Yifan Sun

McGlothlin-Street Hall 117, Williamsburg, VA 23185

📱 (+1) 716-868-2480 | ✉ ysun25@wm.edu | 🏠 syifan.github.io

Academic Appointments

Assistant Professor   Williamsburg, VA
Computer Science, William & Mary   Aug. 2020 - Present

Education

Northeastern University   Boston, MA
Ph.D. in Computer Engineering   Sep. 2013-Aug. 2020

University at Buffalo   Buffalo, NY
M.S. in Electrical Engineering   Sep. 2011-Jun. 2013

Huazhong University of Science and Technology   Wuhan, China
B.Eng. in Electrical Engineering   Sep. 2007-Jun. 2011

Wuhan University   Wuhan, China
Bachelor in Business Administration (Minor)   Sep. 2008-Jun. 2011

Industry Experience

AMD, Software Engineer (Co-op)   Boxborough, MA
Performance modeling and graphics simulator development for AMD Navi GPUs   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

Awards

2023	**Best Paper Award**, CHI'23	Hamburg, Germany
2020	**Best Paper Honorable Mention**, CHI'20	Honolulu, HI, USA
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

Underline—Myself

I have acquired research funding that totals ≈$952,000 at William & Mary.

Enabling GPU Performance Simulation for Large-Scale Workloads with Lightweight Simulation Methods   ≈ $1.2M, W&M ≈ 376,000
NSF, SHF Core, Medium
PI: *Yifan Sun*, Adwait Jog, Sreepathi Pai   Apr. 2023

Binary Instrumentation for GPU Programs on AMD Platforms.		$50,000
AMD, Gift, Sole PI		Dec. 2023

Binary Instrumentation for GPU Programs on AMD Platforms. — $50,000
AMD, Gift, Sole PI — Dec. 2023

HIP Development on AMD ROCm Platform. — $50,000
AMD, Gift, Sole PI — Dec. 2023

The Methods of Profiling and Tracing of GPU Programs Running on AMD ROCm Platforms. — $44,000
AMD, Gift, Sole PI — May. 2023

Building Explainable Architecture with Simulation and Visualization Techniques — $175,000
NSF, CRII, Sole PI — Feb. 2023

Enabling Computer Architecture as a Service — $100,000, W&M $\approx$ 73,000
NSF, CCRI (later renamed as CIRC), Planning-C
PI: <u>Yifan Sun</u>, Katherine E. Issacs (University of Utah) — Feb. 2023

AMD ROCm and HIP Platform Development — $60,000 + 2x AMD MI100 GPU
AMD, Gift, Sole PI — Mar. 2022

Exploring Interpretable Deep Learning from Information Theoretic Perspective: Modeling and Applications — Access to Cerebras Wafer-Scale Computing Devices
Neocortex, Pittsburgh Supercomputing Center
PI: Huajie Shao, <u>Yifan Sun</u> — Feb. 2022

Developing Infrastructure for Advancing Research and Teaching in Security and Reliability — $79,670
Coastal Virginia Center for Cyber Innovation (COVA CCI)
PI: Dmitry Evtyushkin, Co-PI: Evgenia Smirni, <u>Yifan Sun</u>, Adwait Nadkarni — Dec. 2021

AMD ROCm and HIP Platform Development — $40,000
AMD, Gift, Sole PI — Sep. 2021

General-Purpose Computing with AMD Graphics Processors — $40,000
AMD, Gift, Sole PI — Apr. 2021

Publications

<u>Underline</u>—Myself

Peer-Reviewed Publications in Systems

1. Ali Mosallaei, Katherine Isaacs, <u>Yifan Sun</u>. 2024. **Looking into the Black Box: Monitoring Computer Architecture Simulations in Real-Time with AkitaRTM**. In Proceedings of the 57th IEEE/ACM International Symposium on Microarchitecture. IEEE/ACM. Austin, Texas, USA. [Acceptance Rate 113/ 489 $\approx$ 22.7%]

2. Yichen Luo, Daoxuan Xu, Gang Zhou, <u>Yifan Sun</u>, Sidi Lu. 2024. **Impact of Raindrops on Camera-Based Detection in Software-Defined Vehicles.** 2nd IEEE International Conference on Mobility: Operations, Services, and Technologies (MOST '24)

3. Shaoyu Wang (co-first author), Hang Yan (co-first author), Katherine E. Isaacs, <u>Yifan Sun</u>. 2023. **Visual Exploratory Analysis for Designing Large-Scale Network-on-Chip Architectures: A Domain Expert-Led Design Study.** IEEE Transactions on Visualization and Computer Graphics (TVCG) 01 (2023), 1-13.

