BING-YUE WU

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EDUCATION

Arizona State University 2023 - Present
Ph.D. in Electrical Engineering *Tempe, Arizona*

National Taiwan University of Science and Technology (Taiwan Tech) 2021 – 2023
M.S. in Electrical Engineering *Taipei, Taiwan*

National Taiwan University of Science and Technology (Taiwan Tech) 2016 – 2020
B.S. with major in Electrical Engineering and minor in Computer Science and Information Engineering *Taipei, Taiwan*

WORK EXPERIENCE

Arizona State University Aug. 2023 – present
Graduate Research Assistant *Tempe, Arizona*

- Research the use of large language models in EDA tools.
- Conduct research on open-source EDA tools and generative AI-based EDA algorithms.

Synopsys Inc. Oct. 2021 – June 2022
Intern (Technical-Engineering) *Taipei, Taiwan*

- Researched a novel Machine Learning-based (ML) solution estimating the effective resistance of Power Delivery Networks in advanced VLSI designs to speed up the runtime and raise the accuracy of ML-driven IR analysis tools.
- Responsible for designing the data pipeline, the ML model architecture, and the entire effective resistance estimation workflow.

Research Center for Information Technology Innovation (CITI), Academia Sinica Jul. 2020 – Nov. 2020
Full-time Research Assistant at Computational Finance and Data Analytics Lab *Taipei, Taiwan*

- Researched a novel Transformer Encoder-based model to possess financial number category awareness.
- Created new pre-training and new fine-tuning tasks for the novel model.

- Developed an Online Loan Application Recommender System for E.SUN Commercial Bank, boosting performance by nearly 300% using advanced machine learning techniques.
- Designed workflow, built the model, and created Python APIs for industrial use.

SKILLS

Programming Languages: C, C++, Python, Tcl
EDA Tools: OpenROAD, OpenSTA, Innovus, Genus, ICC2, Design Compiler, HSpice, Virtuoso, Calibre
Language Ability: Mandarin (Native), English (Fluent)

PUBLICATIONS

B.-Y. Wu, U. Sharma, A. Rovinski, and V. A. Chhabria, "**OpenROAD Agent: An Intelligent Self-Correcting Script Generator for OpenROAD**", *Proc. ICLAD*, 2025.

V. A. Chhabria, V. Gopalakrishnan, A. B. Kahng, S. Kundu, Z. Wang, **B.-Y. Wu**, and D. Yoon, "**IEEE CEDA DATC: Strengthening the Foundations of IC Physical Design and ML EDA Research**", *Proc. ICCAD*, 2024.

V. A. Chhabria, **B.-Y. Wu**, U. Sharma, K. Kunal, A. Rovinski, and S. S. Sapatnekar, "**Generative Methods in EDA: Innovations in Dataset Generation and EDA Tool Assistants**", *Proc. ICCAD*, 2024.

B.-Y. Wu, R. Liang, G. Pradipta, A. Agnesina, H. Ren, and V. A. Chhabria, "**2024 ICCAD CAD Contest Problem C: Scalable Logic Gate Sizing Using ML Techniques and GPU Acceleration**", *Proc. ICCAD*, 2024.

U. Sharma*, **B.-Y. Wu***, S. R. D. Kankipati, V. A. Chhabria, and A. Rovinski, "**OpenROAD-Assistant: An Open-Source Large Language Model for Physical Design Tasks**", *Proc. MLCAD*, 2024.

V. Gopalakrishnan, **B.-Y. Wu**, and V. A. Chhabria, "**ML-INSIGHT: Machine Learning for Inrush Current Prediction and Power Switch Network Improvement**", *Proc. ISLPED*, 2024.

B.-Y. Wu, U. Sharma, S. R. D. Kankipati, A. Yadav, B. K. George, S. R. Guntupalli, A. Rovinski, and V. A. Chhabria, "**EDA Corpus: A Large Language Model Dataset for Enhanced Interaction with OpenROAD**", *Proc. LAD*, 2024. **(Best Paper Nominated)**

V. A. Chhabria, W. Jiang, A. B. Kahng, R. Liang, H. Ren, S. S. Sapatnekar, and **B.-Y. Wu***, "**OpenROAD and CircuitOps: Infrastructure for ML EDA Research and Education**", *Proc. VTS*, 2024. (primary author)

B.-Y. Wu, S.-Y. Fang, H.-W. Chang, and P. Wei, "**SpeedER: A Supervised Encoder-Decoder Driven Engine for Effective Resistance Estimation of Power Delivery Networks**", *Proc. MLCAD*, 2022. **(Best Paper Award)**

Project Experience

OpenROAD-Agent | Python — Jan. 2025 – Mar. 2025
- **Github link**: https://github.com/OpenROAD-Assistant/OpenROAD-Agent
- Open-sourced the framework that integrates the script-generating LLM with the physical design tool.
- Combined prompt engineering with the physical design tool's feedback to iteratively generate the tool script.

2024 ICCAD Contest Benchmark | Verilog/Tcl/Python/C++ — May. 2024 – Oct. 2024
- **Github link**: https://github.com/ASU-VDA-Lab/2024_ICCAD_Contest_Gate_Sizing_Benchmark
- Used C++ and SWIG to create Python APIs in OpenROAD, enabling gate sizing operations using OpenROAD's Python APIs.
- Developed Python scripts for examples and evaluations for the contest.
- Used EDA tools to synthesize netlists with the ASAP7 library and perform placement and routing.

OpenROAD-Assistant | Python — Mar. 2023 – Jun. 2024
- **Github link**: https://github.com/OpenROAD-Assistant/OpenROAD-Assistant
- Open-sourced the LLM for generating scripts for the physical design tools and answering questions related to the physical design tools.

EDA-Corpus | Python — Feb. 2024 – Mar. 2024
- **Github link**: https://github.com/OpenROAD-Assistant/EDA-Corpus
- Open-sourced the first dataset of physical design tool scripts for LLM-based physical design research.

2024 ASP-DAC Tutorial Talk | C++/Python — Oct. 2023 – Jan. 2024
- **Github link**: https://github.com/ASU-VDA-Lab/ASP-DAC24-Tutorial
- Developed STA-related Python API for OpenROAD to provide flexibility in ML-EDA.
- Created demos on using the OpenROAD Python Interface and using Nvidia's CircuitOps to build data pipelines for ML-based EDA research.
- Presented at 2024 ASP-DAC as a tutorial. (conference link)

CircuitOps | Tcl/Python — Oct. 2023 – Jan. 2024
- **Github link**: https://github.com/NVlabs/CircuitOps
- Developed an ML-friendly data infrastructure to generate datasets for ML-EDA applications.

Awards

MLCAD Student Travel Grant — Sept. 2024

Ferdinand A. Stanchi Fellowship — Aug. 2024

DAC Young Fellow Travel Grant — Jun. 2024

MLCAD Student Travel Grant — Sept. 2023

Fulton Fellows Fellowship — Aug. 2023

Best Paper Award at MLCAD 2022 — Sept. 2022

Professional Experience

Topic chiar of Problem C at 2024 ICCAD CAD Contest — Oct. 2024
IEEE CEDA — *Newark, New Jersey*

2024 ASP-DAC Tutorial Talk — Jan. 2024
ACM SIGDA — *Incheon, South Korea*