

Yuhao Zhu

CONTACT INFORMATION

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

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RESEARCH INTERESTS

My research interests are computer architecture and software design to enable next-generation computing systems that are energy-efficient, intelligent, and offer desirable user-experience. My recent work has focused on domain-specific systems for real-time computer vision, Augmented/Virtual Reality, and Web technologies.

EDUCATION

The University of Texas at Austin

Ph.D., Electrical and Computer Engineering

May 2017

Advisor: [Vijay Janapa Reddi](#)

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

Beihang University, Beijing, China

B.S., Computer Science and Engineering

June 2010

Advisor: [Yangdong Deng](#)

AWARDS

- ACM SIGARCH – IEEE Computer Society TCCA Outstanding Dissertation Award, Honorable Mention, 2018
- Google Faculty Research Award, 2017
- Google Ph.D. Fellowship, 2016
- IEEE Micro Top Picks of Computer Architecture, Honorable Mention, 2016
- Qualcomm Innovation Fellowship Finalist, 2015
- Best of Computer Architecture Letters Award, 2014
- UT Austin Microelectronics and Computer Development Fellowship, 2011-2012
- Outstanding Undergraduate Thesis Award, Beihang University, 2010

PROFESSIONAL POSITIONS

University of Rochester

Assistant Professor, Department of Computer Science
Affiliated Faculty, Goergen Institute for Data Science

Jan. 2018 - now

June 2018 - now

ARM Research

Visiting Researcher

July 2017 - Dec. 2017

Harvard University

Research Fellow

Aug. 2016 - May 2017

The University of Texas at Austin

Graduate Researcher

Aug. 2010 - May 2017

Teaching Assistant

Fall 2010, Spring 2011, Spring 2014

Google Inc.

SWE Intern (Lead of [Flow API](#) of the [Catapult](#) 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 **Invited Articles**

- [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.

Journal Articles

- [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](#), 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 & Significant Workshop Papers

- 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
- 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 \(SoC\) Perspective](#)
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 2016
- [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 Filed

- [Yuhao Zhu](#), Paul Whatmough
Computer Vision Processing
US Patent Filed

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

ACADEMIC TALKS

- **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
ISCA 2018, June 2018, Los Angeles, CA
- **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
- [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 (lightning 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 (lightning version)
Intel invited talk, July 2014, Austin, TX
- [High-Performance and EnergyEfficient Mobile Web Browsing on Big/Little Systems](#)

HPCA 2013, February 2013, Shenzhen, China

UT Austin Programming Language Lunch Seminar, September 2012, Austin, TX

AMD Research Lab, August 2012, Austin, TX

- [Hermes: An Integrated CPU/GPU Microarchitecture for IP Routing](#)
DAC 2011, June 2011, San Diego, CA

SOFTWARE ARTIFACTS

SCALE-Sim (<https://github.com/ARM-software/SCALE-Sim>)

- Systolic CNN AccelErator Simulator.

GreenWeb (<https://codereview.chromium.org/1835303002/>)

- Language and runtime for energy-efficient mobile Web.

AutoGreen (<https://github.com/yuhao/AutoGreen>)

- Framework to annotate Web applications with GreenWeb language extensions.

Node Benchmark (<https://github.com/nodebenchmark/benchmarks>)

- Node.js-based event-driven server workload suite.

Domino.js (<https://github.com/yuhao/domino.js>)

- DOM instrumentation and optimization framework.

SERVICES

Program Committee

- ISPASS 2019: Program Committee
- IEEE Micro Top Picks 2018: Program Committee
- [HPCA 2019](#): Program Committee
- [HPCA 2018](#): External Reviewer Committee
- [ISCA 2017](#): External Reviewer Committee
- [HCOMP 2016](#): Program Committee
- [CGO-PPoPP 2015, 2016](#): Artifacts Evaluation Committee
- [TinyToCS](#) Volume IV: Program Chair
- [TinyToCS](#) Volume III: Program Committee

Workshop and Tutorial Organizations

- Co-organizer: Infrastructure and Methodology for SoC Performance and Power Modeling Tutorial co-located with IISWC 2018
- Co-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
- Co-organizer: [MobiTools](#) Workshop co-located with ISCA 2016

Solicited Reviewer

- [MDPI Sensor](#) (2018), [ICS](#) (2018), [IEEE CAL](#) (2018, 2017), [IEEE TMC](#) (2017), [IEEE Micro](#) (2018, 2017), [ACM TACO](#) (2016), [IEEE ESL](#) (2015), [DAC](#) (2012, 2011), [ACM TODAES](#) (2011)

OUTREACH ACTIVITIES

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

- Taught a three-day workshop 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 2018, Computer Organization
- Fall 2018, Mobile Systems Architecture

Teaching Assistant (UT Austin)

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

MENTORING

University of Rochester

Ph.D.:

- Yu Feng (MS: Carnegie Mellon Univ.)
- Yiming Gan (MS: UC Santa Babara)

MS:

- Chi-chun Chen (BS: National Taiwan Univ.)

Undergraduate:

- Qiuyue Sun
- Yawo Alphonse Siatitse
- Jessica Ervin
- Prikshet Sharma

Alumni:

- **Undergraduate:** Oliver Zhang (now at Univ. of Michigan), Noah Helterbrand, Tolga Furkan Aktas

Previously at UT Austin

- Hannah Peeler, Undergraduate student, 2016
- Janna Tulabot, Undergraduate student, 2016
- Matthew Halpern, Ph.D. student, 2013 - 2017
- Wenzhi Cui, Ph.D. student, 2015 - 2017