

# Yuhao Zhu

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## CONTACT INFORMATION

Assistant Professor  
Department of Computer Science  
University of Rochester  
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Rochester, NY 14627

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## RESEARCH INTERESTS

I work on software and hardware design to solve real-world problems that are technically deep and have broad societal impact. To that end, my recent work has focused mostly on visual computing, e.g., Augmented/Virtual Reality, autonomous machines, and digital cultural heritage.

## EDUCATION

**The University of Texas at Austin**

Ph.D., Electrical and Computer Engineering

May 2017

M.S.E., Electrical and Computer Engineering

May 2015

Dissertation: [Energy-Efficient Mobile Web Computing](#)

**Beihang University, Beijing, China**

B.S., Computer Science and Engineering

June 2010

## ACADEMIC HONORS

- 2022, MICRO Hall of Fame
- 2020, NSF CAREER Award
- 2019, University Research Award, University of Rochester
- 2017, Google Faculty Research Award
- 2016, Google Ph.D. Fellowship
- 2011, Microelectronics and Computer Development Fellowship, UT Austin

## PUBLICATION AWARDS

- 2022, Kostas Pantazos Memorial Award for Outstanding Paper in Visualization and Data Analysis, Society for Imaging Science and Technology  
*"Digital Reconstruction of Elmina Castle for Mobile Virtual Reality via Point-based Detail Transfer"*
  - 2019, IEEE Micro Top Picks of Computer Architecture  
*"Energy-Efficient Video Processing for Virtual Reality"*  
Originally published at ISCA 2019
  - 2018, ACM SIGARCH – IEEE-CS TCCA Outstanding Dissertation Award, Honorable Mention  
For Dissertation ["Energy-Efficient Mobile Web Computing"](#)
  - 2014, Best of Computer Architecture Letters Award  
*"Exploiting Webpage Characteristics for Energy-Efficient Mobile Web Browsing"*
  - 2010, Outstanding Undergraduate Thesis Award, Beihang University  
*"Distributed Time, Conservative Parallel Logic Simulation on GPUs"*
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- **2022, IEEE Micro Top Picks of Computer Architecture, Honorable Mention**  
*"ANT: Exploiting Adaptive Numerical Data Type for Low-bit DNN Quantization"*  
 Originally published at MICRO 2022
- **2022, IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR), Best Paper Honorable Mention**  
*"Real-Time Gaze Tracking with Event-Driven Eye Segmentation"*
- **2022, IEEE International Symposium on High-Performance Computer Architecture (HPCA), Best Paper Nominee**  
*"S2TA: Exploiting Structured Sparsity for Energy-Efficient Mobile CNN Acceleration"*
- **2020, International Conference on Parallel Architectures and Compilation Techniques (PACT), Best Paper Nominee**  
*"Low-Latency Proactive Continuous Vision"*
- **2019, IEEE/ACM International Symposium on Microarchitecture (MICRO), Best Paper Nominee**  
*"Tigris: Architecture and Algorithms for 3D Perception in Point Clouds"*
- **2018, IEEE Micro Top Picks of Computer Architecture, Honorable Mention**  
*"Euphrates: Algorithm-SoC Co-Design for Low-Power Mobile Continuous Vision"*  
 Originally published at ISCA 2018
- **2015, IEEE Micro Top Picks of Computer Architecture, Honorable Mention**  
*"Microarchitectural Implications of Event-driven Server-side Web Applications"*  
 Originally published at MICRO 2015

#### MENTORING AWARDS

- **2020, CRA Outstanding Undergraduate Researcher, Honorable Mention**  
**2019, ACM Student Research Competition (ASPLOS 2019), Gold Medalist**  
*Sam Triest (Advisee)*
- **2019, CRA Outstanding Undergraduate Researcher, Honorable Mention**  
**2019, A. Richard Newton Young Student Fellow (DAC 2019)**  
*Qiuyue Sun (Advisee)*
- **2020, CRA Outstanding Undergraduate Researcher, Honorable Mention**  
*Sifan Ye (Advisee)*

#### PROFESSIONAL POSITIONS

<b>University of Rochester</b>	
Assistant Professor, Department of Computer Science	Jan. 2018 - now
Affiliated Faculty, Goergen Institute for Data Science	June 2018 - now
<b>Arm Research</b>	
Visiting Researcher	July 2017 - Dec. 2017
<b>Harvard University</b>	
Research Fellow	Aug. 2016 - May 2017
<b>The University of Texas at Austin</b>	
Graduate Researcher	Aug. 2010 - May 2017
Teaching Assistant	Fall 2010, Spring 2011, Spring 2014
<b>Google Inc.</b>	
SWE Intern (Lead of <a href="#">Flow API</a> of the <a href="#">Catapult</a> project)	Summer 2015

