LI, Min

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Education

The Chinese University of Hong Kong Aug. 2018 – Apr. 2023
Ph.D. in Computer Science and Engineering *Hong Kong, China*

Shanghai Jiao Tong University Sep. 2014 – Jul. 2018
Bachelor in Electronic Engineering *Shanghai, China*

Experience

Southeast University | School of Integrated Circuit Jun. 2025 – Present
Full Professor

AI for EDA Group, Huawei | Noah's Ark Lab May. 2023 – Jun. 2025
Principle AI Researcher (五星博士, Level 18)
Project #1 - HiSilicion In-house C and RTL Formal Equivalence Checking
⋆ Develop high-level C++ to RTL formal verification tool from scratch, used by **Huawei Taishan CPU & Maleoon GPU & Davinci NPU** verification. Reduce verification cost by 2× against **Synopsys Hector**.
Project #2 - Time-Dependency-Driven SystemVerilog Assert Modelling Solution for Formal Property Verification
⋆ Reduce the number of FFs by **two to three** orders of magnitude, thus enable competitive performance against **Cadence JasperGold**.

CUhk REliable Computing Lab (CURE), CUHK Aug. 2018 – Apr. 2023
Project Leader, Supervisor: Prof. Qiang XU
Thesis: **Circuit Learning and Beyond**
⋆ Employ **graph neural architectures** and **evolutionary learning** to learn a general representation on logic networks; the learned representations are further applied to several EDA and logic reasoning task.
⋆ Very first work to explore general circuit representation, nominated as **Best Paper** in DAC'22.

Machine Learning Group China, Qualcomm Aug. 2022 – Mar. 2023
Engineering Intern
Project: Hardware-Aware Neural Architecture Search for Mobile AI Deployment
⋆ Apply **neural architecture search** (reinforcement learning + evolutionary learning with **hardware runtime** and **memory overhead** as feedback) to search a custom human pose estimator on Qualcomm cutting edge mobile devices.

Intelligent Creation & Computer Vision Team, ByteDance Feb. 2022 – May. 2022
*Research Intern, Mentor: Hao WANG (Author of **CosFace**)*
Project: Uncertainty-aware Contrastive Learning of Facial Representations
⋆ Propose a fully **unsupervised** framework for discriminative facial representation learning, which is built upon a **momentum contrastive** network; introduce a novel **uncertainty-aware consistency K-nearest neighbors** algorithm to generate predicted positive pairs, which enables efficient discriminative learning from large-scale open-world unlabeled data.

Data and AI Research Institute, OPPO Jul. 2021 – Sep. 2021
Research Intern
Project: Uncertainty-Aware Retail Demand Forecasting
⋆ Apply **transformer-based models** for **time series** modelling, forecast sale trend of OPPO mobile phones for better good scheduling.

EDA Lab, HiSilicon Sep. 2020 – May. 2021
Project core member, Supervisor: Prof. Qiang XU & Doc. Yu HUANG
Project: Learning-Based Circuit Test Compression (Outcome: 1^{st} author for 1 paper and 2 patents)

Design Automation Lab, UCLA Jul. 2017 – Sep. 2017
Research Assistant, Supervisor: Prof. Lei HE
Project: FPGA Accelerator for CNN and RNN with Limited Numerical Precision

Publications

(* for equal contribution)

Research Topic #1: AI for EDA: Circuit Learning and Beyond.

Min Li, Zhengyuan Shi, Qiuxia Lai, Sadaf Khan, Shaowei Cai, Qiang Xu. **On EDA-Driven Learning for SAT Solving**. In ACM/IEEE Design Automation Conference (**DAC**, **CCF-A**), 2023.

Min Li, Sadaf Khan, Zhengyuan Shi, Naixing Wang, Yu Huang, Qiang Xu. **DeepGate: Learning Neural Representations of Logic Gates (Best Paper Award Nominee, 6/223)**. In ACM/IEEE Design Automation Conference (**DAC**, **CCF-A**), 2022.

Min Li, Zhengyuan Shi, Zezhong Wang, Weiwei Zhang, Yu Huang, Qiang Xu. **Testability-Aware Low Power Controller Design with Evolutionary Learning**. In IEEE International Test Conference (**ITC**, **CCF-B**), 2021.

Zhengyuan Shi*, **Min Li***, Sadaf Khan, Liuzheng Wang, Naixing Wang, Yu Huang, Qiang Xu. **DeepTPI: Test Point Insertion with Deep Reinforcement Learning**. In IEEE International Test Conference (**ITC**, **CCF-B**), 2022.

Yan Zhiyuan, **Min Li**, Zhengyuan Shi, Wenjie Zhang, Ying-Cong Chen, Hongce Zhang. **AsymSAT: Accelerating SAT Solving with Asymmetric Graph-based Model Prediction**. In Design, Automation and Test in Europe Conference (**DATE**, **CCF-B**), 2024.

Zhengyuan Shi, **Min Li**, Yi Liu, Sadaf Khan, Junhua Huang, Hui-Ling Zhen, Mingxuan Yuan, Qiang Xu. **SATformer: Transformer-Based UNSAT Core Learning**. In International Conference on Computer-Aided Design (**ICCAD**, **CCF-B**), 2023.

Wenji Fang, Mengming Li, **Min Li**, Zhiyuan Yan, Shang Liu, Hongce Zhang, Zhiyao Xie. **AssertLLM: Hardware Verification Assertion Generation and Evaluation from Design Specification via Multi-LLMs**. In Asia and South Pacific Design Automation Conference (**ASP-DAC**, **CCF-C**), 2025.

