Yifan Sun

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Education

Northeastern University — *Boston, MA*

Ph.D. in Computer Engineering — *Sep. 2013 - Present*

University at Buffalo — *Buffalo, NY*

M.S. in Electrical Engineering — *Sep. 2011 - Jun. 2013*

Huazhong University of Science and Technology — *Wuhan, China*

B.S. in Electrical Engineering — *Sep. 2007 - Jun. 2011*

Skills

Programming C/C++, Go, Python, Java, C#, PHP, Javascript, OpenCL, CUDA, SQL

Working Experience

Dell EMC — *Hopkinton, MA*

Engineer (Co-op) — *Jul. 2016 - Dec.2016*

- Invented a system that enables fine-grained GPU sharing on a GPU datacenter to improve GPU utilization
- Developed a library and a server daemon that runs CUDA program on remote server without changing the code
- Designed a mechanism allowing scale-out at runtime and allowing the datacenter to balance workload
- Applied 6 related IPs from this project and initiated a new research direction for the group

Professional Experience

Multi2Sim – HSA, a Heterogeneous System Architecture Emulator — *Northeaster University, Boston, MA*

Mar. 2014 – Jun. 2016

- Developed an HSA emulator that emulates the memory hierarchy, register file, and instruction execution of an HSA platform
- Implemented a full HSA runtime and HSA device driver to enable the simulation of CPU-GPU interaction
- Simulated a unified memory space between CPU and GPU devices
- Implemented a Best-fit memory manager and provided interface for other parts in Multi2Sim
- Presented a workshop tutorial at IISWC 2016

Hetero-Mark, a Benchmark Suite for CPU-GPU Collaborative Computing — *Northeaster University, Boston, MA*

Jan. 2015 - Present

- Summarized CPU-GPU collaborative programming design patterns and provided benchmarks for each pattern
- Developed benchmarks including FIR, AES, PageRank, KMeans, and etc.
- Implemented other benchmarks with HC++, HIP, OpenCL, and CUDA, in the CPU-GPU collaborative manner
- Published papers in ISPASS2018, IISWC 2016 (best paper candidate) and ISPASS 2016

Teaching

Spring 2018	**EECE2560**: Fundamentals of Engineering Algorithms	*Northeastern University*
Fall 2017	**EECE2160**: Embedded Design Enabling Robotics	*Northeastern University*

Publications

- Saiful A. Mojumder, Marcia S Louis, Yifan Sun, Amir Kavyan Ziabari, Jose L. Abellan, John Kim, David Kaeli, Ajay Joshi, "Profiling DNN Workloads on a Volta-based DGX-1 System", 2018 IEEE International Symposium on Workload Characterization (IISWC)

- Rozhin Doroudi, Rana Azghandi, Zlatan Feric, Omic Mohaddesi, Yifan Sun, Jacqueline Griffin, Ozlem Ergun, David Kaeli, Pedro Sequeira, Stacy Marsella, Casper Harteveld, "An Integrated Simulation Framework For Examining Resiliency in Pharmaceutical Supply Chains Considering Human Behavior", 2018 Winter Simulation Conference (WinterSim)
- Yifan Sun, Saoni Mukherjee, Trinayan Baruah, Shi Dong, Julian Gutierrez, Prannoy Mohan, and David Kaeli. "Evaluating Performance Tradeoffs on the Radeon Open Compute Platform." In IEEE International Symposium on Performance Analysis of Systems and Software.
- **[Best Paper Award]** Shi Dong, Gong Xiang, Yifan Sun, Trinayan Baruah, David Kaeli. "Characterizing the Microarchitectural Implications of a Convolutional Neural Network (CNN) on GPUs", In ACM International Conference on Performance Engineering.
- Trinayan Baruah, Yifan Sun, Shi Dong, David Kaeli, and Norm Rubin. "Airavat : Improving Energy Efficiency of Heterogeneous Applications", In Design, Automation & Test in Europe Conference & Exhibition (DATE).
- Leiming Yu, Xun Gong, Yifan Sun, Qianqian Fang, Norm Rubin, and David Kaeli. "Moka: Model-based concurrent kernel analysis." In 2017 IEEE International Symposium on Workload Characterization (IISWC), pp. 197-206. IEEE, 2017.
- **[Best Paper Candidate]** Yifan Sun, Xiang Gong, Amir Kavyan Ziabari, Leiming Yu, Xiangyu Li, Saoni Mukherjee, Carter McCardwell, Alejandro Villegas, and David Kaeli. "Hetero-mark, a benchmark suite for CPU-GPU collaborative computing." In Workload Characterization (IISWC), 2016 IEEE International Symposium on, pp. 1-10. IEEE, 2016.
- Yifan Sun, Chisheng Liang, Steven Sutherland, Casper Harteveld, and David Kaeli. "Modeling player decisions in a supply chain game." In Computational Intelligence and Games (CIG), 2016 IEEE Conference on, pp. 1-8. IEEE, 2016.
- Amir Kavyan Ziabari, Yifan Sun, Yenai Ma, Dana Schaa, José L. Abellán, Rafael Ubal, John Kim, Ajay Joshi, and David Kaeli. "UMH: A hardware-based unified memory hierarchy for systems with multiple discrete gpus." ACM Transactions on Architecture and Code Optimization (TACO) 13, no. 4 (2016): 35.
- Saoni Mukherjee, Yifan Sun, Paul Blinzer, Amir Kavyan Ziabari, and David Kaeli. "A comprehensive performance analysis of HSA and OpenCL 2.0." In Performance Analysis of Systems and Software (ISPASS), 2016 IEEE International Symposium on, pp. 183-193. IEEE, 2016.
- Abdulla K. Al-Ali, Yifan Sun, Marco Di Felice, Jarkko Paavola, and Kaushik R. Chowdhury. "Accessing spectrum databases using interference alignment in vehicular cognitive radio networks." IEEE Transactions on Vehicular Technology 64, no. 1 (2015): 263-272.
- Yifan Sun, and Kaushik R. Chowdhury. "Enabling emergency communication through a cognitive radio vehicular network." IEEE Communications Magazine 52, no. 10 (2014): 68-75.
- Jithin Jagannath, Anu Saji, Hovannes Kulhandjian, Yifan Sun, Emrecan Demirors, and Tommaso Melodia. "A hybrid MAC protocol with channel-dependent optimized scheduling for clustered underwater acoustic sensor networks." In Proceedings of the Eighth ACM International Conference on Underwater Networks and Systems, p. 3. ACM, 2013.
- **[Best Student Paper Award]** Yifan Sun, and Tommaso Melodia. "The internet underwater: An IP-compatible protocol stack for commercial undersea modems." In Proceedings of the Eighth ACM International Conference on Underwater Networks and Systems, p. 37. ACM, 2013.

Book Chapters

- "Simulating HSA," S. Hung, T.B. Jablin, Y. Sun, R. Ubal, and D. Kaeli, a book chapter in Heterogeneous System Architecture: Practical Applications for Industry, 1st edition, Elsevier Nov. 2015.

Talks

- "Benchmarking the New Unified Memory OF CUDA 8", with Frank Zhao. GTC 2017 San Jose.
- "Multi2Sim 5.0" Tutorial at IISWC, September 2016.