**AMD Research Lab**  
Research Intern

Summer 2012, Summer 2013

**STMicroelectronics**  
Co-op Engineer

Summer 2011

**Tsinghua University**  
Undergraduate Researcher

June 2009 - May 2010

## PUBLICATIONS **Journal Articles**

- Carlos Mauricio Villegas Burgos, Pei Xiong, Liangyu Qiu, [Yuhao Zhu](#), Nick Vamivakas  
[Co-designed Metaoptoelectronic Deep Learning](#)  
*Optical Express*, 2023, (60)15:4356-4365
- Qiang Liu, Yuhui Hao, Weizhuang Liu, Bo Yu, Yiming Gan, Jie Tang, Shao-Shan Liu, [Yuhao Zhu](#)  
[An Energy Efficient and Runtime Reconfigurable Accelerator for Robotic Localization](#)  
*IEEE Transactions on Computers*, December 2022
- Shaoshan Liu, Bo Yu, Jie Tang, [Yuhao Zhu](#), Xue Liu  
[Communication Challenges in Infrastructure-Vehicle Cooperative Autonomous Driving: A Field Deployment Perspective](#)  
*IEEE Wireless Communications*, 2022 May 5;29(4):126-31.
- Carlos Mauricio Villegas Burgos, Tianqi Yang, [Yuhao Zhu](#), Nick Vamivakas  
[A Design Framework for Metasurface Optics-based Convolutional Neural Networks](#)  
*Applied Optics*, 2021, (60)15:4356-4365
- Zishen Wan, Bo Yu, Thomas Yuang Li, Jie Tang, [Yuhao Zhu](#), Yu Wang, Arijit Raychowdhury, Shaoshan Liu  
[A Survey of FPGA-Based Robotic Computing](#)  
*IEEE Circuits and Systems Magazine*, 2021, 21(2):48-74
- Yue Leng, Chi-chun Chen, Qiuyue Sun, Jian Huang, [Yuhao Zhu](#)  
[Energy-Efficient Video Processing for Virtual Reality](#)  
*IEEE Micro Special Issue on Top Picks from the 2019 Computer Architecture Conferences*, May/June 2020, 40(3):30-36
- Yiming Gan, Yuxian Qiu, Jingwen Leng, [Yuhao Zhu](#)  
[SVSoC: Speculative Vision Systems-on-a-Chip](#)  
*Computer Architecture Letters (CAL)*, March 2019, 18(1):47-50
- [Yuhao Zhu](#), Vijay Janapa Reddi  
[Optimizing General-Purpose CPUs for Energy-Efficient Mobile Web Computing](#)  
*ACM Transactions on Computer Systems (TOCS)*, March 2017, 35(1):1
- [Yuhao Zhu](#), Vijay Janapa Reddi, Robert Adolf, Saketh Rama, Brandon Reagen, Gu-Yeon Wei, David M. Brooks  
[Cognitive Computing Safety: The New Horizon for Reliability / The Design and Evolution of Deep Learning Workloads](#)  
*IEEE Micro Special Issue on Cognitive Architectures*, Jan/Feb 2017, 37(1):15-21

- Peter Bailis, Jean Yang, Vijay Janapa Reddi, [Yuhao Zhu](#)  
[Research for Practice: Web Security and Mobile Web Computing \(Website\)](#)  
*Communications of the ACM (CACM)*, Jan 2017, 60(1):50-53  
Also appears in *ACM Queue*, July/Aug 2016, 14(4):80-95.
- [Yuhao Zhu](#), Matthew Halpern, Vijay Janapa Reddi  
[The Role of the CPU in Energy-Efficient Mobile Web Browsing](#)  
*IEEE Micro Special Issue on Mobile Systems*, Jan/Feb 2015, 35(1):26-33
- [Yuhao Zhu](#), Aditya Srikanth, Jingwen Leng, Vijay Janapa Reddi  
[Exploiting Webpage Characteristics for Energy-Efficient Mobile Web Browsing](#)  
*Computer Architecture Letters (CAL)*, Oct 2012, 13(1):33-36  
**Awarded Best of Computer Architecture Letter in 2014**
- [Yuhao Zhu](#), Bo Wang, Yangdong Deng  
[Massively Parallel Logic Simulation with GPUs](#)  
*ACM Transactions on Design Automation of Electronic Systems (TODAES)*, June 2011, 16(3):29

