CELESTE TAN

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SUMMARY

NUS computer engineer with a focus on robotics, electronics, PCB design, and IC/FPGA design. Passionate about building autonomous systems bring together hardware, software, and intelligent decision-making.

EDUCATION

National University of Singapore **May 2024 - Present**
Bachelor of Engineering, Computer Engineering (Graduating 2027)

- Accelerated 3-Year Degree under NUS Engineering Scholars Programme
- Relevant Coursework: Digital Design, Signals and Systems, Real Time Operating Systems, Transistor-level Digital Circuits, Computer Organisation, Computer Architecture and Introduction to Machine Learning
- Designed a 5 stage pipeline RISC-V CPU in Verilog, capable of executing with dynamic branch prediction and hazard detection.
- GPA: 4.80 / 5.00

Raffles Institution **Feb 2022 - Dec 2023**
GCE A-Levels

- RP: 88.75 / 90 | H2 Computing, H2 Physics, H2 Maths, H1 Economics

RELEVANT EXPERIENCE

Full-Time Research Intern, DSO National Laboratories **Jan 2026 - Present**

- Designed open source IP blocks for different communication protocols with the AXI-4 Stream protocol (e.g. AXIS UART, AXIS Ethernet, AXIS I2C, AXIS PWM) using VHDL
- Designed AXI-4 Stream interconnect, round robin arbiter, broadcaster and switch for custom many-to-many connections, and integrated with GUI utilising Tkinter

Team Lead, NUS SAFMC Team **May 2025 - Mar 2026**

- Constructed autonomous indoor drone swarm for Singapore Amazing Flying Machine Competition (SAFMC) 2026
- Developed a custom ESC and flight controller from scratch based on AM32 Hardware Group B specifications, completing schematic design, PCB layout (SMD), SMT assembly, and hardware integration of STM32 MCU, MOSFET power stage, current sensing, and more

Teaching & Lab Assistant, National University of Singapore **Jul 2025 - Nov 2025**

- EE2026 - Digital Design: Guided students through Verilog-based FPGA development with Basys 3 using Vivado
- EG1311 - Design & Make: Guided students in electronics and robot prototyping while providing fabrication support through laser cutting

Software Team Member, Bumblebee Autonomous Systems **Mar 2025 - Feb 2026**

- Developed secondary autonomous underwater vehicle (AUV) to score additional points for agile movements (e.g. barrel roll), enabling team to win 1st Place in RoboSub 2025
- Integrated waypoint navigation and various software frameworks (ArduSub, Mavros and ROS2 Humble) with AUV hardware

Software Team Lead, Hornet X **Aug 2024 - Mar 2025**

- Led AUV software development for Singapore AUV Competition (SAUVC) 2025, as part of Bumblebee's training programme

- Wrote and fine-tuned all controls software, enabling vehicle to translate and rotate along all 3 axes of movement and maintain its orientation and position
- Implemented CAN communications protocol between Jetson Orin NX and auxiliary microcontrollers in the AUV for reliable sensor input and thruster control

Team Lead, Club Automatica **Dec 2021 - Jul 2023**

- Built novel computer vision-based search and rescue robot from scratch, winning multiple 3 national/regional championships and 1 international award in RoboCup Junior Rescue Line
- Utilised surface-mount devices (SMD) on circuit board for smaller footprint
- Modelled custom 3D printed gear train to reduce motor count and optimise for less weight
- Integrated Raspberry Pi Pico with 6 Time Of Flight LiDARs and a custom light sensor array PCB for reliable real-time obstacle detection
- Experimented with leveraging 2 cameras and OpenCV for line tracking and victim (textured ball) detection - tasks traditional photodiode-based systems struggle with

Part-Time Research Intern, DSO National Laboratories **Mar 2022 - Mar 2023**

- Created award-winning reflectarray antenna for long distance transmissions by redirecting an antenna waves into a focused beam
- Innovated rectangular phoenix cell design achieves full phase range of 360 degrees while allowing X and Y axis of each cell to be operated for two different frequencies simultaneously
- Simulated antenna performance in CST Studio Suite before performing real-world testing in antenna chamber at Temasek Labs @ NUS

SKILLS

- Programming: Python, C, C++, C#, Java, Javascript, Jinja2, ARM and RISC-V Assembly
- Digital Design & Verification using HDL: Verilog, VHDL, Cocotb
- PCB Design: KiCAD, EasyEDA
- Computer-Aided Design (CAD): Autodesk Fusion, Solidworks
- Fabrication: 3D Printing, Laser Cutting, Soldering
- Robotics: OpenCV, ROS2 Humble, SLAM

AWARDS AND COMPETITIONS

- Best Engineering: RoboCup Junior Open Rescue Line U19 in Bordeaux, France (2023)
- 1st Place: RoboCup Junior Singapore Open Rescue Line U19 (2023)
- Gold Award: Singapore Science and Engineering Fair (2023)
- 12th of 71 teams: World Robot Olympiad in Dortmund, Germany (2023)
- 1st Place & Best Performance & Best Content & Judges' Award: World Robot Olympiad (WRO) Singapore RoboMission Tertiary (2022)
- 1st Place & Best Educational Value: RoboCup Asia Pacific Rescue Line U19 (2022)
- 1st Place: RoboCup Junior Singapore Open Rescue Line U19 (2022)
- SUTD Research & Innovation Award: Singapore Science and Engineering Fair (2022)
- CSIT JC Scholarship (2022)
- KS Goh New Media & Technology Award (2021)
- 1st Place: Microsoft Digigirlz (2020)