

HSIANG-CHUN CHENG

Curriculum Vitae

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RESEARCH INTERESTS

- Analog/RF Integrated Circuit Design
- Mixed-Signal Circuit Design

EDUCATION

Ph.D. in Electrical Engineering Jan. 2021 - present
Ming Hsieh Department of Electrical and Computer Engineering, University of Southern California, CA

B.S. in Electrical Engineering Sept. 2015 - June 2019
Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan

RESEARCH EXPERIENCE

Analog Mixed-Signal Group, University of Southern California Oct. 2021 - present
Advisor: Mike Shuo-Wei Chen, *Professor*
Topic: Memristor-based Analog Accelerator for Solving Quadratic Programming (QP) Problems

- Proposed replica-switch technique in the resistor DAC to improve nonlinearity
- Achieved the fastest solving time among prior works on the analog QP solver in 65nm CMOS

High-Speed Circuits Lab, National Taiwan University Sept. 2017 - Oct. 2019
Advisor: Tai-Cheng Lee, *Professor*
Topic: Low-Power 32.768-kHz Crystal Oscillator

- Proposed a pulse regulator that adaptively adjusts the energy injection time
- Achieved 65.6% power reduction with process variations in 40nm CMOS

PUBLICATIONS

- [1] M. Palaria, S. Su, **H. -C. Cheng**, R. Rasul, Q. Zhang, S. Mahapatra, C.-F. Law, S. Hossain, R. Bena, W. Wu, Q. Nguyen, M. S.-W. Chen, "Analog Kalman Filter with Integration and Digitization via a Shared Thyristor-Based VCO for Sensor Fusion in 65 nm CMOS," in *IEEE European Solid-State Circuits Conference (ESSCIRC)*, Sep. 2023.
- [2] **H. -C. Cheng**, S. Su, M. Palaria, Q. Zhang, C. Yang, S. Hossain, R. Bena, B. Chen, Z. Liu, J. Liu, R. Rasul, Q. Nguyen, W. Wu, M. S.-W. Chen, "A Memristor-Based Analog Accelerator for Solving Quadratic Programming Problems," in *IEEE Custom Integrated Circuits Conference (CICC)*, April 2023. [link]
- [3] Q. Zhang, **H. -C. Cheng**, S. Su, and M. S.-W. Chen, "A Fractional-N Digital MDLL with Injection Error Scrambling and Background Third-Order DTC Delay Equalizer Achieving -67dBc Fractional Spur," in *IEEE International Solid-State Circuits Conference (ISSCC)*, Feb. 2023. [link]

- [4] **H. -C. Cheng**, Y. -H. Yang and T. -C. Lee, "Analysis and Design of a Self-Charged Crystal Oscillator with Pulse Regulating Feedback Loop," *2020 International Symposium on VLSI Design, Automation and Test (VLSI-DAT)*, Hsinchu, Taiwan, 2020, pp. 1-4 [link]

TRAINING

CMOS RFIC Design and Implementation Feb. 2019

5-GHz Low Noise Amplifier Design in 0.18- μ m CMOS, Taiwan Semiconductor Research Institute (Hsinchu), Taiwan

- Completed tape-out and on-wafer measurement [PDF]

Cell-Based Digital IC Design and Implementation Aug. 2019

Gravity Center Calculator Design in 0.18- μ m CMOS, Taiwan Semiconductor Research Institute (Hsinchu), Taiwan

- Completed tape-out and measurement [PDF]

TECHNICAL SKILLS

Programming Languages: Matlab, Verilog, Python, Verilog-A, HSPICE

Design Tools: Virtuoso, Spectre, Design Compiler, Calibre, ADS