## Conference Papers

- Tianrui Ma, Yu Feng, Xuan Zhang, [Yuhao Zhu](#)  
CamJ: Enabling System-Level Energy Modeling and Architectural Exploration for In-Sensor Visual Computing  
*ISCA 2023*
- Nisarg Ujjainkar, Jingwen Leng, [Yuhao Zhu](#)  
ImaGen: A General Framework for Generating Memory- and Power-Efficient Image Processing Accelerators  
*ISCA 2023*
- Cong Guo, Jiaming Tang, Weiming Hu, Jingwen Leng, Chen Zhang, Fan Yang, Yunxin Liu, Minyi Guo, [Yuhao Zhu](#)  
OliVe: Accelerating Large Language Models via Hardware-friendly Outlier-Victim Pair Quantization  
*ISCA 2023*
- [Yuhao Zhu](#)  
[Teaching Color Science to EECS Students Using Interactive Tutorials: Tools and Lessons](#)  
*IS&T EI (VDA) 2023*
- Elias Neuman-Donihue, Michael Jarvis, [Yuhao Zhu](#)  
[FastPoints: A State-of-the-Art Point Cloud Renderer for Unity](#)  
*IS&T EI (VDA) 2023*
- Abhishek Tyagi, Yiming Gan, Shaoshan Liu, Bo Yu, Paul Whatmough, [Yuhao Zhu](#)  
[Thales: Formulating and Estimating Architectural Vulnerability Factors for DNN Accelerators](#)  
*HPCA 2023*
- Budmonde Duinkharjav, Kenny Chen, Abhishek Tyagi, Jiayi He, [Yuhao Zhu](#), Qi Sun  
[Color-Perception-Guided Display Power Reduction for Virtual Reality](#)  
*SIGGRAPH Asia 2022*
- Cong Guo, Chen Zhang, Jingwen Leng, Zihan Liu, Fan Yang, Yunxin Liu, Minyi Guo, [Yuhao Zhu](#)

ANT: Exploiting Adaptive Numerical Data Type for Low-bit Deep Neural Network Quantization

*MICRO 2022*

**IEEE Micro Top Picks of Computer Architecture (Honorable Mention) in 2022**

- Yu Feng, Gunnar Hammonds, Yiming Gan, [Yuhao Zhu](#)  
[Crescent: Taming Memory Irregularities for Accelerating Deep Point Cloud Analytics](#)  
*ISCA 2022*
- Gregory Heyworth, Keith T. Knox, Kenneth Boydston, [Yuhao Zhu](#)  
[Multispectral Scheimpflug: Imaging Degraded Books That Open Less Than 30 Degrees](#)  
*IS&T Archiving 2022*
- Yiming Gan, Paul Whatmough, Bo Yu, Shaoshan Liu, [Yuhao Zhu](#)  
[BRAUM: Analyzing and Protecting Autonomous Machine Software Stack](#)  
*ISSRE 2022*
- Yu Feng, Nathan Goulding-Hotta, Asif Khan, Hans Reyserhove, [Yuhao Zhu](#)  
[Real-Time Gaze Tracking with Event-Driven Eye Segmentation](#)  
*IEEE VR 2022*  
**Best Paper Nominee; Invited Presentation at IEEE VIS 2022**
- [Yuhao Zhu](#)  
[RTNN: Accelerating Neighbor Search Using Hardware Ray Tracing](#)  
*PPoPP 2022*
- Zhi-Gang Liu, Paul Whatmough, [Yuhao Zhu](#), Matt Mattina  
[S2TA: Exploiting Structured Sparsity for Energy-Efficient Mobile CNN Acceleration](#)  
*HPCA 2022*  
**Best Paper Nominee**
- Sifan Ye, Ting Wu, Michael Jarvis, [Yuhao Zhu](#)  
[Digital Reconstruction of Elmina Castle for Mobile Virtual Reality via Point-based Detail Transfer](#)  
*IS&T EI (VDA) 2022*  
**Kostas Pantazos Memorial Award for Outstanding Paper in Visualization and Data Analysis**
- Weizhuang Liu, Bo Yu, Yiming Gan, Qiang Liu, Jie Tang, Shaoshan Liu, [Yuhao Zhu](#)  
[Archytas: A Framework for Synthesizing and Dynamically Optimizing Accelerators for Robotic Localization](#)  
*MICRO 2021*
- Joshua Romphf, Elias Neuman-Donihue, Gregory Heyworth, [Yuhao Zhu](#)  
[Resurrect3D: An Open and Customizable Platform for Visualizing and Analyzing Cultural Heritage Artifacts](#)  
*Web3D 2021*
- Yangjie Zhou, Mengtian Yang, Cong Guo, Jingwen Leng, Yun Liang, Quan Chen, Minyi Guo, [Yuhao Zhu](#)  
[Characterizing and Demystifying the Implicit Convolution Algorithm on Commercial Matrix-Multiplication Accelerators](#)  
*IISWC 2021*
- Shaoshan Liu, Bo Yu, Yahui Liu, Kunai Zhang, Yisong Qiao, Thomas Yuang Li, Jie Tang, [Yuhao Zhu](#)

Brief Industry Paper: The Matter of Time — A General and Efficient System for Precise Sensor Synchronization in Robotic Computing  
*RTAS 2021*

- Yiming Gan, Bo Yu, Boyuan Tian, Leimeng Xu, Wei Hu, Shaoshan Liu, Qiang Liu, Yanjun Zhang, Jie Tang, [Yuhao Zhu](#)

[Eudoxus: Characterizing and Accelerating Localization in Autonomous Machines](#)  
*HPCA 2021*

- Yu Feng, Boyuan Tian, Tiancheng Xu, Paul Whatmough, [Yuhao Zhu](#)  
[Mesorasi: Architecture Support for Point Cloud Analytics via Delayed-Aggregation](#)  
*MICRO 2020*

