

Yifan Sun

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Academic Appointments

Assistant Professor

Computer Science, William & Mary

Williamsburg, VA

Aug. 2020 - Present

Education

Northeastern University

Ph.D. in Computer Engineering

Boston, MA

Sep. 2013 - Aug. 2020

University at Buffalo

M.S. in Electrical Engineering

Buffalo, NY

Sep. 2011 - Jun. 2013

Huazhong University of Science and Technology

B.Eng. in Electrical Engineering

Wuhan, China

Sep. 2007 - Jun. 2011

Wuhan University

Bachelor in Business Administration (Minor)

Wuhan, China

Sep. 2008 - Jun. 2011

Industry Experience

AMD, Software Engineer (Co-op)

Performance modeling and graphics simulator development for AMD Navi GPUs

Boxborough, MA

Jul. 2018 - Dec. 2018

Dell EMC, Software Engineer (Co-op)

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

Hopkinton, MA

Jul. 2016 - Dec. 2016

Awards

2019	Outstanding Graduate Student in Experiential Learning, Northeastern University	Boston, MA
2019	Teaching Award, Northeastern University College of Engineering	Boston, MA
2018	Best Paper Award, ICPE	Berlin, Germany
2016	Best Paper Candidate, IISWC	Providence, RI
2013	Best Student Paper Award, WUWNET	Kaohsiung, Taiwan

Grants and Supports

AMD ROCm and HIP Platform Development

AMD, Gift

\$60,000

Mar. 2022

Exploring Interpretable Deep Learning from Information Theoretic Perspective: Modeling and Applications

Neocortex, Pittsburgh Supercomputing Center

PI: Huajie Shao, [Yifan Sun](#)

Access to Cerebras Wafer-Scale Computing Devices

Feb. 2022

Developing Infrastructure for Advancing Research and Teaching in Security and Reliability

Coastal Virginia Center for Cyber Innovation (COVA CCI)

