JIAN MENG

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Education

Cornell University **Aug. 2023 – Present**
Ph.D. in Electrical Engineering *Advisors: **Jae-sun Seo**, Mohamed Abdelfattah, Noah Snavely*

Arizona State University **Sep. 2019 – May 2023**
Ph.D. in Electrical Engineering *Advisors: **Jae-sun Seo**, Deliang Fan, Yu Cao*

Portland State University **Sep. 2015 – May 2019**
Bachelor of Science in Electrical Engineering *Advisor: Christof Teuscher*

Research Interests

Machine Learning: Energy-efficient foundation model training; Deep neural network compression.
Computer Vision: Hardware efficient 3D rendering; Generative Codec Avatar.
AI Hardware: Neuromorphic hardware accelerator design; In-memory Computing.

Research Experience

Meta Reality Lab **May 2023 – August 2023**
Research Scientist *Pittsburgh, PA*

- Codec Avatar quality enhancement and noise reduction with low-precision generative models. Developed an end-to-end compress-and-deploy toolkit for AR/VR devices. Compress and deploy the model to AR/VR devices with eliminated noise and high-quality rendering.

Texas Instrument, Kilby Lab **June 2021 – August 2021**
System Engineer *Dallas, TX*

- End-to-end PyTorch-based hardware compiler for deploying low-precision neural networks to the in-memory-computing-based neural engine.

Selected Publications

Under review

- **Jian Meng**, Yuecheng Li, Chenghui Li, Syed Shakib Sarwar, Dilin Wang, Jae-sun Seo, "POCA: Post-training Quantization with Temporal Alignment for Codec Avatars," CVPR, 2024. (under review) **(Collaborated with Meta Reality Lab)**
- **Jian Meng**, Yuan Liao, Anupreetham, Ahmed Hasssan, Shixing Yu, Han-sok Suh, Xiaofeng Hu, and Jae-sun Seo, "Torch2Chip: An End-to-end Customizable Deep Neural Network Compression and Deployment Toolkit for Prototype Hardware Accelerator Design," MLSys, 2024. (under review)
- Ahmed Hasssan, **Jian Meng**, and Jae-sun Seo, "IM-SNN: Memory-Efficient Spiking Neural Network with Low-Precision Membrane Potentials and Weights" DAC, 2024. (under review)
- Ahmed Hasssan, Anupreetham, **Jian Meng**, and Jae-sun Seo, "Efficient Neural Radiance Fields Accelerator with Low Precision 3D Gaussian Representation and In-memory Computing Design" DAC, 2024. (under review)
- Yuan Liao, **Jian Meng**, and Jae-sun Seo, "A 28nm Scalable and Flexible Accelerator for Universal Sparse Transformer Models" DAC, 2024. (under review)

Deep Learning Algorithms | **Energy-efficient AI**

- **Jian Meng**, Li Yang, Kyungmin Lee, Jinwoo Shin, Deliang Fan, and Jae-sun Seo, "Slimmed Asymmetrical Contrastive Learning and Cross Distillation for Lightweight Model Training," NeurIPS, 2023.
- **Jian Meng**, Li Yang, Jae-sun Seo, and Deliang Fan, "Get More at Once: Alternating Sparse Training with Gradient Correction," NeurIPS, 2022.
- **Jian Meng**, Li Yang, Jinwoo Shin, Deliang Fan, and Jae-sun Seo, "Contrastive Dual Gating: Learning Sparse Features With Contrastive Learning," CVPR, 2022.
- Deepak Kadetotad, **Jian Meng**, Visar Berisha, Chaitali Chakrabarti, and Jae-sun Seo, "Compressing LSTM Networks with Hierarchical Coarse-Grain Sparsity," INTERSPEECH, 2020.

Hardware-Algorithm Co-Design | **Hardware-aware AI**

- Wangxin He, **Jian Meng**, Sujan Kumar Gonugondla, Shimeng Yu, Naresh R. Shanbhag, and Jae-sun Seo, "PRIVE: Efficient RRAM Programming with Chip Verification for RRAM In-Memory Computing Acceleration," DATE 2023.

