

Yonghao Tan

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Education

September 2019-Present **B.E. in Microelectronics** / Southern University of Science and Technology
Shenzhen, Guangdong, China

- Experimental Class, School of Microelectronics

September 2016-June 2019 **Graduate** / Shimen Middle School
Foshan, Guangdong, China

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: Total 102 Reading 25; Listening 26; Speaking 25; Writing 26

Research Experience

November 2021-Present **Research Project** / Transformer based co-design AI accelerator

AI Chip Center for Emerging Smart Systems, Hongkong, China *Mentor: Prof. Tim CHENG Kwang-Ting*

Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Fengwei An*

- Hardware/Software collaborative optimization of Transformer-based architecture for vision applications.
- Implement an energy-efficient Transformer-based accelerator for specific vision applications on the FPGA platform.

April 2021-Present **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 coprocessor with an instruction set that supports full functionality of operations in SLAM algorithms.
- Propose a reconfigurable visual-inertial odometry accelerator and implemented 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.

March 2022-May 2022 **Research Project** / ASIC design of stereo depth coprocessor in 28nm CMOS technology

Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Fengwei An*

- In charge of back-end design of the Census Transform module of the coprocessor.

October 2020-January 2021 **Research Project** / Auxiliary detection equipment for scoliosis

Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Fengwei An*

- Collect and label skeletal and gait datasets for children and youth with scoliosis.
- Develop AI medical health care by establishing a graph neural network model to predict scoliosis probability.

- April 2022-June 2022 **Course Project / Design of 4×4-bit Multiplier in 180nm CMOS Technology**
Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Chenchang Zhan*
- Realize a 4×4-bit multiplier and demonstrate its full functionality through post-layout simulation.
 - Design an area-delay optimized array multiplier ranking in the top 5% of the class.
- November 2021 **Course Project / Design of ARMv3 pipelined processor**
Southern University of Science and Technology, Shenzhen, China *Mentor: Prof. Longyang Lin*
- Design and verify a five-stage pipelined processor based on ARMv3 ISA with Verilog.
 - Take care of data hazards and control hazards.
 - Achieve full functionality and presented on the 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: 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. <https://doi.org/10.3390/s22197669>

Awards

- December 2021 Shenzhen Longsys Electronics Company Award
(Top 2% in School of Microelectronics)
- December 2021 The First Prize of 2021 National College Students FPGA Innovation Design Competition
(Top 22 in 1341 teams)
- October 2021 The First Prize of 2021 International Competition of Autonomous Running Robots
(Top 1 of 34 teams in the 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)