PI: Dmitry Evtyushkin, Co-PI: Evgenia Smirni, [Yifan Sun](#), Adwait Nadkarni

\$79,670

Dec. 2021

Publications

Underscore—Myself

Peer-reviewed Conference Publications

1. Yixuan Zhang, Yifan Sun, Joseph D Gaggiano, Neha Kumar, Clio Maria Adris, and Andrea G Parker. 2022. **Visualization Design Practices in a Crisis: Behind the Scenes with COVID-19 Dashboard Creators**. IEEE Transactions on Visualization and Computer Graphics (IEEEVis '22). [Acceptance rate: 122/ 460 \approx 26.5%]
2. Yixuan Zhang, Nurul Suhaimi, Nutchanon Yongsatianchot, Joseph D Gaggiano, Miso Kim, Shivani A Patel, Yifan Sun, Stacy Marsella, Jacqueline Griffin, and Andrea G Parker. 2022. **Shifting Trust: Examining How Trust and Distrust Emerge, Transform, and Collapse in COVID-19 Information Seeking**. In CHI Conference on Human Factors in Computing Systems (CHI '22), April 29-May 5, 2022, New Orleans, LA, USA. ACM, New York, NY, USA, 21 pages. [Top 12.5%; Acceptance rate: 638/ 2597 \approx 24.6%]
3. Yifan Sun, Yixuan Zhang, Ali Mosallaei, Michael D. Shah, Cody Dunne, David Kaeli. 2021. **Daisen: A Framework for Visualizing Detailed GPU Execution**. The 23rd EG Conference on Visualization (EuroVis '21). [Acceptance Rate \approx 26.0%]
4. Yixuan Zhang, Yifan Sun, Lace Padilla, Submit Barua, Enrico Bertini, Andrea G. Parker. 2021. **Mapping the Landscape of COVID-19 Crisis Visualizations**. The ACM conference on Human Factors in Computing Systems (CHI '21). ACM. [Acceptance rate \approx 26.3%]
5. Trinayan Baruah, Kaustubh Shivdikar, Shi Dong, Yifan Sun, Saiful A. Mojumder, Kihoon Jung, José L. Abellán, Yash Ukidave, Ajay Joshi, John Kim, David Kaeli. 2021. **GNNMark: A Benchmark Suite to Characterize Graph Neural Network Training on GPUs**. 2021 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS '21). IEEE. [Acceptance rate \approx 36.9%]
6. Trinayan Baruah, Yifan Sun, Saiful A. Mojumder, José L. Abellán, Yash Ukidave, Ajay Joshi, Norman Rubin, John Kim, David Kaeli. 2020. **Valkyrie: Leveraging Inter-TLB Locality to Enhance GPU Performance**. In Proceedings of the 29th International Conference on Parallel Architectures and Compilation Techniques (PACT '20). ACM. Atlanta, GA, USA, 455-466. [Acceptance rate \approx 25.9%]
7. [**Honorable Mention (<5%)**] Omid Mohaddesi, Yifan Sun, Rana Azghandi, Rozhin Doroudi, Sam Snodgrass, Ozlem Ergun, Jacqueline Griffin, David Kaeli, Stacy Marsella, Casper Hartevelde. 2020. **Introducing Gamettes: A Playful Approach for Capturing Decision-Making for Informing Behavioral Models**. The ACM Conference on Human Factors in Computing Systems (CHI '20). ACM. Honolulu, HI, USA, 1-13. [Acceptance rate \approx 24.3%]
8. Trinayan Baruah, Yifan Sun, Ali Tolga Dinçer, Saiful A. Mojumder, José Luis Abellán, Yash Ukidave, Ajay Joshi, Norman Rubin, John Kim, David Kaeli. 2020. **Griffin: Hardware-Software Support for Efficient Page Migration in Multi-GPU Systems**. In Proceedings of the 26th IEEE International Symposium on High-Performance Computer Architecture (HPCA '20). IEEE. San Diego, CA, USA, 596-609. [Acceptance rate \approx 19.4%]
9. Yifan Sun, Trinayan Baruah, Saiful A. Mojumder, Shi Dong, Xiang Gong, Shane Treadway, Yuhui Bao, Spencer Hance, Carter McCardwell, Vincent Zhao, Harrison Barclay, Amir Kavvan Ziabari, Zhongliang Chen, Rafael Ubal, José L. Abellán, John Kim, Ajay Joshi, and David Kaeli. 2019. **MGPUSim: Enabling Multi-GPU Performance Modeling and Optimization**. In Proceedings of the 46th International Symposium on Computer Architecture (ISCA '19). ACM, New York, NY, USA, 197-209. [Acceptance rate \approx 17.0%]
10. 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**. In Proceed-

ings of the 33rd IEEE International Parallel and Distributed Processing Symposium (IPDPS '19). IEEE, Rio de Janeiro, Brazil, 664-674 [Acceptance rate \approx 27.7%]

