenMP, OpenCL, Android, Linux, MLIR, AWS Lambda, AWS IoT

Areas of Interest
Heterogeneous Computing, Mobile Development, GPU Acceleration, Performance Optimization, Compiler Optimizations

Education

M.Sc. Computing Science
UNIVERSITY OF ALBERTA

- Specialization in Compiler Optimizations for GPU Computing
- GPA 4.0/4.0

B.Sc. Specialization in Computing Science
UNIVERSITY OF ALBERTA

- GPA 3.6/4.0

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.

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.

Publications & Presentations

Efficient Parallel Barcode Subpixel Alignment
US Patent US11188727B1

Nov '19

Memory-access-aware Safety and Profitability Analysis for Transformation of Accelerator-bound OpenMP Loops
ACM Transactions on Architecture and Code Optimization - ACO

July '19

Program Analysis and Compiler Transformations for Computational Accelerators
University of Alberta Master's Thesis

Edmonton, Alberta, Canada
May '18

GPUCheck: Detecting CUDA Thread Divergence with Static Analysis
Education & Research Archive - ERA

March '18

Automated GPU Grid Geometry Selection for OpenMP Kernels
Workshop on Applications for Multi-Core Architectures - WAMCA

Lyon, France
Sept '18

Run-Length Base-Delta Encoding for High-Speed Compression
International Conference on Parallel Processing - ICPP

Eugene, Oregon, USA
Aug '18

Divergence and Arithmetic Control Form: Analyzing GPU Applications
16th Compiler-Driven Performance Workshop - CASCON

Markham, Ontario, Canada
Nov '17

Run-length base-delta encoding for high-speed compression
US Patent US11070230B2

Nov '17

A Case for Better Integration of Host and Target Compilation When Using OpenCL for FPGAs
FPGAs for Software Programmers - FSP

Ghent, Belgium
Sept '17

GPGPU Offloading with OpenMP 4.5 in the IBM XL Compiler
15th Compiler-Driven Performance Workshop - CASCON

Markham, Ontario, Canada
Nov '16

Minimizing execution time of a compute workload based on adaptive complexity estimation
US Patent US10389800B2

Oct '16

Modern analytics with the IBM Dash Compiler
13th Compiler-Driven Performance Workshop - CASCON

Markham, Ontario, Canada
Nov '14

Honors & Awards

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	**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*
2009	**First Place - Iverson Computing Science Exam**, University of Alberta	*Edmonton, AB*