

# Yung-Chin (Jim) Chen

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## RESEARCH INTERESTS

**VLSI Designs, Computer Architecture, In-memory Computing Processor, NN Accelerator**

## EDUCATION

### Princeton University

Princeton, NJ, USA

*Ph.D. student in Electrical and Computer Engineering (ECE)*

*Sep 2024 - Present*

- GPA to date: 4.0 / 4.0

### National Taiwan University (NTU)

Taipei, Taiwan

*Bachelor of Science in Electrical Engineering (EE)*

*Sep 2019 - Jan 2024*

- Phi Tau Phi Honorary Member (for top 1% of college graduates), Major GPA: 4.28 / 4.30

### Keio University

Tokyo, Japan

*Exchange Student with Full Scholarship*

*Oct 2022 - Jul 2023*

## RESEARCH EXPERIENCE

### PhD Student at Verma Lab

Jan 2025 – Now

*Princeton University (Advisor: Prof. Naveen Verma)*

*Princeton, NJ, USA*

- Researching on In-memory Computing (IMC) systems and architectures

### Visiting RA at Computing and Sensing Group

Sep 2022 – Feb 2024

*Keio University (Advisor: Prof. Kentaro Yoshioka)*

*Kanagawa, Japan*

- Researched on saliency-aware IMC macro for Neural Network (NN)
- Researched on memory-centric algorithm-architecture co-design for novel NN framework

### Undergrad RA at Energy-Efficient Circuits and Systems Lab

Sep 2021 – Feb 2024

*National Taiwan University (Advisor: Prof. Tsung-Te Liu)*

*Taipei, Taiwan*

- Taped out a 28nm SRAM CIM-based accelerator for end-to-end NN inference

## PUBLICATIONS

- [1] **Yung-Chin Chen**, S. Ando, D. Fujiki, S. Takamaeda-Yamazaki, K. Yoshioka, "OSA-HCIM: On-The-Fly Saliency-Aware Hybrid SRAM CIM with Dynamic Precision Configuration", in *Asia and South Pacific Design Automation Conference (ASP-DAC)*, 2024
- [2] W. Zhang, S. Ando, **Yung-Chin Chen**, S. Miyagi, S. Takamaeda-Yamazaki, K. Yoshioka, "PaCiM: A Sparsity-Centric Hybrid Compute-in-Memory Architecture via Probabilistic Approximation", in *International Conference on Computer-Aided Design (ICCAD)*, 2024
- [3] **Yung-Chin Chen**, S. Ando, D. Fujiki, S. Takamaeda-Yamazaki, K. Yoshioka, "HALO-CAT: A Hidden Network Processor with Activation-Localized CIM Architecture and Layer-Penetrative Tiling", in *arXiv*
- [4] S. Ando, **Yung-Chin Chen**, S. Miyagi, W. Zhang, K. Yoshioka, "A Saliency-Aware Analog Computing-In-Memory Macro with SAR-Embedded Saliency Detection Technique", in *International Conference on Solid State Devices and Materials (SSDM)*, 2024
- [5] K. Yoshioka, S. Ando, S. Miyagi, **Yung-Chin Chen**, W. Zhang, "Towards Efficient and Precise Analog Compute-in-Memory Circuits", in *International Conference on Solid State Devices and Materials (SSDM)*, 2024 (Invited)
- [6] K. Yoshioka, S. Ando, S. Miyagi, **Yung-Chin Chen**, W. Zhang, "A Review of SRAM-based Compute-in-Memory Circuits", in *Japanese Journal of Applied Physics (JJAP)*, 2024
- [7] W. Zhang, S. Ando, **Yung-Chin Chen**, K. Yoshioka, "ASiM: Improving Transparency of SRAM-based Analog Compute-in-Memory Research with an Open-Source Simulation Framework", *Under Review*
- [8] S. Ando, **Yung-Chin Chen**, S. Miyagi, W. Zhang, K. Yoshioka, "A Saliency-Aware Analog Computing In-Memory with SAR-Embedded Detection Achieving 18.5% Power Reduction", in *Japanese Journal of Applied Physics (JJAP)*, 2024

## HONORS AND AWARDS

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<b>Irving T. Ho Memorial Scholarship</b> - EE dept. at NTU	Dec 2022
<b>The Memorial Scholarship Foundation to Lin Hsiung Chen</b> (acc. rate: 2%)	Nov 2022
<b>Research Grant</b> - National Science and Technology Council (NSTC), Taiwan	Jul 2022 – Jan 2023
<b>Research Grant</b> - Taiwan Semiconductor Manufacturing Co., Ltd (TSMC)	Feb 2022 – Jun 2022
<b>1st Place (Best Solver Award)</b> - MakeNTU - largest student maker hackathon in Taiwan	Mar 2022
<b>Principal Award</b> - Awarded to top 2% NTUEE students for their academic excellences	Dec 2022

## TEACHING EXPERIENCE

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<b>TA in Computer Architectures</b> , lectured by Prof. Tsung-Te Liu	Sep 2023 – Jan 2024
<ul style="list-style-type: none"><li>Designed Verilog assignments including ALU, CPU, and Cache and delivered programming tutorials</li></ul>	
<b>TA in EECS Lab Undergraduate Research</b> , supervised by Prof. Tsung-Te Liu	Sep 2023 – Jan 2024
<ul style="list-style-type: none"><li>Guided lab members through CIM paper survey and circuit simulation</li><li>Established training courses for circuit design tools, encompassing HSPICE, Verilog, and Virtuoso</li></ul>	
<b>TA in Signal and Systems</b> , lectured by Prof. Lin-Shan Lee	Feb 2022 – Jun 2022
<ul style="list-style-type: none"><li>Delivered MATLAB lectures, held weekly problem-solving seminars, and graded homework and exams</li></ul>	

## TECHNICAL SKILLS

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**Programming:** Verilog, System Verilog, Python, C++, MATLAB  
**IC Design Tools:** NC-Verilog, Design Compiler, Innovus, Virtuoso, HSPICE, FPGA  
**Toolbox:** PyTorch, TensorFlow, NumPy, L<sup>A</sup>T<sub>E</sub>X  
**Languages:** Chinese (Native), English (TOEFL: 110, GRE: 333), Japanese (JLPT N1)

## ACTIVITIES

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<b>Compulsory Military Service in Taiwan</b>	Mar 2024 – Jun 2024
<b>Student Ambassador of National Taiwan University</b>	Oct 2021 – Sep 2022
<ul style="list-style-type: none"><li>Introduced Taiwan to foreign visitors, orchestrated international events, and guided campus tours</li><li>Provided support for international scholars to facilitate their integration into the life in Taiwan</li></ul>	
<b>Vice Captain of NTUEE Baseball Team</b>	Sep 2021 – Aug 2022
<ul style="list-style-type: none"><li>Led and coached a team of 20+ players; provided personalized instructions and training menus</li></ul>	
<b>Vice President of NTU Escape Room and Puzzle Solving Club</b>	Aug 2020 – Jul 2021
<ul style="list-style-type: none"><li>Led a club of 30+ members to design engaging puzzles and develop reality games</li><li>Held 3 school-wide real escape games, attracting over 200 participants</li></ul>	