11. Saiful A Mojumder, Marcia S Louis, [Yifan Sun](#), Amir Kavyan Ziabari, José L Abellán, John Kim, David Kaeli, and Ajay Joshi. 2018. **Profiling DNN Workloads on a Volta-based DGX-1 System**. In Proceedings of the 2018 IEEE International Symposium on Workload Characterization (IISWC '18). IEEE, Raleigh, North Carolina, USA, 122-133. [Acceptance rate \approx 36.2%]
12. Rozhin Doroudi, Rana Azghandi, Zlatan Feric, Omid 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**. In Proceedings of the 2018 Winter Simulation Conference (WSC '18). ACM, Gothenburg, Sweden, 88-99. [Acceptance rate \approx 70.4%]
13. [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**. In Proceedings of the 2018 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS '18). IEEE, Belfast, Northern Ireland, United Kingdom, 209-218. [Acceptance rate \approx 31.3%]
14. [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**. In Proceedings of the 2018 ACM International Conference on Performance Engineering (ICPE '18). ACM, Berlin, Germany, 96-106. [Acceptance rate = 24.0%]
15. Trinayan Baruah, [Yifan Sun](#), Shi Dong, David Kaeli, and Norm Rubin. 2018. **Airavat : Improving Energy Efficiency of Heterogeneous Applications**. In Proceedings of the 2018 Design, Automation & Test in Europe Conference & Exhibition (DATE '18). IEEE, Dresden, Germany, 731-736. [Acceptance rate \approx 24.2%]
16. Leiming Yu, Xun Gong, [Yifan Sun](#), Qianqian Fang, Norm Rubin, and David Kaeli. 2017. **Moka: Model-based Concurrent Kernel Analysis**. In Proceedings of the 2017 IEEE International Symposium on Workload Characterization (IISWC '17). IEEE, Seattle, Washington, USA, 197-206. [Acceptance rate \approx 27.7%]
17. [Best Paper Candidate] [Yifan Sun](#), Xiang Gong, Amir Kavyan 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**. In Proceedings of the 2016 IEEE International Symposium on Workload Characterization (IISWC '16). IEEE, Providence, Rhode Island, USA, 1-10. [Acceptance rate \approx 30.4%]
18. [Yifan Sun](#), Chisheng Liang, Steven Sutherland, Casper Hartevelde, and David Kaeli. 2016. **Modeling Player Decisions in a Supply Chain Game**. In Proceedings of the 2016 IEEE Conference on Computational Intelligence and Games (CIG '16). IEEE, Santorini, Greece, 1-8. [Acceptance rate unknown]
19. Saoni Mukherjee, [Yifan Sun](#), Paul Blinzer, Amir Kavyan Ziabari, and David Kaeli. 2016. **A Comprehensive Performance Analysis of HSA and OpenCL 2.0**. In Proceedings of the 2016 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS '16). IEEE, Uppsala, Sweden, 183-193. [Acceptance rate \approx 35.1%]
20. Jithin Jagannath, Anu Saji, Hovannes Kulhandjian, [Yifan Sun](#), Emre Can Demirors, and Tommaso Melodia. 2013. **A Hybrid MAC Protocol with Channel-Dependent Optimized Scheduling for Clustered Underwater Acoustic Sensor Networks**. In Proceedings of the 8th ACM International Conference on Underwater Networks and Systems (WUWNET). ACM, Kaohsiung, Taiwan, Article 3, 8 pages. [Acceptance rate = 20.0%]
21. [Best Student Paper Award] [Yifan Sun](#), and Tommaso Melodia. 2013. **The internet underwater: An IP-compatible Protocol Stack for Commercial Undersea Modems**. In Proceedings of the 8th ACM International Conference on Underwater Networks and Systems (WUWNET). ACM, Kaohsiung, Taiwan, Article 37, 8 pages. [Acceptance rate = 20.0%]

Journal Publications

1. Shi Dong, Yifan Sun, Nicolas Bohm Agostini, Elmira Karimi, Daniel Lowell, Jing Zhou, José Cano, José L. Abellán, David Kaeli. 2021. **Spartan: A Sparsity-Adaptive Framework to Accelerate Deep Neural Network Training on GPUs**. IEEE

Transactions on Parallel and Distributed Systems (TPDS) 32, 10 (October 2021), 2448-2463.

2. Rozhin Doroudi, Pedro Sequeira, Stacy Marsala, Ozlem Ergun, Rana Azghandi, David Kaeli, [Yifan Sun](#), Jacqueline Griffin. 2019. **Effects of Trust-Based Decision Making in Disrupted Supply Chains**. PloS One 15, no. 2 (2020): e0224761
3. Chen Li, [Yifan Sun](#), Lingling Jin, Lingjie Xu, Zheng Cao, Pengfei Fan, David Kaeli, Sheng Ma, Yang Guo, and Jun Yang. 2019. **Priority-Based PCIe Scheduling for Multi-Tenant Multi-GPU System**. IEEE Computer Architecture Letters (CAL) 18, 2 (July-Dec. 1 2019), 157-160.
4. 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) 13, 4 Article 35 (December 2016), 25 pages.
5. 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 64, 1 (2014), 263-272.
6. [Yifan Sun](#), and Kaushik R. Chowdhury. 2015. **Enabling Emergency Communication through a Cognitive Radio Vehicular Network**. IEEE Communications Magazine 52, 10 (2014), 68-75.

Book Chapters

1. 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.

