USC Viterbi
School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Ming Hsieh Institute **Seminar Series**

Integrated Systems

Foundational AI Framework for Automated Synthesis of Analog Integrated Circuits

Dr. Xuan 'Silvia' Zhang
Associate Professor, Northeastern University

Date: Friday, November 1st, 2024, Time: 2:00pm, Location: EEB 132

Zoom Meeting Link: https://usc.zoom.us/j/92564669688

Refreshments will be served

Abstract: Artificial intelligence (AI) and machine learning (ML) technologies have profoundly reshaped our world, manifesting their prowess in perception, knowledge generation, and decision making. In a similar fashion, AI/ML will undoubtedly be a disruptive force to revolutionize the IC design process. Due to their labor-intensive nature, analog and radio frequency (RF) circuits take a disproportionate share in design cost and could therefore benefit tremendously from automation. In this talk, I will present the recent work from my lab towards the goal of building a foundational AI framework for analog IC design automation. I will first introduce our deep learning-based method to automate parameter optimization in analog/RF circuits with a unique domain knowledge-infused approach. This method is then expanded to provide robustness and sampling efficiency against design variations caused by process, voltage, and temperature (PVT). Next, I will briefly talk about CktGNN, our hierarchical graph neural network-based approach to synthesizing circuit topology and the first of its kind that leads to the construction of an open-sourced analog circuit dataset (https://github.com/zehao-dong/CktGNN). Finally, I will conclude the talk with a vision statement and roadmap for future AI-driven design automation.

Biography:

Dr. Xuan Zhang is an Associate Professor in the Electrical and Computer Engineering Department at Northeastern University. She works across the fields of integrated circuits/VLSI design, computer architecture, and electronic design automation. Dr. Zhang is an IEEE Women in Engineering (WiE) Distinguished Lecturer for 2023-2024, IEEE Circuits and Systems Society (CAS) Distinguished Lecturer for 2022-2023, and the recipient of NSF CAREER Award in 2020. She currently serves as the Associate Editor-in-Chief at IEEE Transactions on Circuits and Systems I (TCAS-I) and Associate Editor at IEEE Transactions on Computer-Aided Designs (TCAD). Her work has received numerous best paper awards and nominations including ISLPED Best Paper Award in 2022, AsianHOST Best Paper Award in 2020, DATE Best Paper Award in 2019, and Best Paper nominations at DAC 2022, ASP-DAC 2021, MLCAD 2020, DATE 2019, and DAC 2017.

Hosted by Profs. Hossein Hashemi, Mike Chen and Constantine Sideris
Organized by Soumya Mahapatra (smahapat@usc.edu)
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