- Bo Yu, Wei Hu, Leimeng Xu, Jie Tang, Shaoshan Liu, [Yuhao Zhu](#)  
[Building the Computing System for Autonomous Micromobility Vehicles: Design Constraints and Architectural Optimizations](#)  
*MICRO 2020*

- Yiming Gan, Yuxian Qiu, Jingwen Leng, Minyi Guo, [Yuhao Zhu](#)  
[Ptolemy: Architecture Support for Robust Deep Learning](#)  
*MICRO 2020*

- Yu Feng, Shaoshan Liu, [Yuhao Zhu](#)  
[Real-Time Spatio-Temporal LiDAR Point Cloud Compression](#)  
*IROS 2020*

- Haichuan Yang, Shupeng Gui, [Yuhao Zhu](#), Ji Liu  
[Automatic Neural Network Compression by Sparsity-Quantization Joint Learning: A Constrained Optimization-based Approach](#)  
*CVPR 2020*

- Cong Guo, Bo Yang Hsueh, Jingwen Leng, Yuxian Qiu, Yue Guan, Zehuan Wang, Xiaoying Jia, Xipeng Li, Minyi Guo, [Yuhao Zhu](#)  
[Accelerating Sparse DNN Models Without Hardware-Support via Tile-wise Sparsity](#)  
*SC 2020*

- Yiming Gan, Yuxian Qiu, Lele Chen, Jingwen Leng, [Yuhao Zhu](#)  
[Low-Latency Proactive Continuous Vision](#)  
*PACT 2020*

**Best Paper Nominee**

- Cong Guo, Yangjie Zhou, Jingwen Leng, [Yuhao Zhu](#), Zidong Du, Quan Chen, Chao Li, Minyi Guo, Bin Yao  
[Balancing Efficiency and Flexibility for DNN Acceleration via Temporal GPU-Systolic Array Integration](#)  
*DAC 2020*

- Anand Samajdar, J. Joseph, [Yuhao Zhu](#), Paul Whatmough, Matt Mattina, Tushar Krishna  
[A Systematic Methodology for Characterizing Scalability of DNN Accelerators](#)  
*ISPASS 2020*

- Qiuyue Sun, Amir Taherin, Yawo Siatitse, [Yuhao Zhu](#)  
[Energy-Efficient 360-Degree Video Rendering on FPGA via Algorithm-Architecture Co-Design](#)  
*FPGA 2020*

- Yu Feng, Paul Whatmough, [Yuhao Zhu](#)  
[ASV: Accelerated Stereo Vision System](#)  
*MICRO 2019*
- Tiancheng Xu, Boyuan Tian, [Yuhao Zhu](#)  
[Tigris: Architecture and Algorithms for 3D Perception in Point Clouds](#)  
*MICRO 2019*  
**Best Paper Nominee**
- Yu Feng, [Yuhao Zhu](#)  
[PES: Proactive Event Scheduling for Energy-Efficient Mobile Web Computing](#)  
*ISCA 2019*
- Yue Leng, Chi-chun Chen, Qiuyue Sun, Jian Huang, [Yuhao Zhu](#)  
[Energy-Efficient Video Processing for Virtual Reality](#)  
*ISCA 2019*  
**IEEE Micro Top Picks of Computer Architecture in 2019**
- Yuxian Qiu, Jingwen Leng, Cong Guo, Quan Chen, Chao Li, Minyi Guo, [Yuhao Zhu](#)  
[Adversarial Defense Through Network Profiling Based Path Extraction](#)  
*CVPR 2019*
- Haichuan Yang, [Yuhao Zhu](#), Ji Liu  
[ECC: Energy-Constrained Deep Neural Network Compression via a Bilinear Regression Model](#)  
*CVPR 2019*
- Haichuan Yang, [Yuhao Zhu](#), Ji Liu  
[Energy-Constrained Compression for Deep Neural Networks via Weighted Sparse Projection and Layer Input Masking](#)  
*ICLR 2019*
- Yu Wang, [Yuhao Zhu](#), Glenn Ko, Brandon Reagen, Gu-Yeon Wei, David Brooks  
[Demystifying Bayesian Inference Workloads](#)  
*ISPASS 2019*
- Wenzhi Cui, Daniel Richins, [Yuhao Zhu](#), Vijay Janapa Reddi  
[Tail Latency in Node.js: Energy Efficient Turbo Boosting for Long Latency Requests in Event-Driven Web Services](#)  
*VEE 2019*
- Yue Leng, Chi-chun Chen, Qiuyue Sun, Jian Huang, [Yuhao Zhu](#)  
[Semantic-Aware Virtual Reality Video Streaming](#)  
*APSys 2018*
- [Yuhao Zhu](#), Anand Samajdar, Matthew Mattina, Paul Whatmough  
[Euphrates: Algorithm-SoC Co-Design for Low-Power Mobile Continuous Vision](#)  
*ISCA 2018*  
**IEEE Micro Top Picks of Computer Architecture (Honorable Mention) in 2018**
- Yuwei Hu, Jidong Zhai, Dinghua Li, Yifan Gong, [Yuhao Zhu](#), Wei Liu, Lei Su, Jiangming Jin  
[BitFlow: Exploiting Vector Parallelism for Binary Neural Networks on CPU](#)  
*IPDPS 2018*
- [Yuhao Zhu](#), Matthew Mattina, Paul Whatmough  
[Mobile Machine Learning Hardware at ARM: A Systems-on-Chip \(SoC\) Perspec-](#)

