

Yifan Sun

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Education

Northeastern University

PH.D. IN COMPUTER ENGINEERING

Boston, MA

Sep. 2013 - Present

University at Buffalo

M.S. IN ELECTRICAL ENGINEERING

Buffalo, NY

Sep. 2011 - Jun. 2013

Huazhong University of Science and Technology

B.S. IN ELECTRICAL ENGINEERING

Wuhan, China

Sep. 2007 - Jun. 2011

Working Experience

AMD

SOFTWARE DEVELOPER (CO-OP)

Boxborough, MA

Jul. 2018 - Dec. 2018

Dell EMC

SOFTWARE DEVELOPER (CO-OP)

Hopkinton, MA

Jul. 2016 - Dec. 2016

Teaching

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

Northeastern University

Northeastern University

Publications

- **Yifan Sun**, Trinayan Baruah, Saiful A Mojumder, Shi Dong, Rafael Ubal, Xiang Gong, Shane Treadway, Yuhui Bao, Vincent Zhao, José Luis Abellán, John Kim, Ajay Joshi, David Kaeli, "MGSim+ MGMark: A Framework for Multi-GPU System Research", arXiv preprint arXiv:1811.02884
- 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 Hartevel, "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 Hartevel, 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**, Emre Can Demircors, 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.

Patent

- Yifan Sun, Layne Peng, Jr. Robert A. Lincourt, John Cardente, John S Harwood. "Queue-based GPU virtualization and management system", US 10,109,030

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.

Selected Media Coverage

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| News@Northeastern | A Student Went off to Do a Co-op at a Major Tech Firm. He Came Back With a Patent. |
| WIRED | Finally, the Underwater We've All Been Waiting For |
| NBC News | Deep-sea Internet to Detect Tsunamis, Spy on Smugglers, and Discover Oil |

Services

Web Chair Annual Workshop on General Purpose Processing using Graphics Processing Unit (GPGPU)

2016

Skills

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

Professional Experience

Multi2Sim – HSA, a Heterogeneous System Architecture Emulator

Northeastern 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

Northeastern 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