Yonghao Tan CV

Yonghao Tan

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Education

- **B.E. in Microelectronics**, Southern University of Science and Technology, Shenzhen, Guangdong, China (September 2019 - Present)
  - Experimental Class, School of Microelectronics
- **Graduate**, Shimen Middle School, Foshan, Guangdong, China (September 2016 - June 2019)

Research Interests

- Hardware acceleration for vision algorithms
- Software/hardware co-design AI accelerator
- Simultaneous localization and mapping (SLAM)
- High-performance and low-power VLSI circuit design

Academic Performance & Standardized Test

- Overall GPA: **3.77 / 4.0** (Rank: **11 / 77**)
- TOEFL iBT: **102** (Reading 25, Listening 26, Speaking 25, Writing 26)

Research Experience

Transformer Based Co-Design AI Accelerator

- **Date:** November 2021 - Present
- **Affiliation:** AI Chip Center for Emerging Smart Systems, Hong Kong, China
- **Mentors:** Prof. Tim CHENG Kwang-Ting (HK), Prof. Fengwei An (SUSTech)
- Hardware/software collaborative optimization of Transformer-based architecture for vision applications.

- Implemented an energy-efficient Transformer-based accelerator for specific vision applications on FPGA.

ASIC Design of SLAM Accelerator in 28nm CMOS Technology

- **Date:** April 2021 - Present
- **Affiliation:** Southern University of Science and Technology, Shenzhen, China
- **Mentor:** Prof. Fengwei An
- Proposed a reconfigurable coprocessor with an instruction set supporting full SLAM operations.
- Proposed a reconfigurable visual-inertial odometry accelerator and implemented it on FPGA.
- Achieved real-time trajectory output at 160MHz and 110fps.
- Optimized architecture and performed back-end design for ASIC development.

ASIC Design of Stereo Depth Coprocessor in 28nm CMOS Technology

- **Date:** March 2022 - May 2022
- **Affiliation:** Southern University of Science and Technology, Shenzhen, China
- **Mentor:** Prof. Fengwei An
- Responsible for back-end design of the Census Transform module.

Auxiliary Detection Equipment for Scoliosis

- **Date:** October 2020 - January 2021
- **Affiliation:** Southern University of Science and Technology, Shenzhen, China
- **Mentor:** Prof. Fengwei An
- Collected and labeled skeletal and gait datasets for children and youth with scoliosis.
- Developed a graph neural network model to predict scoliosis probability.

Course Projects

Design of 4x4-bit Multiplier in 180nm CMOS Technology

- **Date:** April 2022 - June 2022
- **Affiliation:** Southern University of Science and Technology, Shenzhen, China
- **Mentor:** Prof. Chenchang Zhan
- Realized a 4x4-bit multiplier and verified full functionality by post-layout simulation.
- Designed an area-delay optimized array multiplier ranked in top 5% of the class.

Design of ARMv3 Pipelined Processor

- **Date:** November 2021

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- **Affiliation:** Southern University of Science and Technology, Shenzhen, China
- **Mentor:** Prof. Longyang Lin
- Designed and verified a five-stage pipelined processor based on ARMv3 ISA in Verilog.
- Handled data hazards and control hazards.
- Achieved full functionality and presented on course website as an outstanding project.

Publications

- **2022** Yonghao Tan, Huanshihong Deng, Mengying Sun, Minghao Zhou, Yifei Chen, Lei Chen, Chao Wang, Fengwei An.
  A Reconfigurable Coprocessor for Simultaneous Localization and Mapping Algorithms in FPGA, IEEE Transactions on Circuits and Systems II: Express Briefs.
  DOI: https://doi.org/10.1109/TCSII.2022.3198759
- **2022** Yonghao Tan, Mengying Sun, Huanshihong Deng, Haihan Wu, Minghao Zhou, Yifei Chen, Zhuo Yu, Qinghan Zeng, Ping Li, Lei Chen, Fengwei An.
  A Reconfigurable Visual-Inertial Odometry Accelerator with High Area and Energy Efficiency for Autonomous Mobile Robots, Sensors 2022, 22, 7669.
  DOI: https://doi.org/10.3390/s22197669

Awards

- December 2021: Shenzhen Longsys Electronics Company Award (Top 2% in School of Microelectronics)
- December 2021: First Prize, 2021 National College Students FPGA Innovation Design Competition (Top 22 in 1341 teams)
- October 2021: First Prize, 2021 International Competition of Autonomous Running Robots (Top 1 of 34 teams in final match)
- September 2021: Second-class Outstanding Students Scholarship
- September 2020: Second-class Outstanding Students Scholarship

Fundings

- April 2022: Undergraduate Innovation and Entrepreneurship Training Programs (Provincial Level)
- July 2021: Guangdong College Students' Scientific and Technological Innovation (Provincial Level)

Skills

- C, C++, Java, MATLAB, Python, Verilog

Languages

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