JIAQI GU

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EDUCATION

The University of Texas at Austin PhD of Electrical and Computer Engineering May 2023
Integrated Circuits and System Track Overall GPA 4.00/4.00

Fudan University, Shanghai, China Bachelor of Microelectronic Science and Engineering Jul 2018
(Eminent Engineer Program) Overall GPA: 3.91/4.00

EXPERIENCE

Graduate Research Assistant, The University of Texas at Austin Jun 2019 – Present
- Designed novel architecture for area-efficient optical neural network based on Fast Fourier Transformation; achieved 3-4x area reduction than previous ONN architectures; Wrote academic paper that was published in *IEEE/ACM ASP-DAC, Jan 2020*.
- Developed noise-aware quantization scheme to enable robust optical neural networks with low-precision voltage controls; achieved better accuracy and robustness to limited control resolution and device-level variations than previous methods; Wrote academic paper that was published in *DATE, Mar 2020.*
- Proposed efficient on-chip learning algorithm for optical neural networks with stochastic zeroth-order optimization algorithms; achieved 3-4x higher ONN forward efficiency and better robustness to thermal variation than previous methods.
- Worked on photonic chip tapeout for novel ONN architectures with synopsys optodesigner.
- Collaborated on the design of photonic recurrent neural networks.
- Helped develop high-performance CUDA kernels for ASIC Placement acceleration with GPUs.

Graduate Research Assistant, The University of Texas at Austin Sep 2018 – Jan 2019
- Projected RISC-V Rocket Core on Zynq FPGA and achieved communication between them
- Customized FIRRTL transformation and built infrastructure for fault injection and system state snapshot

Research Assistant, Fudan University, Shanghai, China Aug 2017 – Jul 2018
- Modified infant brain atlas offered by UNC and created complete tissue probability maps
- Developed two-stage reconstruction framework for infant thin-section MR image reconstruction by using GANs and CNN; research is developing brand new method to improve reconstruction performance by fusing multi-planar MR images, and improving PSNR, SSIM, and NMI by 26.2%, 93.4%, and 25.3% respectively compared to bicubic interpolation
- Wrote academic paper on research that was published in *IEEE Access, May 2019*.

Research Assistant, Fudan University, Shanghai, China Mar 2016 – Jul 2017
- Developed embedded simulation system on Xilinx Zynq-7000 AP SoC with partial reconfiguration techniques; system allows for end-to-end software/hardware co-design project simulation
- Achieved convenient Wi-Fi connection, flexible development environment, and no network downloading latency
- Designed embedded server and client PC application that could manage simulation requests from multiple users
- Designed FPGA circuits using dynamic partial reconfiguration technique to decouple user logic from simulation system's static logic
- Scheduled user access to on-chip FPGA resources by adopting distributed task queue
- Wrote paper on research that was published in *IEEE 12th International Conference on ASIC, 2017*

PUBLICATIONS

- **Gu, J.**, Zhao, Z., Feng, C., Liu, M., Chen, R., Pan, D. "Towards Area-Efficient Optical Neural Networks: An FFT-based Architecture", accepted to *IEEE/ACM Asian and South Pacific Design Automation Conference (ASPDAC), Beijing, China, Jan. 13-16, 2020*. (**Best Paper Award**)
- **Gu, J.**, Zhao, Z., Feng, C., Zhu, H., Chen, R., Pan, Z. "ROQ: A Noise-Aware Quantization Scheme Towards Robust Optical Neural Networks with Low-bit Controls", accepted to *IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE), Grenoble, France, Mar. 09-13, 2020*.
- Liu, M., Zhu, K., **Gu, J.**, Shen, L., Tang, X., Sun, N., Pan, D. "Towards Decrypting the Art of Analog Layout: Placement Quality Prediction via Transfer Learning", accepted to *IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE), Grenoble, France, Mar. 09-13, 2020*.
- Feng, C., Ying, Z., Zhao, Z., **Gu, J.**, Pan, D., Chen, R. "Wavelength-division-multiplexing based electronic photonic network for high speed computing", accepted to SPIE Photonics West, San Francisco, California, United States, Feb. 01-06, 2020.
- Lin, Y., Li, W., **Gu, J.**, Ren, M., Khailany, B., Pan, D. "ABCDPlace: Accelerated Batch-based Concurrent Detailed Placement on Multi-threaded CPUs and GPUs", accepted to *IEEE Transaction on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Jan., 2020*.

- Zhao, Z., **Gu, J.**, Ying, Z., Feng, C., Chen, R., Pan, D. "Design Technology for Scalable and Robust Photonic Integrated Circuits", accepted to *IEEE/ACM International Conference on Computer-Aided Design (ICCAD), Westminster, CO, Nov. 4-7, 2019* (invited paper).
- **Gu, J.**, Yu, J., Li, Z., Wang, Y., Yang, H., Qiao, Z. "Deep Generative Adversarial Networks for Thin-section Infant MR Image Reconstruction", accepted to *IEEE Access, May, 2019*.
- **Gu, J.**, Wang, R., Wang, J., Lai, J., Duan, Q. "Remote Embedded Simulation System for SW/HW Co-design Based On Dynamic Partial Reconfiguration", accepted to *IEEE 12th International Conference on ASIC, 2017*.

RELATED GRADUATE COURSES

- Computer Architecture (EE 382N 1)
- High Speed Computer Arithmetic (EE 382N 14)
- Computer Architecture: Parallism/Locality (EE 382N 20)
- Parallel Algorithm Scientific Computing (CS 395T)
- Reinforcement Learning: Theory & Practice (CS 394R)
- VLSI (EE 382M.7)

HONORS

• Certificate of NVIDIA workshop on Fundamentals of Accelerated Computing with CUDA Python, NVIDIA DLI	2019
• 4th Place in 2019 DAC System Design Contest on Low Power Object Detection	2019
• First Prize Scholarship, Fudan University	2017 – 2018
• Top 5, 2018 HUAWEI & FUTURELAB AI Contest (CV Group)	2018
• Top 11%, 2017 IEEEXtreme Global Programming Competition (out of 3,350 teams worldwide)	2017
• 2nd & 3rd prize, National Mathematical Contest in Modeling	2016, 2017

ADDITIONAL INFORMATION

Computer Skills: Python, PyTorch, C/C++, CUDA, Tensorflow, Matlab, Verilog, Java, Chisel
Software: Linux OS, Xilinx Vivado Design Suite, Synopsys Optodesigner, Cadence toolchain, Synopsys toolchain, Matlab, Hspice