

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

Awards

2019 ACM Student Travel Grant for ISCA 2019

2019 Northeastern University Outstanding Graduate Student in Experiential Learning

2019 Northeastern University College of Engineering Teaching Award

2018 ICPE Best Paper Award

2016 NSF Student Travel Grant for IISWC 2016

2013 WUWNET Best Student Paper Award

Publications

Yifan Sun, Trinayan Baruah, Saiful A. Mujumder, Shi Dong, Xiang Gong, Shane Treadway, Yuhui Bao, Spencer Hance, Carter McCardwell, Vincent Zhao, Harrison Barclay, Amir Kavyan Ziabari, Zhongliang Chen, Rafael Ubal, José L. Abellán, John Kim, Ajay Joshi, and David Kaeli. 2019. **MGPUSim: Enabling Multi-GPU Performance Modeling and Optimization**. International Symposium on Computer Architecture (ISCA).

Mohammad Khavari Tavana, Yifan Sun, Nicolas Bohm Agostini, and David Kaeli. 2019. **Exploiting Adaptive Data Compression to Improve Performance and Energy-efficiency of Compute Workloads in Multi-GPU Systems**. IEEE International Parallel & Distributed Processing Symposium (IPDPS).

Yifan Sun, Trinayan Baruah, Shi Dong, and David Kaeli. 2019. **MGSim: A Flexible High-Performance Simulator for Multi-GPU Systems**. International Workshop on OpenCL (IWOCCL).

Yifan Sun, Trinayan Baruah, Saiful A. Mujumder, Shi Dong, Rafael Ubal, Xiang Gong, Shane Treadway, Yuhui Bao, Vincent Zhao, José Luis Abellán, John Kim, Ajay Joshi, and David Kaeli. 2019. **MGSim+MGMark: A Framework for Multi-GPU System Research**. arXiv preprint arXiv:1811.02884.

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

Rozhin Doroudi, Rana Azghandi, Zlatan Ferić, Omic Mohaddesi, Yifan Sun, Jacqueline Griffin, Ozlem Ergun, David Kaeli, Pedro Sequeira, Stacy Marsella, and Casper Hartevelde. 2018. **An Integrated Simulation Framework for Examining Resiliency in Pharmaceutical Supply Chains Considering Human Behavior**. Winter Simulation Conference (WinterSim).

Yifan Sun, Saoni Mukherjee, Trinayan Baruah, Shi Dong, Julian Gutierrez, Prannoy Mohan, and David Kaeli. 2018. **Evaluating Performance Tradeoffs on the Radeon Open Compute Platform**. IEEE International Symposium on Performance

Analysis of Systems and Software (ISPASS).

[**Best Paper Award**] Shi Dong, Gong Xiang, [Yifan Sun](#), Trinayan Baruah, and David Kaeli. 2018. **Characterizing the Microarchitectural Implications of a Convolutional Neural Network (CNN) on GPUs**. ACM International Conference on Performance Engineering (ICPE).

Trinayan Baruah, [Yifan Sun](#), Shi Dong, David Kaeli, and Norm Rubin. 2018. **Airavat : Improving Energy Efficiency of Heterogeneous Applications**, Design, Automation & Test in Europe Conference & Exhibition (DATE).

Leiming Yu, Xun Gong, [Yifan Sun](#), Qianqian Fang, Norm Rubin, and David Kaeli. 2017. **Moka: Model-based Concurrent Kernel Analysis**. IEEE International Symposium on Workload Characterization (IISWC).

[**Best Paper Candidate**] [Yifan Sun](#), Xiang Gong, Amir Kavvan Ziabari, Leiming Yu, Xiangyu Li, Saoni Mukherjee, Carter McCardwell, Alejandro Villegas, and David Kaeli. 2016. **Hetero-Mark, a Benchmark Suite for CPU-GPU Collaborative Computing**. IEEE International Symposium on Workload Characterization (IISWC).

[Yifan Sun](#), Chisheng Liang, Steven Sutherland, Casper Harteveld, and David Kaeli. 2016. **Modeling Player Decisions in a Supply Chain Game**. IEEE Conference on Computational Intelligence and Games (CIG).

Amir Kavvan Ziabari, [Yifan Sun](#), Yenai Ma, Dana Schaa, José L. Abellán, Rafael Ubal, John Kim, Ajay Joshi, and David Kaeli. 2016. **UMH: A Hardware-based Unified Memory Hierarchy for Systems with Multiple Discrete GPUs**. ACM Transactions on Architecture and Code Optimization (TACO).

Saoni Mukherjee, [Yifan Sun](#), Paul Blinzer, Amir Kavvan Ziabari, and David Kaeli. 2016. **A Comprehensive Performance Analysis of HSA and OpenCL 2.0**. IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS).

