

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Zhengya Zhang, associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:

Ph.D.	2009	University of California, Electrical Engineering, Berkeley, CA
M.S.	2005	University of California, Electrical Engineering, Berkeley, CA
B.S.	2003	University of Waterloo, Computer Engineering, Waterloo, ON Canada

Professional Record:

2015 – present	Associate Professor (with tenure), Department of Electrical Engineering and Computer Science, University of Michigan
2009 – 2015	Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan

Summary of Evaluation:

Teaching: Professor Zhang has taught classes ranging from the 200 to 500 level with EECS 312 and 427 being the most frequent and 215 taught twice. In addition, he has introduced two new graduate level courses, one on VLSI design for digital signal processing, and one on hardware design for machine learning - both extremely popular courses with enrollments over 40. Notably, he has taught the undergraduate sequence of EECS 215, an introductory course on circuit analysis, EECS 312, a first course in digital circuits, and EECS 427, a digital VLSI/circuits class and MDE taken by both senior-level undergraduate and graduate students. Over the several classes taught, Professor Zhang's course evaluations for Q1 and Q2 are in the mid to upper 4 level, with 15 courses scoring at 4.9 and three at 5.0. He is the recipient of the 2019 College of Engineering Neil Van Eenam Memorial Award for contributions to undergraduate teaching. Beyond his teaching record, he values and emphasizes interaction with the students outside of the classroom, where he meets with students in small groups and creates an open atmosphere. He has supervised 19 Ph.D. students as the chair or co-chair (graduating 13). He has been a member of several other Ph.D. committees, is active in advising M.S. and undergraduate students, as well as mentoring post-doctoral scholars.

Research: Professor Zhang works in the area of digital signal processing (DSP) on chip, or high-performance DSP: implementing common signal processing algorithms as VLSI chips and the creation of domain specific chips for LDPC (low density parity) codes. He has produced a succession of chips in this area. His most recent area of focus, systems composed of chiplets, is a technology that allows one to assemble large systems from smaller chips, such as LPDC encoders, on a silicon substrate. He has published several papers in the *Journal of Solid-State Circuits* (JSSC), the flagship journal for researchers who build VLSI prototypes, as well as

several papers in the IEEE International Solid-State Circuits Conference (ISSCC), the leading conference for VLSI prototypes. ISSCC is more competitive than JSSC, and it requires a VLSI chip that exhibits significant novelty that has been built and tested. He has an h-index of 27 with approximately 2,750 total citations. Professor Zhang has been successful in obtaining significant funds to support his research group from the government and industry including the NSF, ONR, Army Research Office, Ford Motor Company, and Facebook. He is highly respected by his peers for his outstanding research.

Recent and Significant Publications:

Thomas Chen, Jacob Botimer, Teyuh Chou, Zhengya Zhang, “A 1.87mm² 56.9GOPS accelerator for solving partial differential equations,” *IEEE. J. Solid-State Circuits*, 55, 6, 1709-1718, 2020.

Thomas Chen, Ching-En Lee, Chester Liu, Zhengya Zhang, “A 135mW 1.70TOPS sparse video sequence inference SoC for action classification,” *IEEE. J. Solid-State Circuits*, 54, 7, 2081-2090, 2019.

Wei Tang, Chia-Hsiang Chen, Zhengya Zhang, “A 2.4mm² 130mW MMSE-nonbinary LDPC iterative detector-decoder for 4×4 256-QAM MIMO in 65nm CMOS,” *IEEE. J. Solid-State Circuits*, 54, 7, 2070-2080, 2019.

Shiming Song, Kyojin D. Choo, Thomas Chen, Sunmin Jang, Michael P. Flynn, and Zhengya Zhang, “A maximum-likelihood sequence detection powered ADC-based serial link,” *IEEE Trans. Circuits Syst. I, Reg. Papers*, 65, 7, 2269-2278, 2018.

Teyuh Chou, Wei Tang, Zhengya Zhang, “CASCADE: Connecting RRAMs to extend analog dataflow in an end-to-end in-memory processing paradigm,” *IEEE/ACM Int. Symp. Microarchitecture (MICRO)*.” 114-125, 2019.

Service: Professor Zhang has demonstrated an exceptional commitment to service, in particular, to curriculum development and student mentoring within the ECE division that has gone well above and beyond expectations. Professor Zhang’s professional service includes his role as an associate editor and program committee member for top-tier journals and conferences, and a notable commitment to DEI through mentoring URM and female students and as a presenter at the Rising Stars 2020 Workshop at the International Solid-State Circuits Conference to encourage minority and female graduate students to pursue academic careers.

External Reviewers:

Reviewer A: “... Dr. Zhengya Zhang is an internationally renowned researcher whose work has had significant impact in the general area of energy-efficient high-performance VLSI systems for communications and computations. He straddles effortlessly between signal processing algorithms and VLSI circuits and is considered to be a leader in designing innovative systems whose high performance comes not only from use of smart circuits techniques but also from algorithmic innovations.”

Reviewer B: “Zhengya is a terrific researcher. He has risen to the very top of the field worldwide and is without a doubt a researcher of outstanding ability.”

Reviewer C: “His work has made significant impact in the next-gen signal-processor designs and I have witnessed adoption of these techniques by other research groups, both in the industry

and the academia. His work has led to several key publications in the International Solid State Circuits Conference and the VLSI Circuit Symposium, both of which are premier venues for circuit researchers. ... He is a valued member of the circuits society and he is always insightful, collaborative and eager to foster new ideas and mentor [junior] members to develop their own research careers.”

Reviewer D: “Zhengya is a consummate researcher. I am impressed by his attention to details and his masterful and judicious mixing of systems and circuits. Of all the contributions, I consider Zhengya’s contributions to the design of decoders for communications systems – decoders for polar codes and MIMO systems - being most influential and Zhengya as *the* leading authority in this area.”

Reviewer E: “Prof. Zhang has established new research tracks from high-performance DSP engines to AI accelerators, with applications to large-scale computing.”

Summary of Recommendation: Professor Zhang is an excellent instructor who has shown extraordinary dedication to supporting and mentoring students outside of the classroom. He has demonstrated an outstanding record of research and technology transfer. He has been successful in attracting funding for his research and maintains a large and productive research group. It is with the support of the College of Engineering Executive Committee that I recommend Zhengya Zhang for promotion to professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

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