4. Ying Li, <u>Yifan Sun</u>, Adwait Jog. 2023. **Path Forward Beyond Simulators: Fast and Accurate DNN Execution Time Prediction.** The 56th IEEE/ACM International Symposium on Microarchitecture (MICRO '23). IEEE/ACM. Toronto, Canada,

13 pages. [Acceptance rate: 101/ 424 $\approx$ 23.8%]

5. Changxi Liu, <u>Yifan Sun</u>, Trevor E. Carlson. 2023. **Photon: A Fine-grained Sampled Simulation Methodology for GPU Workloads.** The 56th IEEE/ACM International Symposium on Microarchitecture (MICRO '23). IEEE/ACM. Toronto, Canada, 13 pages. [Acceptance rate: 101/ 424 $\approx$ 23.8%]

6. Yuhui Bao, <u>Yifan Sun</u>, Zlatan Feric, Michael Tian Shen, Micah Weston, José L Abellán, Trinayan Baruah, John Kim, Ajay Joshi, David Kaeli. 2022. **NaviSim: A Highly Accurate GPU Simulator for AMD RDNA GPUs.** The 31st International Conference on Parallel Architectures and Compilation Techniques (PACT '22). ACM. Chicago, IL, USA, 13 pages. [Acceptance rate: 50/ 118 $\approx$ 42.4%]

7. <u>Yifan Sun</u>, 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%]

8. 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 AccelerateDeep Neural Network Training on GPUs**. IEEE Transactions on Parallel and Distributed Systems (TPDS) 32, 10 (October 2021), 2448-2463.

9. Trinayan Baruah, Kaustubh Shivdikar, Shi Dong, <u>Yifan Sun</u>, 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. Stony Brook, NY, USA, 13-23. [Acceptance rate $\approx$ 36.9%]

10. Trinayan Baruah, <u>Yifan Sun</u>, 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%]

11. Trinayan Baruah, <u>Yifan Sun</u>, 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%]

12. Chen Li, <u>Yifan Sun</u>, 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.

13. <u>Yifan Sun</u>, Trinayan Baruah, Saiful A. Mojumder, 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**. In Proceedings of the 46th International Symposium on Computer Architecture (ISCA '19). ACM, New York, NY, USA, 197-209. [Acceptance rate $\approx$ 17.0%]

14. Mohammad Khavari Tavana, <u>Yifan Sun</u>, 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 Proceedings of the 33rd IEEE International Parallel and Distributed Processing Symposium (IPDPS '19). IEEE, Rio de Janeiro, Brazil, 664-674 [Acceptance rate $\approx$ 27.7%]

15. Saiful A Mojumder, Marcia S Louis, <u>Yifan Sun</u>, 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%]

16. <u>Yifan Sun</u>, 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%]

17. 🏆 [Best Paper Award] Shi Dong, Gong Xiang, <u>Yifan Sun</u>, 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%]

18. Trinayan Baruah, <u>Yifan Sun</u>, 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 ≈ 24.2%]

19. Leiming Yu, Xun Gong, <u>Yifan Sun</u>, 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 ≈ 27.7%]

20. 🏆 [Best Paper Candidate] <u>Yifan Sun</u>, 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 ≈ 30.4%]

21. Saoni Mukherjee, <u>Yifan Sun</u>, 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 ≈ 35.1%]

22. Amir Kavyan Ziabari, <u>Yifan Sun</u>, 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.

23. Abdulla K. Al-Ali, <u>Yifan Sun</u>, 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.

24. <u>Yifan Sun</u>, and Kaushik R. Chowdhury. 2015. **Enabling Emergency Communication through a Cognitive Radio Vehicular Network**. IEEE Communications Magazine 52, 10 (2014), 68-75.

