Juzheng Liu

Curriculum Vitae

PERSONAL DETAILS

Address	3737 Watt Way, room 424; Los Angeles, California, USA
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RESEARCH INTERESTS

Analog-mixed-signal (AMS) circuit design
AMS circuit modeling and circuit design automation
In-memory computing
Biomedical circuit and systems
Machine learning

EDUCATION

Ph.D. of Electrical Engineering 2019-now
Ming Hsieh Department of Electrical and Computer Engineering
University of Southern California
GPA:4.0/4.0
Advisor: Mike Shuo-Wei Chen

Bachelor of Science 2015-2019
Department of Physics
Tsinghua University
GPA:3.62/4.0

RESEARCH EXPERIENCE

High-Speed Time-domain ADC Design 2020-now
ECE, University of Southern California

- Designed the circuit architecture, schematic, and physical layout of a **5GS/s 8-bit** single-channel ADC in **12nm** FinFet CMOS. Measured the silicon prototype performance.Achieved state-of-the-art conversion speed and power/area efficiency.
- Collaborated with MediaTek. Designed the calibration algorithm, circuit architecture, schematic, and physical layout of a **16GS/S 10-bit** TI Time-Based ADC in **4nm** FinFet CMOS. Measured the silicon prototype performance. Achieved state-of-the-art power/area efficiency.

Circuit Modeling and Design Automation 2019-now
ECE, University of Southern California

- Developed the Bayesian optimization aided sampling (BOAS) algorithm for efficient circuit modeling

- Developed the transfer learning algorithm of circuit regression models. Improved the modeling accuracy and efficiency.
- Developed the CNN-based early performance assertion (CEPA) scheme for AMS circuits.
- Developed the analog-mixed-signal circuit parameter search engine.

Image Morphing for Distributed Learning 2018
ECE, Duke University

- Developed an image morphing algorithm for privacy-preserving image learning tasks.

Bowel Sound Detection 2018
Institute of Microelectronics, Tsinghua University

- Collected bowel sound through a wireless recording device and a blue tooth gateway
- Developed a piece-wise audio MFCC feature extraction method for LSTM training
- Achieved the state of the art detection accuracy

Activity Recognition in Wearable ECG Monitoring 2017
Institute of Microelectronics, Tsinghua University

- Collected three-axis accelerometer data through a wearable Electrocardiography (ECG) device.
- Developed an automated human activity classification algorithm to be applied to motion artifact removal in ECG signal.

TEACHING EXPERIENCE

EE479: Analog Integrated Circuit Design 2020 Fall
Teaching assistant
University of Southern California

EE536b: Mixed-Signal Integrated Circuit Design 2023 Spring
Teaching assistant
University of Southern California

Research Mentor Since 2019
University of Southern California

- Worked with master students **Zihao Mai** and **Zijie Wang** on digital circuit design and layout in 12nm FinFet technology.
- Worked with master student **Shuxuan Wen** on digital synthesis flow in 12nm FinFet technology.
- Worked with master student **Samual Saunders** on VCO measurement and characterization.
- Worked with undergraduate student **Yubin Lin** on circuit modeling and training dataset generation.

AWARDS

MHI Ph.D. Scholar 2023
University of Southern California

ISSCC 2022 Jack Kilby Award for Outstanding Student Paper 2022
IEEE International Solid State Circuit Conference

3rd Place of Low-Power Image Recognition Challenge 2018
IEEE Rebooting Computing

Summer Internship Scholarship 2018
Department of Physics, Tsinghua University

First Prize of Chinese Physics Olympiad(CPhO) 2014
Chinese Physical Society

PROFESSIONAL AFFILIATION AND REVIEW ACTIVITIES

IEEE Student Member, IEEE Solid-State Circuit Society Member

Reviewer
IEEE Journal of Solid-State Circuits (JSSC)
IEEE Solid-State Circuits Letters (SSCL)
IEEE Transaction on Computer-Aided Design (TCAD)

INDUSTRY EXPERIENCE

Analog-Mixed Signal Circuit Design Intern 2022 Summer
MediaTek Inc.
Design and layout of the 16GS/s 10-bit ADC in 4nm FinFet CMOS technology.

