

# Yuhao Zhu

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## CONTACT INFORMATION

Assistant Professor, Computer Science  
University of Rochester  
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## RESEARCH INTERESTS

My research interests are computer architecture and software design to enable next-generation mobile systems that are energy-efficient, intelligent, and offer desirable end-user experience. To that end, my recent work has focused on domain-specific systems architecture for continuous vision, Virtual Reality, and Web technologies.

## EDUCATION

### The University of Texas at Austin

Ph.D., Electrical and Computer Engineering  
Advisor: [Vijay Janapa Reddi](#)  
Dissertation: [Energy-Efficient Mobile Web Computing](#)

*May 2017*

### Beihang University, Beijing, China

B.S., Computer Science and Engineering  
Advisor: [Yangdong Deng](#)

*June 2010*

## HONORS & RECOGNITIONS

- Google Faculty Research Award, 2018
- SIGARCH/TCCA Outstanding Dissertation Award, Honorable Mention, 2018
- 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  
Teaching Assistant

Aug. 2010 - May 2017

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 Papers**

- [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*

### **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 (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)*  
*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

- **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 III: Program Committee

### Organizing Committee

- 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
- Program Chair: **TinyToCS** Volume IV

### Solicited Reviewer

- **ICS** (2018), **IEEE CAL** (2018), **IEEE TMC** (2017), **IEEE Micro** (2018, 2017), **ACM TACO** (2016), **IEEE ESL** (2015), **DAC** (2012, 2011), **ACM TODAES** (2011)

**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

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 Barbara)

**MS:**

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

**Undergraduate:**

- Tolga Furkan Aktas
- Noah Helterbrand
- Prikshet Sharma
- Qiuyue Sun

**Alumni:**

- **Undergraduate:** Oliver Zhang (Univ. of Michigan)
- **Undergraduate:** Abdullah Al Mamun (Yale Univ.)

**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