tive

*SysML 2018*

- [Yuhao Zhu](#), Vijay Janapa Reddi  
[GreenWeb: Language Extensions for Energy-Efficient Mobile Web Computing](#)  
*PLDI 2016*
- Matthew Halpern, [Yuhao Zhu](#), Vijay Janapa Reddi  
[Mobile CPU's Rise to Power: Quantifying the Impact of Generational Mobile CPU Design Trends on Performance, Energy, and User Satisfaction](#)  
*HPCA 2016*
- [Yuhao Zhu](#), Daniel Richins, Matthew Halpern, Vijay Janapa Reddi  
[Microarchitectural Implications of Event-driven Server-side Web Applications](#)  
*MICRO 2015*  
**IEEE Micro Top Picks of Computer Architecture (Honorable Mention) in 2015**
- [Yuhao Zhu](#), Matthew Halpern, Vijay Janapa Reddi  
[Event-based Scheduling for Energy-Efficient QoS \(eQoS\) in Mobile Web Applications](#)  
*HPCA 2015*
- Matthew Halpern, [Yuhao Zhu](#), Ramesh Peri, Vijay Janapa Reddi  
[Mosaic: Cross-Platform User-Interaction Record and Replay Tool for the Fragmented Android Ecosystem](#)  
*ISPASS 2015*
- [Yuhao Zhu](#), Vijay Janapa Reddi  
[WebCore: Architectural Support for Mobile Web Browsing](#)  
*ISCA 2014*
- Chen Zhou, Xiaofei Wang, Weichao Xu, [Yuhao Zhu](#), Vijay Janapa Reddi, Chris Kim  
[Estimation of Instantaneous Frequency Fluctuation in a Fast DVFS Environment Using an Empirical BTI Stress-Relaxation Model](#)  
*IRPS 2014*
- [Yuhao Zhu](#), Vijay Janapa Reddi  
[High-Performance and Energy-Efficient Mobile Web Browsing on Big/Little Systems](#)  
*HPCA 2013*
- [Yuhao Zhu](#), Yangdong Deng, Yubei Chen  
[Hermes: An Integrated CPU/GPU Microarchitecture for IP Routing](#)  
*DAC 2011*
- Bo Wang, [Yuhao Zhu](#), Yangdong Deng  
[Distributed Time, Conservative Parallel Logic Simulation on GPUs](#)  
*DAC 2010*

## Patents

- [Yuhao Zhu](#), Paul Whatmough  
[Region of Interest Determination in Video](#)  
*US Patent App. 15/875,464*
- [Yuhao Zhu](#), Paul Whatmough  
[Computer Vision Processing](#)



US Patent App. 16/127,007

## Book Chapters

- Yangdong Deng, [Yuhao Zhu](#), Bo Wang  
[Asynchronous Parallel Logic Simulation on Modern Graphics Processors](#)  
*GPU Solutions to Multi-scale Problems in Science and Engineering*, 2013
- Yangdong Deng, Xiaomeng Jiao, Shuai Mu, Kang Kang, [Yuhao Zhu](#)  
[NPGPU: Network Processing on Graphics Processing Units](#)  
*Theoretical and Mathematical Foundations of Computer Science*, 2011

TALKS  
[decks](#)  
[videos](#)

## Invited Talks

- **Rethinking Imaging-Computing Interface**  
*University of College London, March 2023, Virtual*
- **Harnessing and Harvesting the Computer Science-Vision Science Symbiosis**  
*RIT Munsell Color Science Laboratory, March 2023, Rochester, NY*
- **High Performance Embedded Imaging: An Optics, Sensing, and Computing Co-Designed Approach**  
*High Performance Computing for Imaging at EI 2023, Jan 2023, San Francisco, CA*
- **Color Perception-Guided Display Optimizations: Power and Beyond**  
*Meta, Sept 2022, Virtual*
- **Go Horizontal, Not Vertical: Addressing Visual Computing Challenges in Autonomous Machines**  
[RoboArch Workshop](#) co-located with MICRO 2022, Oct 2022, Chicago, IL
- **RTNN: Accelerating Neighbor Search Using Hardware Ray Tracing**  
[WDDSA Workshop](#) co-located with MICRO 2022, Oct 2022, Chicago, IL
- **Improving and Harnessing Software Resiliency in Autonomous Machines**  
*Plenary Panel on Reliability of Autonomous Machines, IEEE COMPSAC, June 2022, Virtual*
- **Visual Computing: A Horizontal Approach**  
*Efficient AI Seminar, Rutgers University, Oct 2022, Virtual*  
*Keynote Speech, IFIP NPC, Sept 2022, Virtual*  
*GlobalFoundries, May 2022, Virtual*  
*University of Massachusetts Amherst, May 2022, Virtual*
- **Intelligent Visual Computing**  
*Duke University, March 2021, Virtual*  
*University of Utah, Oct 2021, Virtual*  
*HALO workshop co-located with ICCAD, Nov 2021, Virtual*
- **Watt-Wise Web: Architecting a Responsive and Energy-Efficient Mobile Web**  
*University of Utah, Oct 2020, Virtual*
- **Architecture Support for Robust Deep Learning: Exploiting Software 1.0 Techniques to Defend Software 2.0**  
*AMD Research, Oct 2020, Virtual*
- **Rethinking Computer Systems Stack for Point Cloud Processing**  
*Arm Research, Sept 2019, Waltham, MA*