25. Jithin Jagannath, Anu Saji, Hovannes Kulhandjian, <u>Yifan Sun</u>, Emrecan 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 '13). ACM, Kaohsiung, Taiwan, Article 3, 8 pages. [Acceptance rate = 20.0%]

26. 🏆 [Best Student Paper Award] <u>Yifan Sun</u>, 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 '13). ACM, Kaohsiung, Taiwan, Article 37, 8 pages. [Acceptance rate = 20.0%]

Peer-Reviewed Publications in Human-Computer Interaction

1. Wenhan Lyu, Yimeng Wang, Tingting Rachel Chung, <u>Yifan Sun</u>, Yixuan Zhang. 2024. **Evaluating the Effectiveness of LLMs in Introductory Computer Science Education: A Semester-Long Field Study**. In Proceedings of the Eleventh ACM Conference on Learning @ Scale (L@S '24). ACM. Atlanta, Georgia, USA. [Acceptance rate: 22/ 90 ≈ 24.4%]

2. 🏆 [Best Paper Award (Top 1%)] Yixuan Zhang, Joseph D Gaggiano, Nutchanon Yongsatianchot, Nurul Suhaimi, Miso Kim, <u>Yifan Sun</u>, Jacqueline Griffin, and Andrea G. Parker. 2023. **What Do We Mean When We Talk about Trust in Social Media? A Systematic Review**. In ACM CHI Conference on Human Factors in Computing Systems (CHI '23).

3. Yixuan Zhang, <u>Yifan Sun</u>, 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 ≈ 26.5%]

4. Yixuan Zhang, Nurul Suhaimi, Nutchanon Yongsatianchot, Joseph D Gaggiano, Miso Kim, Shivani A Patel, <u>Yifan Sun</u>, 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 ≈ 24.6%]

5. Yixuan Zhang, <u>Yifan Sun</u>, 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 ≈ 26.3%]

6. 🏆 [**Best Paper Honorable Mention (<5%)**] Omid Mohaddesi, <u>Yifan Sun</u>, Rana Azghandi, Rozhin Doroudi, Sam Snodgrass, Ozlem Ergun, Jacqueline Griffin, David Kaeli, Stacy Marsella, Casper Harteveld. 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 ≈ 24.3%]

7. Rozhin Doroudi, Pedro Sequeira, Stacy Marsala, Ozlem Ergun, Rana Azghandi, David Kaeli, <u>Yifan Sun</u>, Jacqueline Griffin. 2019. **Effects of Trust-Based Decision Making in Disrupted Supply Chains**. PloS One 15, no. 2 (2020): e0224761

8. Rozhin Doroudi, Rana Azghandi, Zlatan Feric, Omid Mohaddesi, <u>Yifan Sun</u>, Jacqueline Griffin, Ozlem Ergun, David Kaeli, Pedro Sequeira, Stacy Marsella, and Casper Harteveld. 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 ≈ 70.4%]

9. <u>Yifan Sun</u>, Chisheng Liang, Steven Sutherland, Casper Harteveld, 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]

Books

1. <u>Yifan Sun</u>, Sabila Al Jannat, Trinayan Buruah, and David Kaeli. 2024. (In Progress) **Accelerated Computing with HIP, rev. 2**.

1. <u>Yifan Sun</u>, Trinayan Buruah, and David Kaeli. 2022. **Accelerated Computing with HIP**. ISBN:979-8218107444.

Book Chapters

1. Shih-Hao Hung, Thomas B. Jablin, <u>Yifan Sun</u>, 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, <u>Yifan Sun</u>. 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. <u>Yifan Sun</u>, 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 <u>Yifan Sun</u>. (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. <u>Yifan Sun</u>, 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 or Poster Publications

1. Chris Thames, <u>Yifan Sun</u>. 2024. **A Survey of Artificial Intelligence Approaches to Safety and Mission-Critical Systems**. The 24th Integrated Communications, Navigation and Surveillance Conference (ICNS 2024).

