Renhe Chen

Curriculum Vitae

393 Road Middle Huaxia
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Education

2021–2024 (Expected) **ShanghaiTech University**, *Master of Eng. candidate in Electrical Engineering*.
Thesis supervisor: Prof. Xufeng Kou.
Thesis: CMOS Mixed Signal Circuits for Spintronic Memory
GPA:3.77/4.0
Major Courses: Analog IC II(A+), Nano Processing(A+), Physics of Semiconductor Devices(A+)

2017–2021 **ShanghaiTech University**, *Bachelor of Eng. in Electrical Engineering*.
GPA:3.71/4.0
Major Courses: Analog IC(A+), Digital IC(A+), Embedded Systems(A+), Electric Circuits(A)

Research Projects

Apr. 2022 – Present **High performance analog-to-digital converter**, in ShanghaiTech University.
- Built a SAR ADC model including sampling jitter, thermal noise, mismatch and incomplete settling.
- Proposed a gain-boosting dynamic comparator featuring a modified pre-amplifier with positive feedback and static current cut-off circuit.
- Designed an asynchronous SAR logic maximizing CDAC settling time and has low circuit complexity.
- Implemented a 12-bit 100 MS/s SAR ADC utilizing the proposed comparator and SAR logic.
- Customized circuit layout with area and mismatch optimization.
- Fabricated in 28-nm CMOS, set up testing system with dedicated PCB and FPGA control program.

Collaborator: Prof. Hao Xu from Fudan University, Shanghai, China.

Jun. 2022 – Present **Dynamic bias optimization circuit for MRAM**, in ShanghaiTech University.
- Quantified the optimal read bias voltage of MRAM cell, in reference with measured results.
- Designed a dynamic bias optimization circuit (DBO) that can track the optimal read bias voltage in background, with respect to a wide range of process variation and thermal conditions.
- Simulated the proposed DBO with 1-Mb MRAM array, using 28-nm PDK and Verilog-A MRAM model.

Collaborator: Dr. Albert Lee from UCLA, CA, the US.

Jul. 2020 – 2021 **Cryogenic circuit design and testing**, in ShanghaiTech University.
- Simulated CMOS circuit operation down to 10K using cryogenic compact model.
- Implemented a 5-bit flash ADC using cryogenic modeled PDK, fabricated in 40-nm CMOS.
- Cryogenic circuit test and evaluation using liquid helium dewar.

Skills

Software **IC Design**: Cadence Virtuoso, Synopsys Design Compiler, IC Compiler, Verdi, VCS, Formality
Embedded system: Altuim Designer, Xilinx Vivado, Keil uVision, NI Multisim
Other: Silvaco TCAD, Tanner L'edit, Adobe Photoshop, Illustrator

Programming Matlab, C/C++, Python, Rust, R

Instrument oscilloscope, network analyzer, logic analyzer, signal source analyzer, cryogenic testing system

Language Chinese (Native), English (Fluent, TOEFL iBT: 99), Japanese (Basic)

Work Experience

Jun. 2022 – Jan.2023 Internship as Analog IC Design Engineer, United Imaging, Shanghai

2021 Spring, 2021 Fall Teaching Assistant of Digital Integrated Circuits I, ShanghaiTech University

Publications

Journal publications

• **R.Chen**, A. Lee, Z. Wang, D. Wu, X. Kou. "A Read Margin Enhancement Circuit with Dynamic Bias Optimization for MRAM." IEEE Transactions on Circuits and Systems II - Express Briefs (under review).

Conference publications

• **R.Chen**, A. Lee, H. Xu, Y. Hu, X, Kou." A 100 MS/s 5.3 fJ/conversion-step Asynchronous SAR ADC with Gain Boosting Comparator." IEEE International Symposium on Circuits and Systems (ISCAS), 2024 (under review).

• Y Hu, Z Wang, **R Chen**, Z Tang, A Guo, C Cao, W Wu, S Chen, Y Zhao, L Yu, G Shang, H Xu, S Hu, X Kou." Cryo-CMOS Model-Enabled 8-Bit Current Steering DAC Design for Quantum Computing." IEEE International Symposium on Circuits and Systems (ISCAS), 2022.

• Z Wang, C Cao, P Yang, Y Yuan, Z Tang, **R Chen**, W Wu, X Luo, A Guo, L Yu, G Shang, Z Zhang, S Hu, X Kou." Designing EDA-Compatible Cryogenic CMOS Platform for Quantum Computing Applications." IEEE Electron Devices Technology & Manufacturing Conference (EDTM), 2021.

Awards

2022 Outstanding Student, ShanghaiTech University

2019 Second Prize in Shanghai, National Undergraduate Electronics Design Contest

2019 First Prize in the north region, RoboMaster Robotics Competition

2019 Third Prize national, RoboMaster Robotics Competition

2018,2020 Excellent Academic Scholarship of SIST, ShanghaiTech University

Activities

2018-2019 Vice President of the School's Volunteers' Association, ShanghaiTech University

2017-2021 Vice President of the School's Modelers' Club, ShanghaiTech University

Jul. 2019 Museum Docent in Shanghai Science and Technology Museum

Jun. 2018, Jun. 2021 Volunteer of the Open Day, ShanghaiTech University

References

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