- **Getting Computer Systems Ready for Visual Computing in Ten Years**  
*Intel Labs, Sept 2019, Hillsboro, OR*  
*Harvard University, Sept 2019, Cambridge, MA*  
*Yale University, Oct 2019, New Haven, CT*  
*University of Michigan, Nov 2019, Ann Arbor, MI*  
*FastPath Workshop co-located with ISPASS, Aug 2020, Virtual*
- **The Next Quintillion Pixels and Beyond: Architecting Next-Generation Mobile Visual Computing Systems**  
*Arm Research, Sept 2019, Austin, TX*  
*UT Austin, Sept 2019, Austin, TX*  
*Rice University, Sept 2019, Houston, TX*
- **Resource-Guaranteed Deep Learning**  
*Arm Research, April 2019, Waltham, MA*
- **Energy-Efficient Mobile Web: Proactive and Reactive Perspectives**  
*Google, April 2018, Seattle, WA*
- **Algorithm-SoC Co-design for Energy-Efficient Mobile Continuous Vision**  
*Cornell University, Feb 2018, Ithaca, NY*  
*CogArch Workshop co-located with ASPLOS 2018, March 2018, Williamsburg, VA*  
*SRI International, April 2018, Princeton, NJ*  
*Rochester Institute of Technology, Feb 2019, Rochester, NY*
- **The Watt Wise Web**  
*Texas A&M University, Jan 2017, Teleseminar*  
*Boston Area Architecture Workshop (BARC), Jan 2017, Cambridge, MA*  
*ARM Research, Jan 2017, Austin, TX*  
*UT Austin School of Information, Feb 2017, Austin, TX*
- **WebCore: Architectural Support for Mobile Web Browsing**  
*Intel, July 2014, Austin, TX*
- **High-Performance and EnergyEfficient Mobile Web Browsing on Big/Little Systems**  
*UT Austin Programming Language Lunch Seminar, September 2012, Austin, TX*  
*AMD Research Lab, August 2012, Austin, TX*

## Conference Presentations

- Teaching Color Sciences to EECS Students Using Interactive Tutorials  
*Visual Data Analytics at EI 2023, Jan 2023, San Francisco, CA*
- [RTNN: Accelerating Neighbor Search Using Hardware Ray Tracing](#)  
*PPoPP 2022, April 2022, Virtual*
- [Tail Latency in Node.js: Energy Efficient Turbo Boosting for Long Latency Requests in Event-Driven Web Services](#)  
*VEE 2019, April 2019, Providence, RI*
- [Algorithm-SoC Co-design for Energy-Efficient Mobile Continuous Vision](#)  
*ISCA 2018, June 2018, Los Angeles, CA*
- [GreenWeb: Language Extensions for Energy-Efficient Mobile Web Computing](#)  
*PLDI 2016, June 2016, Santa Barbara, CA*

- [Energy and Power Measurement on Mobile Devices](#)  
*MobiTools co-located with ISCA 2016*, June 2016, Seoul, Korea
- [The Human Processing Unit \(HPU\) as a New Approximate Computing Substrate](#)  
*WAX 2016 co-located with ASPLOS 2016*, April 2016, Atlanta, GA
- [Scalable End-to-end Quality Control in Approximate Computing](#)  
*WAX 2016 co-located with ASPLOS 2016*, April 2016, Atlanta, GA
- [Microarchitectural Implications of Event-driven Server-side Web Applications](#)  
*MICRO 2015*, December 2015, Waikiki, HI ([lightening version](#))
- [Exploiting Webpage Characteristics for Energy-Efficient Mobile Web Browsing](#)  
*Best of CAL 2014 presented at HPCA 2015*, February 2015, San Francisco, CA
- [Event-Based Scheduling for Energy-Efficient QoS \(eQoS\) in Mobile Web Applications](#)  
*HPCA 2015*, February 2015, San Francisco, CA
- [WebCore: Architectural Support for Mobile Web Browsing](#)  
*ISCA 2014*, June 2014, Minneapolis, MN ([lightening version](#))
- [High-Performance and EnergyEfficient Mobile Web Browsing on Big/Little Systems](#)  
*HPCA 2013*, February 2013, Shenzhen, China
- [Hermes: An Integrated CPU/GPU Microarchitecture for IP Routing](#)  
*DAC 2011*, June 2011, San Diego, CA

## SOFTWARE

See the [GitHub page](#) of the Horizon Lab.