2. Ying Li, Yuhui Bao, Pranav Vaid, Gongyu Wang, Adwait Jog, Darius Bunandar, Ajay Joshi, <u>Yifan Sun</u>. 2023. **TraceSim: a Lightweight Simulator for Large-Scale DNN Workloads on Multi-GPU Systems**. The First Workshop on Computer Architecture Modeling and Simulation (CAMS 2023).

3. Ali Mosallaei, Katherine Isaacs, <u>Yifan Sun</u>. 2023. **Looking into the Black Box: Monitoring Computer Architecture Simulations in Real-Time with AkitaRTM**. The First Workshop on Computer Architecture Modeling and Simulation (CAMS 2023).

4. Ying Li, <u>Yifan Sun</u>, Adwait Jog. 2023. **A Regression-based Model for End-to-End Latency Prediction for DNN Execution on GPUs**. 2023 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2023).

5. Chris Thames, Hang Yan, <u>Yifan Sun</u>. 2022. **Understanding Wafer-Scale GPU Performance using an Architectural Simulator**. The 14th Workshop on General Purpose Processing using GPU (GPGPU 2022).

6. Yixuan Zhang, <u>Yifan Sun</u>, Sumit Barua, Enrico Bertini, and Andrea Grimes Parker. 2020. **Mapping the Landscape of COVID-19 Crisis Visualizations**. Visualization for Communication (VisComm).

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

Preprints

1. Saiful A. Mojumder, <u>Yifan Sun</u>, 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, <u>Yifan Sun</u>, 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. <u>Yifan Sun</u>, Nicolas Bohm Agostini, Shi Dong, and David Kaeli. 2019. **Summarizing CPU and GPU Design Trends with Product Data**. arXiv preprint arXiv:1911.11313.

4. <u>Yifan Sun</u>, 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 & Datasets

1. **The CHIP Dataset** https://chip-dataset.vercel.app
   Dataset with 2185 CPUs and 2668 GPUs.
   Help researchers understand the semiconductor development trends.

2. **Daisen (now part of Akita)**
   General purpose visualization tool that reveals the detailed behavior of hardware components.

3. **MGPUSim** https://github.com/sarchlab/mgpusim
   Multi-GPU system simulator based on AMD GCN3 GPUs.

4. **Akita** https://github.com/sarchlab/akita
   High-flexibility, high-performance, parallel computer architecture simulation framework.

5. **Hetero-Mark** https://github.com/NUCAR-DEV/Hetero-Mark
   Benchmark suite for CPU-GPU collaborative computing.

6. **Drug Supply Chain Simulator** https://gitlab.com/syifan/crisp
   Human-in-the-loop logistics simulator for the U.S. drug supply chain.

7. **VistaLights** https://github.com/syifan/VistaLights
   Strategic game for maritime traffic management and disaster relief.

Talks and Tutorials

1. **Towards Building Explainable Computer Architecture**
   Lehigh University. Feb 2023.

2. **MGPUSim: A One-Stop Solution for GPU Architecture Simulation**
   The 2020 International Conference on High Performance Computing & Simulation (HPCS '20). Jan 2021.

3. **MGPUSim: A High-Flexibility, High-Performance, Multi-GPU Simulator**
   Alibaba. July 2020.

4. **Exploring Multi-GPU Simulation and Visual Profiling with MGPUSim**
   With José L. Abellán, Trinayan Baruah, and David Kaeli. Tutorial at ISCA 2020. May 2020.

5. **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.

6. **Tutorial on the Akita Simulator Framework and MGPUSim**
   With Trinayan Baruah, Shi Dong, and David Kaeli. Tutorial at HPCA 2020. February 2020.

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

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

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

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

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

12. **Multi2Sim 5.0**
    Tutorial at IISWC 2016. September 2016.

Teaching

Teaching @ William & Mary

CSCI43: Web Programming   Fall 2024
   Instructor
   Senior undergrad-level course, new course

CSCI780: Computer Architecture Modeling and Simulation   Spring 2023
   Instructor
   Ph.D.-level course, new course
   Instructor effectiveness 4.75 out of 5.