- **Jian Meng**, Injune Yeo, Wonbo Shim, Li Yang, Deliang Fan, Shimeng Yu, and Jae-sun Seo "Sparse and Robust RRAM-based Efficient In-memory Computing for DNN Inference", IRPS, 2022.
- **Jian Meng**, Wonbo Shim, Li Yang, Injune Yeo, Deliang Fan, Shimeng Yu, and Jae-sun Seo, "Temperature-Resilient RRAM-based In-Memory Computing for DNN Inference," IEEE MICRO, vol. 42, no. 1, 2022.
- Wonbo Shim, **Jian Meng**, Xiaochen Peng, Jae-sun Seo, and Shimeng Yu, "Impact of Multilevel Retention Characteristics on RRAM based DNN Inference Engine," IRPS, 2021.
- Fan Zhang, Li Yang, **Jian Meng**, Jae-sun Seo, Yu Cao, and Deliang Fan, "XMA: A Crossbar-aware Multi-task Adaption Framework via Shift-based Mask Learning Method," DAC, 2022.
- Fan Zhang, Li Yang, **Jian Meng**, Jae-sun Seo, Yu Cao and Deliang Fan, "XST: A Crossbar Column-wise Sparse Training for Efficient Continual Learning," DATE, 2022. **(Best Interactive Presentation(IP) Award)**.
- Arnab Mazumder, **Jian Meng**, Hasib-Al Rashid, Utteja Kallakuri, Xin Zhang, Jae-sun Seo, and Tinoosh Mohsenin, "A Survey on the Optimization of Neural Network Accelerators for Micro-AI On-Device Inference," IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS), 2021
- Han-sok Suh, **Jian Meng**, Ty Nguyen, Shreyas K. Venkataramanaiah, Vijay Kumar, Yu Cao, and Jae-sun Seo, "Algorithm-Hardware Co-Optimization for Energy-Efficient Drone Detection on FPGA," FPT, 2021.
- **Jian Meng**, Li Yang, Xiaochen Peng, Shimeng Yu, Deliang Fan, and Jae-sun Seo, "Structured Pruning of RRAM Crossbars for Efficient In-Memory Computing Acceleration of Deep Neural Networks," IEEE TCAS-II, 2021.

Neuromorphic Accelerator | **AI Hardware**

- Shreyas Venkataramanaiah, **Jian Meng**, Han-Sok Suh, Injune Yeo, Jyotishman Saikia, Sai Kiran Cherupally, Yichi Zhang, Zhiru Zhang, and Jae-sun Seo, "A 28nm 8-bit Floating-Point Tensor Core based CNN Training Processor with Dynamic Activation/Weight Sparsification", IEEE Journal of Solid-State Circuits (JSSC), vol. 58, no. 7, 2023.
- **Jian Meng**, Shreyas Kolala Venkataramanaiah, Chuteng Zhou, Patrick Hansen, Paul Whatmough and Jae-sun Seo, "FixyFPGA: Efficient FPGA Accelerator for Deep Neural Networks with High Element-Wise Sparsity and without External Memory Access," FPL, 2021. **(Collaborated with ARM Research)**

Awards

Finallist of 2023 Qualcomm Innovation Fellowship
Best IP (Interactive Presentations) Paper Award, DATE, 2022
Dean's List, Winter 2017, Spring 2017, Fall 2017, Portland State University

Teaching Experience

Teaching Assistant **Jan. 2022 - May 2022**
EEE 598: Neuromorphic Computing Hardware Design *Arizona State University*

Teaching Assistant **Jan. 2019 - Jun. 2019**
ECE 510 (Mathematical Foundation of Machine Learning *Portland State University*

Teaching Assistant **Sep. 2018 - Jun. 2019**
ECE 221/2/3: Circuit Analysis *Portland State University*

Professional Services

Reviewer: CVPR, NeurIPS, ICLR, ICCV
Reviewer: IEEE Transactions on Biomedical Circuits and Systems (BioCAS)
Reviewer: Transactions on Reconfigurable Technology and Systems (TRET)
Reviewer: IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
Reviewer: IEEE Transactions on Circuits and Systems II: Express Briefs (TCAS-II)

Skills

Python, PyTorch, TensorFlow, C, MatLab, SystemVerilog