

# Yonghao Tan

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## Education & Academic Performance

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Sept. 2023 - Present **Ph.D. in Electronic and Computer Engineering**, The Hong Kong University of Science and Technology (HKUST), supervised by Prof. Tim Kwang-Ting CHENG.  
Hong Kong, China

Sept. 2019 - Jun. 2023 **B.E. in Microelectronics**, Southern University of Science and Technology (SUSTech), supervised by Prof. Fengwei An.

Shenzhen, Guangdong, China

**Overall GPA: 3.77 / 4.0 Weighted Average Score: 90.38 Rank: 11 / 77**

## Research Interests

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- Software/hardware co-design
- Model compression
- 3D processing

## Research Experience

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Jan. 2025 - Present **Research Project / SLAM-based co-design Embodied AI Chip**  
AI Chip Center for Emerging Smart Systems, Hong Kong, China *Mentor: Prof. Tim CHENG Kwang-Ting*

- Integrate SLAM into a novel embodied AI system.
- Co-design exploration of heterogenous SLAM and AI computing core design.

Apr. 2024 - Present **Research Project / Hybrid bonding based co-design AI accelerator**  
AI Chip Center for Emerging Smart Systems, Hong Kong, China *Mentor: Prof. Tim CHENG Kwang-Ting*

- Co-design optimization for LLMs.
- Implement the AI-core and ReRAM with 55nm die-on-wafer stacking via bumping process.

Nov. 2021 - Sept. 2024 **Research Project / Transformer based co-design AI accelerator**  
AI Chip Center for Emerging Smart Systems, Hong Kong, China *Mentor: Prof. Tim CHENG Kwang-Ting*

- Hardware/Software collaborative optimization of Transformer-based architecture.
- Implement an energy-efficient Transformer-based accelerator for semantic segmentation with 28nm ASIC process.

Oct. 2021 - Jun. 2023 **Research Project / ASIC design of SLAM accelerator in 28nm CMOS technology**  
Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Fengwei An*

- Propose a reconfigurable visual-inertial odometry accelerator and implement it on the FPGA platform which can process data from an image sensor and inertial measurement unit for trajectory output in real-time at 160MHz and 110fps.
- Optimize the hardware architecture and perform back-end design for ASIC development.

Jan. 2021- Oct. 2021 **Research Project / Reconfigurable SLAM coprocessor**  
Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Fengwei An*

- Investigate and co-optimize SLAM algorithms and their operations.
- Propose a reconfigurable coprocessor with an instruction set that supports full functionality of operations in SLAM algorithms.

## Publications

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- 2025 Dong, P.\*, **Tan, Y.\***, Liu, X., Luo, P., Liu, Y., Liang, L., ... & Cheng, K. T. (2025, Feb.). A 28nm 0.22 $\mu$ J/Token Memory-Compute-Intensity-Aware CNN-Transformer Accelerator with Hybrid-Attention-Based Layer-Fusion and Cascaded Pruning for Semantic-Segmentation. In *2025 IEEE International Solid-State Circuits Conference (ISSCC)*. IEEE.
- 2024 Dong, P.\*, **Tan, Y.\***, Zhang, D., Ni, T., Liu, X., Liu, Y., ... & Cheng, K. T. (2024, Jun.). Genetic Quantization-Aware Approximation for Non-Linear Operations in Transformers. In *2024 61st ACM/IEEE Design Automation Conference (DAC)*. IEEE.
- 2022 **Tan, Y.\***, Deng, H.\*, Sun, M., Zhou, M., Chen, Y., Chen, L., ... & An, F. (2022). A reconfigurable coprocessor for simultaneous localization and mapping algorithms in FPGA. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 70(1), 286-290.
- 2022 **Tan, Y.\***, Sun, M.\*, Deng, H., Wu, H., Zhou, M., Chen, Y., ... & An, F. (2022). A Reconfigurable Visual-Inertial Odometry Accelerated Core with High Area and Energy Efficiency for Autonomous Mobile Robots. *Sensors*, 22(19), 7669.

\*: Both authors contributed equally to this research.

## Honors and Awards

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- Oct. 2022 First-class Outstanding Students Scholarship  
**(Top 5% in SUSTech)**
- May. 2022 Successful Participant in Mathematical Contest in Modeling
- Dec. 2021 Shenzhen Longsys Electronics Company Award  
**(Top 2% in School of Microelectronics)**
- Dec. 2021 The First Prize of 2021 National College Students FPGA Innovation Design Competition  
**(Top 22 in 1341 teams)**
- Oct. 2021 The First Prize of 2021 International Competition of Autonomous Running Robots  
**(Top 1 of 34 teams in the final match)**
- Oct. 2021 Second-class Outstanding Students Scholarship
- Mar. 2021 Third Prize of 2020 Asia and Pacific Mathematical Contest in Modeling
- Oct. 2020 Second-class Outstanding Students Scholarship

## Fundings

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- Sept. 2023 - Present Postgraduate Studentship (PGS) award in HKUST
- Apr. 2022 Undergraduate Innovation and Entrepreneurship Training Programs  
**(Provincial Level)**
- Jul. 2021 Guangdong College Students' Scientific and Technological Innovation  
**(Provincial Level)**

## Skills

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- Programming language C, C++, Java, Python, System Verilog, Verilog HDL, VHDL
- Professional software AutoCAD, Cadence, Design Compiler, IC Compiler II, MatLab, Multisim, Silvaco

## Languages

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English (fluent), Mandarin (native), Cantonese (native)