CSCI780: Data Visualization
Spring 2022
Instructor
Ph.D.-level course, new course
Instructor effectiveness 4.71 out of 5

CSCI780: Topics in Computer Architecture
Spring 2021
Instructor
Ph.D.-level course, new course
Instructor effectiveness 4.73 out of 5

CSCI141: Computational Problem Solving
Fall 2020-2023
Instructor
Undergraduate's first Python programming course (1st - 2nd year)
Instructor effectiveness 3.6, 4.2, 3.6, 4.1 out of 5.

Teaching @ Northeastern University

EECE2322: Fundamental Digital Design and Computer Organization
Fall 2019
Co-instructor. With Dr. Pereira da Silva Aloizio
Intermediate-level undergraduate course (3rd year)

EECE2560: 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

EECE2160: Embedded Design Enabling Robotics
Fall 2017
Instructor
Intermediate-level undergraduate course (2nd year)
Instructor effectiveness 4.6 out of 5

Student Mentees

Ph.D. Students

Daoxuan Xu		William & Mary	2023-current
Sabila Al Jannat		William & Mary	2022-current
Ying Li	Co-advised with Adwait Jog	William & Mary	2021-current
Chris Thames	Part-time, with full-time job at NASA	William & Mary	2020-current

Master Researchers

Daoxuan Xu	University of Florida	2020-current
Yuhui Bao	Northeastern University	2018-2020

Undergraduate Researchers

William & Mary
Lake Bradford, Songquan Dong, Brian Janicki, Manav Kapoor, Michael Kolacki, Harris Marsland, Ben Neifeld, Leah Pak, Yagnik Panguluri, Ryan Russell, Srikar Vadgantam, Effie Zhang, Zhuoyan Zheng, Caesar Zhu

Northeastern University

Harrison Barclay, Nicholas Fresneda, Spencer Hance, Anton Lazarev, Chisheng Liang, Benjamin Logan, Carter McCardwell, Prannoy Mohan, Joseph Moore, Andrew Nguyen, Michael Shen, Will Sung, Shane Treadway, Micah Weston, Vincent Zhao

University of Michigan, Ann Arbor

Ali Mosallaei

Huazhong University of Science & Technology (China)

Shaoyu Wang, Hang Yan

Istanbul Technical University (Turkey)

Ali Tolga Dinçer

REU Student

Xin Li

Selected Media Coverage

William & Mary News	2023
Books published by William & Mary faculty in 2023	
FiveThirtyEight	2022
The Datasets We're Looking At This Week (The CHIP dataset is highlighted by the "Data Is Plural" column at FiveThirtyEight)	
William & Mary News	2022
Misinformation examination: How trust and distrust shift during COVID-19	
WYDaily	2021
W&M Professor Helps Medical Experts Study COVID-19 With GPUs	
William & Mary News	2021
Sun is Teaching COVID-19 Researchers How to Use High-Performance AMD Computers	
HiPEAC info 58	2019
MGPUSim announced at ISCA 2019	
News@Northeastern College of Engineering	2019
Yifan Sun and NUCAR Research Lab featured in HiPEAC News	
News@Northeastern	2018
A Student Went off to Do a Co-op at a Major Tech Firm. He Came Back With a Patent.	
WIRED	2013
Finally, the Underwater We've All Been Waiting For	
NBC News	2013
Deep-sea Internet to Detect Tsunamis, Spy on Smugglers, and Discover Oil	

Service

Ph.D. Dissertation Committee

Lishan Yang	Joined GMU as Assitant Prof.	William & Mary	Defended in Spring 2022
Yuhui Bao		Northeastern University	

Master Thesis Committee

Chair   2024
  2nd Workshop on Computer Architecture Modeling and Simulation (CAMS '24)

  16th Workshop on General Purpose Processing Using GPU (GPGPU '24)

Program Committee   2024
  21th ACM International Conference on Computing Frontiers (CF' 24)
  30th IEEE International Symposium on High-Performance Computer Architecture (HPCA '24)
  6th Workshop on Accelerated Machine Learning (AccML '24)

  42nd IEEE International Conference on Computer Design (ICCD '24)

External Review Committee   2024
  The 51st International Symposium on Computer Architecture (ISCA '24)

Ad-hoc Reviewer   2024
  IEEE 17th Pacific Visualization Symposium (PacificVis '24)