Patents

1. Junping Zhao, [Yifan Sun](#), Layne Peng, Jie Bao, Kun Wang. (Jan. 2021). **Intelligent data coordination for accelerated computing in cloud environment**. Patent No. US 10,891,156, Filed Apr 26, 2017, Issued Jan 12, 2021.
2. [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 14, 2017, Issued Jun 27, 2019.
3. 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 25, 2017, Issued Apr 30, 2019.
4. [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 27, 2016, Issued Oct 23, 2018.

Workshop Publications

1. Chris Thames, Hang Yan, [Yifan Sun](#). 2022. **Understanding Wafer-Scale GPU Performance using an Architectural Simulator**. The 14th Workshop on General Purpose Processing using GPU (GPGPU 2022).
2. Yixuan Zhang, [Yifan Sun](#), Sumit Barua, Enrico Bertini, and Andrea Grimes Parker. 2020. **Mapping the Landscape of COVID-19 Crisis Visualizations**. Visualization for Communication (VisComm).
3. [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).

Preprints

1. Saiful A. Mojumder, [Yifan Sun](#), Leila Delshadtehrani, Yenai Ma, Trinayan Baruah, José L. Abellán, John Kim, David Kaeli, Ajay Joshi. 2020. **MGPU-TSM: A Multi-GPU System with Truly Shared Memory**. arXiv preprint arXiv:2008.02300.
2. Saiful A. Mojumder, [Yifan Sun](#), Leila Delshadtehrani, Yenai Ma, Trinayan Baruah, José L. Abellán, John Kim, David Kaeli, Ajay Joshi. 2020. **HALCONE: A Hardware-Level Timestamp-Based Cache Coherence Scheme for Multi-GPU Systems**. arXiv preprint arXiv:2007.04292.

3. [Yifan Sun](#), Nicolas Bohm Agostini, Shi Dong, and David Kaeli. 2019. **Summarizing CPU and GPU Design Trends with Product Data**. arXiv preprint arXiv:1911.11313.
4. [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, and David Kaeli. 2019. **MGSim+MGMark: A Framework for Multi-GPU System Research**. arXiv preprint arXiv:1811.02884.

Open-Source Software & Software

1. **The CHIP Dataset** (<https://chip-dataset.vercel.app/>)
Dataset with 2185 CPUs and 2668 GPUs.
Help researchers understand the semiconductor development trends.
2. **MGPUSim** (<https://gitlab.com/akita/mgpusim>)
Multi-GPU system simulator based on AMD GCN3 GPUs.
3. **Akita** (<https://gitlab.com/akita/akita>)
High-flexibility, high-performance, parallel computer architecture simulation framework.
4. **Hetero-Mark** (<https://github.com/NUCAR-DEV/Hetero-Mark>)
Benchmark suite for CPU-GPU collaborative computing.
5. **Drug Supply Chain Simulator** (<https://gitlab.com/syifan/crisp>)
Human-in-the-loop logistics simulator for the U.S. drug supply chain.
6. **VistaLights** (<https://github.com/syifan/VistaLights>)
Strategic game for maritime traffic management and disaster relief.

Talks and Tutorials

1. **MGPUSim: A One-Stop Solution for GPU Architecture Simulation**
The 2020 International Conference on High Performance Computing & Simulation (HPCS '20). Jan 2021.
2. **MGPUSim: A High-Flexibility, High-Performance, Multi-GPU Simulator**
Alibaba. July 2020.
3. **Exploring Multi-GPU Simulation and Visual Profiling with MGPUSim**
With José L. Abellán, Trinayan Baruah, and David Kaeli. Tutorial at ISCA 2020. May 2020.
4. **Collaborative Heterogeneous Computing**
William & Mary. March 2020.
University of California, Santa Cruz. March 2020.
University of Pittsburgh. March 2020.
University of Central Florida. March 2020.
5. **Tutorial on the Akita Simulator Framework and MGPUSim**
With Trinayan Baruah, Shi Dong, and David Kaeli. Tutorial at HPCA 2020. February 2020.
6. **Research in the NUCAR Laboratory at Northeastern University**
FutureWei. With David Kaeli. July 2019.
7. **MGPUSim: a Flexible High-Performance Simulator for Multi-GPU Systems**
International Workshop on OpenCL (IWOCCL). May 2019.
8. **AKITA: A Go-Based Computer Architecture Simulator Framework**
Google. May 2019.
9. **Enabling Multi-GPU High Performance Computing with Memory System Design**
Lighting talk at Boston University Red Hat Collaboratory. February 2019.