Abdulla K. Al-Ali, [Yifan Sun](#), Marco Di Felice, Jarkko Paavola, and Kaushik R. Chowdhury. 2015. **Accessing Spectrum Databases using Interference Alignment in Vehicular Cognitive Radio Networks**. IEEE Transactions on Vehicular Technology.

[Yifan Sun](#), and Kaushik R. Chowdhury. 2015. **Enabling Emergency Communication through a Cognitive Radio Vehicular Network**. IEEE Communications Magazine.

Jithin Jagannath, Anu Saji, Hovannes Kulhandjian, [Yifan Sun](#), Emrehan Demirs, and Tommaso Melodia. 2013. **A Hybrid MAC Protocol with Channel-Dependent Optimized Scheduling for Clustered Underwater Acoustic Sensor Networks**. ACM International Conference on Underwater Networks and Systems (WUWNET).

[**Best Student Paper Award**] [Yifan Sun](#), and Tommaso Melodia. **The internet underwater: An IP-compatible Protocol Stack for Commercial Undersea Modems**. ACM International Conference on Underwater Networks and Systems(WUWNET).

Patents

[Yifan Sun](#), Layne Peng, Robert A. Lincourt JR., John Cardente, and Junping Zhao. (Jun. 2019). **Managing access to a resource pool of graphics processing units under fine grain control**. Patent No. US 10,262,390, Filed Apr. 14th., 2017, Issued Jun. 27th., 2019.

Junping Zhao, Layne Peng, Jie Bao, Kun Wang, and [Yifan Sun](#). (Apr. 2019). **Checkpointing for GPU-as-a-Service in Cloud Computing Environment**, Patent No. US 10,275,851, Filed Apr. 25th., 2017, Issued Apr. 30th., 2019.

[Yifan Sun](#), Layne Peng, Robert A. Lincourt JR., John Cardente, John S Harwood. (Oct. 2018). **Queue-based GPU Virtualization and Management System**. Patent No. US 10,109,030, Filed Dec. 27th., 2016, Issued Oct. 23rd., 2018.

Book Chapters

Shih-Hao Hung, Thomas B. Jablin, [Yifan Sun](#), Rafael Ubal, and David Kaeli. 2015. **HSA Simulators**. A book chapter in Heterogeneous System Architecture: Practical Applications for Industry, 1st edition, Elsevier Nov. 2015.

Open-Source Software

MGPUSim (<https://gitlab.com/akita/gcn3>)

Multi-GPU system simulator based on AMD GCN3 GPUs

Akita (<https://gitlab.com/akita/akita>)

High-flexibility, high-performance, parallel computer architecture framework

Hetero-Mark (<https://github.com/NUCAR-DEV/Hetero-Mark>)

Benchmark suite for CPU-GPU collaborative computing

Talks and Tutorials

Tutorial on the Akita Simulator Framework and MGPUSim. With Trinayan Baruah, Shi Dong, and David Kaeli. To be presented at HPCA 2020.

Research in the NUCAR Laboratory at Northeastern University. FutureWei. With David Kaeli. July 2019.

MGPUSim: a Flexible High-Performance Simulator for Multi-GPU Systems. International Workshop on OpenCL (IWOCCL). May 2019.

AKITA: A Go-Based Computer Architecture Simulator Framework. Google. May 2019.

Enabling Multi-GPU High Performance Computing with Memory System Design. Lighting talk at Boston University Red Hat Collaboratory. Feb. 2019.

Benchmarking the New Unified Memory of CUDA 8. With Frank Zhao. GTC 2017 San Jose. Aug. 2017.

Multi2Sim 5.0 Tutorial at IISWC. Sep. 2016.

Teaching

NORTHEASTERN UNIVERSITY, BOSTON, MA

Fundamental Digital Design and Computer Organization

Fall 2019

Co-instructor. With Dr. Pereira da Silva Aloizio

Intermediate-level Undergraduate Course (3rd year)

Fundamentals of Engineering Algorithms

Spring 2018

Instructor

Intermediate-level Undergraduate Course (3rd year)

Instructor Effectiveness 4.4 out of 5

Embedded Design Enabling Robotics

Fall 2017

Instructor

Intermediate-level Undergraduate Course (2nd year)

Instructor Effectiveness 4.6 out of 5

Industry Experience

AMD, Software Engineer (Co-op)

Boxborough, MA

Performance modeling and graphics simulator development for AMD Navi GPU

Jul. 2018 - Dec. 2018

Dell EMC, Software Engineer (Co-op)

Hopkinton, MA

Cloud-based GPU-as-a-service system design, development, and deployment

Jul. 2016 - Dec. 2016

Selected Media Coverage

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 Workshop on General Purpose Processing using Graphics Processing Unit (GPGPU)

2016