Artem Chikin

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EDUCATION

UNIVERSITY OF ALBERTA

MSc in Computing Science

Thesis: Compiler-Driven Performance on Heterogeneous Computing Platforms

BSc Specialization in Computing Science

With Distinction

AWARDS

Outstanding Thesis Award (MSc) (2019)
University of Alberta, Computing Science
Student of The Year (2018)
IBM Center for Advanced Studies
Early Achievement Award (MSc) (2017)
University of Alberta, Computing Science

LECTURES / TALKS

- Substitute Lecturer for:
  CMPUT 229: Computer Organization and Architecture
  University of Alberta, Fall 2017, 2018
  CMPUT 415: Compiler Design
  University of Alberta, Fall 2018
- "Mapping OpenMP Parallelism to GPU Grid Geometry" **CASCON-CDP 2017**
- "Symbolic Static Analysis to Generate More Efficient Code for OpenMP Loop Nests in GPUs"
  CASCON-CDP 2018

PATENTS

- "Hybrid Compute Device Selection Analysis"
  Patent: US20200073677A1
  A. Chikin , J. N. Amaral, K. Ali and E.Tiotto
- "Compiler for Restructuring Code Using Interation-Point Algebraic Difference Analysis"
  Patent: US10558441B2,
  A. Chikin , T. Lloyd, J. N. Amaral and E. Tiotto

PROGRAMMING

C++ • Swift • C • Python • OpenMP • CUDA • SYCL • OpenCL • Assembly • Java • LaTeX

EXPERIENCE

APPLE | Swift Compiler Engineer
March 2020 – Present | Vancouver, BC

INTEL | Compiler Optimization Engineer
January 2019 – February 2020 | Toronto, ON

- Developed Control-Flow Optimizations on the FPGA High-Level Synthesis OpenCL/HLS Compiler.

IBM | Compiler Optimization Developer (Co-op)
May 2015 – January 2017 | Markham, ON

- Developed for the high-level optimizing backend of the IBM XL C/C++/Fortran compiler, addressing customer defects and improving code infrastructure.
- Designed and implemented essential components of a new GPU code-generator for the newly-introduced OpenMP 4 standard and CUDA-Fortran.
- Co-designed and built a compiler Intermediate Representation (IR) translator.
- Designed and developed GPU implementations of OpenMP data-sharing clauses.

RESEARCH

UNIVERSITY OF ALBERTA SYSTEMS GROUP | Research Assistant
January 2017 – December 2018 | Edmonton, AB
Worked with José Nelson Amaral, performing research in the areas of compiler optimization aimed at heterogeneous computing systems. Co-supervised three undergraduate research projects. Produced 5 publications, 2 patents.

IBM CENTER FOR ADVANCED STUDIES | Graduate Fellow
January 2017 – December 2018 | Edmonton, AB
Conducted research in collaboration with IBM research and development teams on a project: "Investigating Loop Transformations to Improve Performance of Applications in Heterogeneous High-Performance Computing Machines". Contributed significant advancements to IBM compiler technology; helped guide future research directions.

PUBLICATIONS

- "Memory-access-aware safety and profitability analysis for transformation of accelerator-bound OpenMP loops"
  ACM TACO: Transactions on Architecture and Code Optimization, 2019
  A. Chikin , T. Lloyd, J. N. Amaral, E. Tiotto and M. Usman
- "Toward an Analytical Performance Model to Select between GPU and CPU Execution" HIPS 2019, May 20, Rio de Janeiro, Brazil
  A. Chikin , J. N. Amaral, K. Ali and E.Tiotto
- "OpenMP Code Offloading: Splitting GPU Kernels, Pipelining Communication and Computation, and Selecting Better Grid Geometries"
  WACCPD 2018, Nobember 11, Dallas, TX, USA
  A. Chikin , T. Gobran and J. N. Amaral
- "Automated GPU Grid Geometry Selection for OpenMP Kernels"
  WAMCA 2018, September 24-27th, Lyon, France
  T. Lloyd, **A. Chikin** , S. Kedia, D. Jain and J. N. Amaral
- "A Case for Better Integration of Host and Target Compilation When Using OpenCL for FPGAs" FSP 2017, October 26th, Ghent, Belgium
  T. Lloyd, **A. Chikin** , E. Ochoa, K. Ali and J. N. Amaral