Sadaf Khan, Zhengyuan Shi, **Min Li**, Qiang Xu. **DeepSeq: Deep Sequential Circuit Learning**. In Design, Automation and Test in Europe Conference (**DATE**, **CCF-B**), 2024.

Sadaf Khan, Zhengyuan Shi, Ziyang Zheng, **Min Li**, Qiang Xu. **DeepSeq2: Enhanced Sequential Circuit Learning with Disentangled Representations**. In Asia and South Pacific Design Automation Conference (**ASP-DAC**, **CCF-C**), 2025.

Zhengyuan Shi, Hongyang Pan, Yi Liu, **Min Li**, Sadaf Khan, Junhua Huang, Hui-Ling Zhen, Mingxuan Yuan, Zhufei Chu, Qiang Xu. **DeepGate-2: Functionality-Aware Circuit Representation Learning**. In International Conference on Computer-Aided Design (**ICCAD**, **CCF-B**), 2023.

Research Topic #2: AI Security.

Yu Li*, **Min Li***, Bo Luo, Ye Tian, Qiang Xu. **DeepDyve: Dynamic Verification for Deep Neural Networks**. In ACM SIGSAC Conference on Computer and Communications Security (**CCS**, **CCF-A**), 2020.

Yu Li, **Min Li**, Qiuxia Lai, Yannan Liu, Qiang Xu. **TestRank: Bringing Order into Unlabeled Test Instances for Deep Learning Tasks**. In Conference on Neural Information Processing Systems (**NeurIPS**, **CCF-A**), 2021.

Luo Bo, **Min Li**, Yu Li, Qiang Xu. **On Configurable Defense against Adversarial Example Attacks**. In Great Lakes Symposium on VLSI (**GLSVLSI**, **CCF-C**), 2020.

Yu Li, Yannan Liu, **Min Li**, Ye Tian, Bo Luo, Qiang Xu. **D2NN: A Fine-Grained Dual Modular Redundancy Framework for Deep Neural Networks**. In Annual Computer Security Applications Conference (**ACSAC**, **CCF-B**), 2019.

Research Topic #3: AI Deployment.

Min Li, Yu Li, Ye Tian, Li Jiang, Qiang Xu. **AppealNet: An Efficient and Highly-Accurate Edge/Cloud Collaborative Architecture for DNN Inference**. In ACM/IEEE Design Automation Conference (**DAC**, **CCF-A**), 2021.

Hao Wang*, **Min Li***, Yangyang Song, Youjian Zhang, Liying Chi. **UCoL: Unsupervised Learning of Discriminative Facial Representations via Uncertainty-Aware Contrast**. In AAAI Conference on Artificial Intelligence (**AAAI**, **CCF-A**), 2023.

Ye Tian, **Min Li**, Qiang Xu. **Lightweight Prediction based Big/Little Design for Efficient Neural Network Inference**. In ACM/IEEE Symposium on Edge Computing (**SEC**), 2019.

Yunyan Hong, Ailing Zeng, **Min Li**, Cewu Lu, Li Jiang, Qiang Xu. **Skimming and Scanning for Untrimmed Video Action Recognition**. In International Congress on Image and Signal Processing, BioMedical Engineering and Informatics, 2021.

Minhao Liu, Ailing Zeng, Qiuxia Lai, Ruiyuan Gao, **Min Li**, Jing Qin, Qiang Xu. **T-WaveNet: A Tree-Structured Wavelet Neural Network for Time Series Signal Analysis**. In International Conference on Learning Representations (**ICLR**), 2022.

Research Interest

My current research interests span **hardware formal verification**, including efficient verification of data-path circuits and equivalence checking across circuit modalities; and **AI4EDA**, including circuit representation learning for VLSI testing.

Research Funding

Neural Representation Learning of Logic Circuits and Its Application to EDA Jan. 2023 – Dec. 2024
***Project Leader**, Hong Kong Research Grants Council, General Research Fund (GRF), #1412422.* *1,168,028 HKD*

Learning-Based VLSI Testing May. 2021 – Dec. 2022
***Project Leader**, HiSilicon.* *1,8300,000 HKD*

New Test Compression/Decompression Architecture Apr. 2020 – Jun. 2021
***Project Leader**, HiSilicon.* *600,000 HKD*

Awards

Best Partner Award Feb. 2025
5032 Chixiao Dept., HiSilicon

Spark Shining Award Dec. 2024
Peking Research Dept., Huawei

Science Fund Program for Excellent Young Scientists (Overseas) Nov. 2024
National Natural Science Foundation of China

Huawei Excellent Technical Cooperation Project Award Sep. 2023
ATPG Compression Technology. Huawei Technologies Co. Ltd.

Best Paper Nomination: DeepGate (6/223) Jul. 2022
ACM/IEEE Design Automation Conference

Best Teaching Assistant Award Sep. 2019
CSE department of CUHK

Academic Excellence Scholarship (Type A) (Top 1%) Sep. 2017
SJTU

Finalist in CASS Competition (Top 1%) Apr. 2017
Circuits and System Society (CAS) Student Design Competition, ISCAS 2017

Meritorious Winner in ICM (Top 8%) Jan. 2017
COMPAS's Interdisciplinary Contest of Modeling 2017