## EXTERNAL SERVICE

### Program Committee

- [ISCA](#): 2023 (ERC), 2022 (ERC), 2020, 2019, 2017 (ERC)
- [HPCA](#): 2022, 2019, 2018 (ERC)
- [MICRO](#): 2022, 2021 (ERC), 2020 (ERC), 2019
- [MICRO SRC](#): 2022
- [SC](#): 2022
- [IPDPS](#): 2023
- [HPCI](#): 2022
- [ECCV](#): 2022
- [ICCV](#): 2021
- [IEEE VR](#): 2023
- [CVPR](#): 2022, 2021, 2020
- [ICLR](#): 2022, 2021, 2020
- [AAAI](#): 2022, 2021
- [NeurIPS](#): 2022, 2021, 2020
- [WACV](#): 2021
- [ACCV](#): 2020
- [ISLPED](#): 2021
- [IISWC](#): 2021, 2019

- [ISPASS](#): 2022, 2019
- IEEE Micro Top Picks: 2018
- [HCOMP](#): 2016
- [CGO-PPoPP Artifacts Evaluation](#): 2016, 2015
- [TinyToCS](#) Volume IV, III

#### Solicited Reviewer

- [IROS](#) (2023), [IEEE TPAMI](#) (2023), [IEEE TCAD](#) (2023), [IEEE VR](#) (2021), [IEEE TCC](#) (2022), [IEEE ISMAR](#) (2022), [ACM TOCS](#) (2022, 2019), [ASPLOS](#) (2021), [IEEE TNNLS](#) (2021, 2020), [IEEE TSUSC](#) (2020), [ACM TWEB](#) (2020), [IEEE TC](#) (2020, 2019), [IEEE CAL](#) (2022, 2021, 2020, 2018, 2017), [IEEE TMC](#) (2017), [IEEE Micro](#) (2022, 2020, 2019, 2018, 2017), [ACM TACO](#) (2019, 2018, 2016), [IEEE ESL](#) (2015), [ACM TODAES](#) (2011), [ICS](#) (2018), [DAC](#) (2012, 2011)

#### Workshop and Tutorial Organizations

- Workshop and Tutorial Co-Chair, IEEE/ACM International Symposium on Microarchitecture ([MICRO](#)), 2022
- Co-chair: Artifact Evaluation Committee, IEEE International Symposium on Workload Characterization ([IISWC](#)), 2022
- Co-organizer: RSS2: Workshop on Robustness and Safe Software 2.0 ([RSS2](#)) co-located with ASPLOS 2022, 2021
- Co-chair: International Workshop on Performance Analysis of Machine Learning Systems ([FastPath](#)) co-located with ISPASS 2021
- Organizer: Infrastructure and Methodology for SoC Performance and Power Modeling Tutorial co-located with IISWC 2018, ASPLOS 2019, [ISCA 2019](#)
- Organizer: [Cognitive Edge Computing](#) Workshop co-located with MICRO 2017
- Co-chair: [Sensors to Cloud Architectures](#) Workshop co-located with HPCA 2017
- Web chair: [Cognitive Edge Computing](#) Workshop co-located with MICRO 2016
- Organizer: [MobiTools](#) Workshop co-located with ISCA 2016

#### DEPARTMENTAL SERVICE

- *PhD Admissions Committee*, 2022-2023, 2021-2022, 2020-2021, 2019-2020, 2018-2019
- *MS Admissions Committee*, 2021-2022
- *Undergraduate Curriculum Committee*, 2021-2022, 2020-2021, 2019-2020
- *Industrial Affiliates Exploration*, 2020-2021
- *Lab Committee*, 2018-2019
- *Colloquium Coordinator*, 2018-2019

#### OUTREACH ACTIVITIES

**University of Rochester Upward Bound Math and Science** (<https://www.rochester.edu/college/kearnscenter/pre-college/trio-programs.html#math-science>)

- Taught three-day workshop each summer to high-schoolers from the Vanguard Collegiate High School and Wilson High School
- Used Raspberry Pi as the platform to introduce programming to students, and incrementally built simple computer vision programs such as edge detectors.

**Women in Engineering Program (WEP)** (<http://www.engr.utexas.edu/wep>)

- Speaker at high school-focused summer camps at UT Austin with an emphasis on inspiring high school female about engineering (~75 high school senior women)

- Mentored two female sophomores in the Graduates Linked with Undergraduates in Engineering (GLUE) Program.

