

**Toward Agile and Open-Source Design
Automation of Digital/Analog/Mixed-Signal ICs**

David Z. Pan

The University of Texas at Austin

Location: Zoom

2:00 pm – 3:30 pm, Friday, Oct. 8th, 2021

Meeting ID: 947 0191 2463 Passcode:138956

<https://usc.zoom.us/j/94701912463?pwd=eW1KVmhuODFHdHpMemhQbTlIMEZ6Zz09>

Abstract: This talk will present some recent results and trends toward agile and open-source design automation for digital/analog/mixed-signal ICs, in particular leveraging AI/machine learning with domain-specific customizations. I will first show how we leverage deep learning hardware and software to develop an open-source VLSI placement engine, DREAMPlace [DAC'19 Best Paper Award, TCAD 2020], which is around 40x faster than the previous state-of-the-art academic global placer with high quality. DREAMPlace 2.0 and 3.0 have been further developed to tackle detailed placement acceleration and region constraints. I will then present the DARPA-funded project MAGICAL which leverages both machine and human intelligence to produce fully automated analog layout from netlists to GDSII, including automatic layout constraint generation, placement, and routing. MAGICAL 1.0 has been open-sourced, and validated with a silicon-proven 40nm 1GS/s $\Delta\Sigma$ ADC [CICC'21]. I will also discuss our new MAGICAL extension -- OpenSAR, an open-source automated end-to-end SAR ADC compiler [ICCAD'21], and other directions.

Biography: David Z. Pan is a Professor and Silicon Laboratories Endowed Chair at the Department of Electrical and Computer Engineering, The University of Texas at Austin. His research interests include bidirectional AI and IC interactions, electronic design automation, design for manufacturing, hardware security, and CAD for analog/mixed-signal ICs and emerging technologies. He has published over 400 refereed journal/conference papers and 8 US patents. He has served in many journal editorial boards and conference committees, including various leadership roles such as ICCAD 2019 General Chair, ASP-DAC 2017 TPC Chair, and ISPD 2008 General Chair. He has received many awards, including SRC Technical Excellence Award, 19 Best Paper Awards (at DAC, ICCAD, DATE, ASP-DAC, ISPD, HOST, etc.), DAC Top 10 Author Award in Fifth Decade, ASP-DAC Frequently Cited Author Award, Communications of ACM Research Highlights, ACM/SIGDA Outstanding New Faculty Award, NSF CAREER Award, IBM Faculty Award (4 times), and many international CAD contest awards. He has graduated 40 PhD students and postdocs who have won many awards, including the First Place of ACM Student Research Competition Grand Finals (twice, in 2018 and 2021), ACM/SIGDA Student Research Competition Gold Medal (three times), ACM Outstanding PhD Dissertation in EDA Award (twice), EDAA Outstanding Dissertation Award (twice), etc. He is a Fellow of IEEE and SPIE.



Faculty Hosts: Mike Chen, Hossein Hashemi, Manuel Monge, Constantine Sideris

Student Organizer & Host: Qiaochu Zhang (giaochuz@usc.edu)