Journal Reviewer   2024
  Transactions on Cloud Computing

Chair   2023
  1st Workshop on Computer Architecture Modeling and Simulation (CAMS '23)

  15th Workshop on General Purpose Processing Using GPU (GPGPU '23)

Program Committee   2023
  41st IEEE International Conference on Computer Design (ICCD '23)
  20th ACM International Conference on Computing Frontiers (CF '23)
  5th Workshop on Accelerated Machine Learning (AccML '23)

  IEEE International Symposium on High-Performance Computer Architecture (HPCA '23)

Journal Reviewer   2023
  Journal of Parallel and Distributed Computing (JPDC)

  ACM Transactions on Architecture and Code Optimization (TACO)

Co-Chair   2022
  14th Workshop on General Purpose Processing Using GPU (GPGPU '22)

Workshop/Tutorial Chair   2023
  IEEE International Symposium on High-Performance Computer Architecture (HPCA '23)

Panelist   2022
  NSF CISE Office of Advanced Cyberinfrastructure (OAC)

Program Committee   2022
  International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD '22)
  40th IEEE International Conference on Computer Design (ICCD '22)

  4th Workshop on Accelerated Machine Learning (AccML '22)

Journal Reviewer   2022
  Transaction on Modeling and Performance Evaluation of Computing Systems (TOMPECS)
  ACM Transactions on Architecture and Code Optimization (TACO)
  Future Generation Computer Systems (FGCS)
  40 thIEEE Transactions on Very Large Scale Integration Systems (TPDS)

  IEEE Micro

Program Committee   2021
  IEEE International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD '21)

  40th IEEE International Conference on Computer Design (ICCD '21)

Journal Reviewer   2021
  IEEE Transactions on Parallel and Distributed Systems (TPDS)
  ACM Transactions on Architecture and Code Optimization (TACO)

  IEEE Computer Architecture Letters (CAL) $\times 2$

Program Committee   2020
  39th IEEE International Conference on Computer Design (ICCD '20)

  13th Workshop on General Purpose Processing Using GPU (GPGPU '20)

Journal Reviewer   2020
  Journal of Parallel and Distributed Computing (JPDC)
  IEEE Transactions on Parallel and Distributed Systems (TPDS)
  IEEE Transactions on Computers (TOC)

  ACM Transactions on Architecture and Code Optimization (TACO)

Web Chair   2016
  6th Workshop on General Purpose Processing Using GPU (GPGPU '16)

Service @ William & Mary

CS Major Advisor   2023-2024
  Mengyan He
  Zhuoyan Zheng

  Daniel Seo

Pre-Major Advisor   2023-2024
  8 students

Member of University-Wide Committees   2023-2024
  Generative AI University Teaching & Learning Project (UTLP)

Chair   2023-2024
  Computer Science Department Web Presence Committee

Member of Committees in the Computer Science Department   2023-2024
  Colloquium
  Graduate Recruiting

Member of University-Wide Committees   2022-2023
  S. Laurie Sanderson Awards for Excellence in Undergraduate Mentoring Committee
  Research Computing Advisory Committee

CS Major Advisor   2022-2023
  Srikar G. Vadgantam

Pre-Major Advisor   2022-2023
  10 students

Chair   Spring 2023
  Computer Science Department Web Presence Committee

Co-chair   Fall 2022
  Computer Science Department Web Presence Committee

Member of Committees in the Data Science Department   2022-2023
  Faculty Recruitment Committee

Member of Committees in the Computer Science Department   2022-2023
  Colloquium Committee
  Graduate Admissions Committee
  Graduate Recruiting Committee
  System Committee

Member of Committees in the Computer Science Department   2022-2023
  Colloquium Committee
  Graduate Admissions Committee
  Graduate Recruiting Committee
  System Committee

CS Major Advisor   2022-2023
  Ryan Thomas Gainor

Pre-Major Advisor   2021-2022
  6 students

Member of University-Wide Committees   2021-2022
  S. Laurie Sanderson Awards for Excellence in Undergraduate Mentoring Committee

Member of Committees in the Computer Science Department   2021-2022
  Undergraduate Curriculum Committee
  Web Presence Committee