## TEACHING EXPERIENCE

### Instructor (University of Rochester)

- Spring 2023, CSC 252/452 *Computer Organization*
- Fall 2022, CSC 292/572 *Mobile Visual Computing*
- Fall 2022, CSC 412 *Introduction to Augmented and Virtual Reality* (co-instructor)
- Spring 2022, CSC 252/452 *Computer Organization*
- Fall 2021, CSC 292/572 *Mobile Visual Computing*
- Fall 2021, CSC 412 *Introduction to Augmented and Virtual Reality* (co-instructor)
- Spring 2021, CSC 414 *Selected Topics on Augmented and Virtual Reality* (co-instructor)
- Spring 2021, CSC 252/452 *Computer Organization*
- Fall 2020, CSC 292/572 *Mobile Visual Computing*
- Fall 2020, CSC 412 *Introduction to Augmented and Virtual Reality* (co-instructor)
- Spring 2020, CSC 252/452 *Computer Organization*
- Spring 2019, CSC 252/452 *Computer Organization*
- Fall 2018, CSC 292/572 *Mobile Systems Architecture*
- Spring 2018, CSC 252/452 *Computer Organization*

### Teaching Assistant (UT Austin)

- Spring 2013, *Dynamic Compilation*, with Vijay Janapa Reddi
- Spring 2011, *Computer Architecture*, with Yale N. Patt
- Fall 2010, *Introduction to Embedded Systems*, with Jonathan W. Valvano

## MENTORING

### University of Rochester

#### Ph.D.:

- Yu Feng
- Yiming Gan
- Abhishek Tyagi
- Nisarg Ujjainkar

#### M.S.:

- Raj Rajwade
- Suumil Roy

#### Undergraduate:

- Ethan Chen
- Ethan Shahan
- Matan Kotler-Berkowitz
- Junhua Huang

#### Alumni:

- Shreyan Goswami (M.S. 2022)

- Zeyi Pan (M.S. 2021)
- Hanlin Gao (M.S. 2021)
- Yi Yang (M.S. 2021)
- Chi-chun Chen (M.S. 2019; now at Cray Inc.)
- Boyuan Tian (M.S. 2019; now at UIUC)
- Tianqi Yang (M.S. 2020; now at Amazon)
- Tiancheng Xu (M.S. 2020; now at Rice University)
- Christopher Bruinsma (Spring 2022)
- Jiayi He (Spring 2022)
- Jennifer Yu (Spring 2022)
- Meisen Hu (Summer 2022)
- Ruihan Xu (Summer 2022)
- Muhammad Qasim (Summer 2022)
- Shengyi Jia (Summer 2022)
- Nikhil Khanna (Summer 2022)
- Edmund Sepeku (B.S. 2022; Spring 2021)
- Kharissa King (Spring 2021)
- Elias Neuman-Donihue (B.S. 2022; Summer 2021–Spring 2022)
- Samuel Triest (B.S. 2020; now at CMU)
- Yawo Alphonse Siatitse (B.S. 2020; now at John Hopkins University)
- Qiuyue Sun (B.S. 2020; now at ByteDance)
- Sifan Ye (B.S. 2020; now at Stanford University)
- Weituo Kong (B.S. 2020; now at Brown University)
- Oliver Zhang (now at Univ. of Michigan)
- Noah Helterbrand (B.S. 2020)
- Tolga Furkan Aktas (B.S. 2020)
- Jessica Ervin (B.S. 2020)

#### Previously at UT Austin

- Hannah Peeler, Undergraduate student, 2016 (now at Arm Research)
- Janna Tulabot, Undergraduate student, 2016
- Matthew Halpern, Ph.D. student, 2013 - 2017 (now at Google)
- Wenzhi Cui, Ph.D. student, 2015 - 2017 (now at Google)

#### DISSERTATION COMMITTEE

##### **Ph.D. Candidate**

- David Lippman (Optics, proposed in 2021): *Freeform gradient-index optical design and metrology for reduced system size and weight*
- Uday Kumar Redd Vengalam (ECE, proposed in 2022)
- Irving Barron (ECE, proposed in 2022)

##### **Ph.D.**

- Sayak Chakraborti (CS, 2022): *Opportunistic Resource Management: Resource Utilization in Datacenters*
- Divya Ojha (CS, 2022): *Defending Against Microarchitectural Side Channel Leaks*
- Haichuan Yang (CS, 2020): *Sparse Learning for Model Optimization*
- Daniel Nikolov (Optics, 2020): *Software and Hardware Enabling the Next-Generation Near-Eye Displays*
- Kan Xu (ECE, 2020): *Power Delivery in High Current 3-D Systems*
- Hoda Sadat Ayatollahi Tabatabaei (ECE, 2018): *Energy Balancing in Wireless Networks with MIMO Communications*

### **M.S.**

- Yiwen Fan (Optics, 2020): *Numerical Calculation of Zernike Polynomials and the Sample Selection Method of NURBS Spline Generation*

### **B.S.**

- Sifan Ye (CS, 2020): *3D Reconstruction from Colored Point Clouds with Detail Transfer*
- Samuel Triest (CS, 2020): *Unsupervised Reinforcement Learning in Environments with Strong Priors*
- Benned Hedegaard (CS, 2022): *Sign-Informed Semantic Mapping for Language Interaction*
- Elias Neuman-Donihue (CS, 2022): *Fast Rendering of Massive Point Clouds*