PUBLICATIONS

A Memristor-Based Analog Accelerator for Solving Quadratic Programming Problems
*Hsiang-Chun Cheng, ... **Juzheng Liu**, ... Mike Shuo-Wei Chen, 2023, IEEE CICC*

A 10GS/s 8bit 2850um^2 Two-Step Time-Domain ADC With Speed and Efficiency Enhanced by the Delay-Tracking Pipelined-SAR TDC
***Juzheng Liu**, Mohsen Hassanpourghadi, and Mike Shuo-Wei Chen, 2022, IEEE Journal of Solid-State Circuits (JSSC)*

A 10GS/s 8b 25fJ/c-s 2850um2 Two-Step Time-domain ADC Using Delay-Tracking Pipelined-SAR TDC with 500fs Time Step in 14nm CMOS Technology (Jack Kilby Best Student Paper Award)
***Juzheng Liu**, Mohsen Hassanpourghadi, and Mike Shuo-Wei Chen, 2022, IEEE ISSCC*

Analog/Mixed-Signal Circuit Synthesis Enabled by the Advancements of Circuit Architectures and Machine Learning Algorithms
*Shiyu Su, Qiaochu Zhang, Mohsen Hassanpourghadi, **Juzheng Liu**, Rezwan A Rasul, and Mike Shuo-Wei Chen, 2022, Asia and South Pacific Design Automation Conference (ASP-DAC)*

TAFA: Design Automation of Analog Mixed-Signal FIR Filters Using Time Approximation Architecture
*Shiyu Su, Qiaochu Zhang, **Juzheng Liu**, Mohsen Hassanpourghadi, Rezwan Rasul, Mike Chen, 2022, Asia and South Pacific Design Automation Conference (ASP-DAC)*

From Specification to Silicon: Towards Analog/Mixed-Signal Design Automation using Surrogate NN Models with Transfer Learning
***Juzheng Liu**, et al, 2021, IEEE/ACM ICCAD*

Circuit Connectivity Inspired Neural Network for Analog Mixed-Signal Functional Modeling
*Mohsen Hassanpourghadi, Shiyu Su, Rezwan A. Rasul, **Juzheng Liu**, Qiaochu Zhang, and Mike Shuo-Wei Chen, 2021, 58th ACM/EDAC/IEEE Design Automation Conference (DAC).*

CEPA: CNN-based Early Performance Assertion Scheme for Analog and Mixed-Signal Circuit Simulation
*Qiaochu Zhang, Shiyu Su, **Juzheng Liu** and Mike Shuo-Wei Chen, 2020, IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*

Transfer Learning with Bayesian Optimization-Aided Sampling for Efficient AMS Circuit Modeling
***Juzheng Liu**, Mohsen Hassanpourghadi, Qiaochu Zhang, Shiyu Su and Mike Shuo-Wei Chen, 2020, IEEE/ACM International Conference on Computer-Aided Design (ICCAD).*

Low-power computer vision: Status, challenges, and opportunities
*Sergei Alyamkin, ... **Juzheng Liu**, ... Shaojie Zhuo, 2019, IEEE Journal on Emerging and Selected Topics in Circuits and Systems*

Bowel Sound Recognition Using SVM Classification in a Wearable Health Monitoring System
*Yin, Yue; Jiang, Hanjun; Feng, Shulin; **Liu, Juzheng**; Chen, Ping; Zhu, Binjie; Wang, Zhihua. Sci China Inf Sci, 2018, 61: 084301*

Bowel Sound Detection Based on MFCC Feature and LSTM Neural Network
***Juzheng Liu**, Yue Yin, Hanjun Jiang, Huili Kan, Zongwang Zhang, Ping Chen, Binjie Zhu, Zhihua Wang. 2018, IEEE Biomedical Circuits and Systems (BioCAS)*

Activity Recognition in Wearable ECG Monitoring Aided by Accelerometer Data
***Juzheng Liu**, Jing Chen, Hanjun Jiang, Wen Jia, Qingliang Lin, Zhihua Wang. 2018 IEEE International Symposium on Circuits and Systems (ISCAS)*