10. **Benchmarking the New Unified Memory of CUDA 8**

With Frank Zhao. GTC 2017 San Jose. August 2017.

11. **Multi2Sim 5.0**

Tutorial at IISWC 2016. September 2016.

Teaching

William & Mary, Williamsburg, VA

Data Visualization

Spring 2022

Instructor

Ph.D.-level Course

Topics in Computer Architecture

Spring 2021

Instructor

Ph.D.-level Course

Computational Problem Solving

Fall 2020, Fall 2021, Fall 2022

Instructor

Undergraduate's First Python Programming Course (1st - 2nd year)

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)

Redesigned the course ("I have learned a lot in this course": 4.7 out of 5)

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

Selected Media Coverage

William & Mary News

Misinformation examination: How trust and distrust shift during COVID-19

WYDaily

W&M Professor Helps Medical Experts Study COVID-19 With GPUs

William & Mary News

Sun is Teaching COVID-19 Researchers How to Use High-Performance AMD Computers

HiPEAC info 58

MGPUSim announced at ISCA 2019

News@Northeastern

Yifan Sun and NUCAR Research Lab featured in HiPEAC News

College of Engineering

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

Service

Program Committee	IEEE 34rd International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD '22)	2022
Program Committee	The 40th IEEE International Conference on Computer Design (ICCD '22)	2022
Program Committee	The 29th IEEE International Symposium on High-Performance Computer Architecture (HPCA-29)	2022
Program Committee	4th Workshop on Accelerated Machine Learning (AccML)	2022
Panelist	NSF CISE Office of Advanced Cyberinfrastructure (OAC)	2022
Co-Chair	The 14th Workshop on General Purpose Processing Using GPU (GPGPU 2022)	2022
Workshop/Tutorial Chair	The 28th IEEE International Symposium on High-Performance Computer Architecture (HPCA-28)	2022
Program Committee	IEEE 33rd International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD '21)	2021
Program Committee	The 39th IEEE International Conference on Computer Design (ICCD '21)	2021
Program Committee	The 38th IEEE International Conference on Computer Design (ICCD '20)	2020
Program Committee	The 13th Workshop on General Purpose Processing Using GPU (GPGPU 2020)	2019
Web Chair	The 9th Workshop on General Purpose Processing Using GPU (GPGPU 2016)	2016

Ad-hoc Reviewer

Reviewer	ACM Transactions on Architecture and Code Optimization (TACO)	2022
Reviewer	Future Generation Computer Systems	2021
Reviewer	IEEE Transactions on Very Large Scale Integration Systems	2021
Reviewer	IEEE Transactions on Parallel and Distributed Systems	2021
Reviewer	ACM Transactions on Architecture and Code Optimization (TACO)	2021
Reviewer X2	IEEE Computer Architecture Letters	2021
Reviewer	Journal of Parallel and Distributed Computing	2020
Reviewer	IEEE Transactions on Parallel and Distributed Systems	2020
Reviewer	IEEE Transactions on Computers	2020
Reviewer	ACM Transactions on Architecture and Code Optimization (TACO)	2020

Service @ William & Mary

Committee Member	Computer Science Department Colloquium Committee	2022 - 2023
Committee Member	Computer Science Department Graduate Admissions Committee	2022 - 2023
Committee Member	Computer Science Department Graduate Recruiting Committee	2022 - 2023
Committee Member	Computer Science Department System Committee	2022 - 2023
Co-chair	Computer Science Department Web Presence Committee	2022 - 2023
Committee Member	S. Laurie Sanderson Awards for Excellence in Undergraduate Mentoring Committee	2022
Committee Member	Computer Science Department Undergraduate Curriculum Committee	2021 - 2022
Committee Member	Computer Science Department Graduate Recruiting Committee	2021 - 2022
Committee Member	Computer Science Department Web Presence Committee	2021 - 2022