
Education

University of Michigan

Ph.D., Electrical Engineering and Computer Science

- Advised by Hun-Seok Kim and Ron Dreslinski

Ann Arbor, MI, USA

2018–pres.

University of Washington

M.S., Electrical Engineering

B.S., Electrical Engineering, Minor in Mathematics

- Advised by Visvesh Sathe

Seattle, WA, USA

2015–2018

2011–2015

Research Interests

Hardware and algorithm design for high-performance and energy-efficient computing systems, with an emphasis on critical application domains such as machine learning, computer vision, and next-generation wireless communications.

Peer-Reviewed Publications

Conferences

VLSI'18

“An All-Digital Unified Clock Frequency and Switched-Capacitor Voltage Regulator for Variation Tolerance in a Sub-Threshold ARM Cortex M0 Processor”

Fahim U. Rahman, **Sung Kim**, Naveen John, Roshan Kumar, Xi Li, Rajesh Pamula, Keith A. Bowman, and Visvesh Sathe

IEEE Symposium on VLSI Circuits, 2018

VLSI'18

“An All-Digital True-Random-Number Generator with Integrated De-correlation and Bias Correction at 3.2-to-86 MB/s, 2.58 PJ/Bit in 65-nm CMOS”

Rajesh Pamula, Xun Sun, **Sung Kim**, Fahim U. Rahman, Baosen Zhang, and Visvesh Sathe

IEEE Symposium on VLSI Circuits, 2018

ISSCC'18

“A Combined All-Digital PLL-Buck Slack Regulation System with Autonomous CCM/DCM Transition Control and 82% Average Voltage Margin Reduction in a 0.6-1.0V Cortex-M0 Processor”

Xun Sun, **Sung Kim**, Fahim U. Rahman, Rajesh Pamula, Xi Li, Naveen John, and Visvesh Sathe

IEEE International Solid State Circuits Conference, 2018

DATE'18

“MATIC: Learning Around Errors for Efficient Low-Voltage Neural Network Accelerators”

Sung Kim, Patrick Howe, Thierry Moreau, Armin Alaghi, Luis Ceze, and Visvesh Sathe

Design, Automation and Test in Europe, 2018

Best Paper Award

IISWC'17

“Exploring Computation-Communication Tradeoffs in Camera Systems”

Amrita Mazumdar, Thierry Moreau, **Sung Kim**, Meghan Cowan, Armin Alaghi, Luis Ceze, Mark Oskin, and Visvesh Sathe

IEEE International Symposium on Workload Characterization, 2017

ISC2'15

“Motion-Vector Clustering for Traffic Speed Estimation from UAV Video”

Ruimin Ke, **Sung Kim**, Zhibin Li, and Yin Hai Wang

IEEE International Smart Cities Conference, 2015

Journals

- SSCL'19 **"A 65nm CMOS 3.2-to-86 Mbps 2.58 pJ/b Highly Digital True-Random-Number Generator with Integrated De-correlation and Bias Correction"**
Rajesh Pamula, Xun Sun, Sung Kim, Fahim U. Rahman, Baosen Zhang and Visvesh Sathe
IEEE Solid-State Circuits Letters, 2019
- JSSC'19 **"A Unified Clock and Switched-Capacitor-Based Power Delivery Architecture for Variation Tolerance in Low-Voltage SoC Domains"**
Fahim U. Rahman, **Sung Kim**, Naveen John, Roshan Kumar, Xi Li, Rajesh Pamula, Keith A. Bowman, Visvesh Sathe
IEEE Journal of Solid-State Circuits, 2019
- TCAS-I'18 **"Energy-Efficient Neural Network Acceleration in the Presence of Bit-Level Memory Errors"**
Sung Kim, Patrick Howe, Thierry Moreau, Armin Alaghi, Luis Ceze, and Visvesh Sathe
IEEE Transactions on Circuits and Systems - I, 2018
- ITS'16 **"Real-Time Bidirectional Traffic Flow Parameter Estimation from Aerial Videos"**
Ruimin Ke, Zhibin Li, **Sung Kim**, John Ash, and Yinhai Wang
IEEE Transactions on Intelligent Transportation Systems, 2016

Workshops

- INFOCOM'18 **"Enabling Time-Critical Applications over Next-Generation 802.11 Networks"** (Demo Paper)
Sung Kim, Mohammad Mamunur Rashid, Saurabh Deo, Javier Perez-Ramirez, Mikhail Galeev, Ganesh Venkatesan, Sabyasachi Dey, William Li, Dave A. Cavalcanti
IEEE International Conference on Computer Communications, 2018
Best Demo Award
- TRB'16 **"Efficient Vehicle Detection in Aerial Videos Using Combined Cascaded Classifiers and Neural Network Detectors"**
Sung Kim, Ruimin Ke, Zhibin Li, Yinhai Wang
The Transportation Research Board 95th Annual Meeting, 2016

Research and Industry Experience

University of Michigan Ann Arbor, MI
Graduate Researcher 2018–pres.

- Computer architecture and digital IC design; software-defined reconfigurable processors
- With Hun-Seok Kim and Ron Dreslinski

Intel Labs & Intel Programmable Solutions Group (Altera) Hillsboro, OR
Research Intern 2017–2018 (8 mo.)

- Hardware and systems development for time-sensitive WiFi on SoC FPGAs
- With Mamun Rashid and Dave Cavalcanti

University of Washington Seattle, WA
Graduate Researcher, Processing Systems Lab 2015-2018

- Algorithm/hardware co-design for energy-efficient machine learning accelerators
- With Visvesh Sathe

NVIDIA Santa Clara, CA
Software Engineer Intern 2016 (5 mo.)

- EDA algorithm development, and applications of machine-learning for VLSI physical design
- With Vikas Agrawal and Ramesh Sundararaman

Electro Scientific Industries*Hardware Engineer Intern*

Portland, OR

2014 (4 mo.)

- Hardware development for industrial manufacturing lasers

University of Washington*Undergraduate Researcher, M.P. Anantram Group and UW Photonics Lab*

Seattle, WA

2013-2014

- Development of software tools for quantum device research, and optical trap experiments

InnovaTek*Engineering Intern*

Richland, WA

2011

- Hydrogen-reforming catalyst synthesis and characterization

Recognition

- INFOCOM Best Demo Award 2018
- DATE Best Paper Award 2018
- Tau Beta Pi and Eta Kappa Nu 2013
- Xerox Technical Scholarship 2012
- Seattle Foundation C.E. Boucher Scholarship 2011
- University of Washington Dean's List 2011-2015

Teaching and Service
Reviewer

- *IEEE Transactions on Circuits and Systems* 2019
- *Journal of Signal Processing Systems* 2018
- *IEEE Transactions on Intelligent Transportation Systems* 2017

Teaching Assistant, University of Washington.

- Design in Communications with Software-Defined Radio (EE 420) Spring 2018
- Digital VLSI Design I and II (EE 476/477) Winter 2015, Spring 2016
- Seattle MESA (volunteer tutor) 2015-2016

Mentorship

- Chi-Sheng Yang ECE M.S., 2019, University of Michigan
CPU/GPU performance characterization on image and document analysis kernels
- Patrick Howe EE B.S., 2016, University of Washington
FPGA verification and emulation of an OpenMSP430 microcontroller