# ONG DUN YAN

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## Leadership & Competitions

**ROBO@EEE (University Robotics Competition Team)** Aug 2025 – Present
*Executive Team Lead*

- Led an 8-member team developing autonomous navigation systems for the **IEEE ICRA BARN Challenge 2026**, ranked **1st All-Time in Dynamic Environments**, 6th in Static Environment, and **3rd in the physical final**.
- Leading a **34-member team** developing mobile manipulator home robot for the **RoboCup@Home 2027**.

*Selected Technical Contributions:*

- Model Predictive Control on the Jackal Robot via Acados and non-convex optimization.
- Co-developed dynamic obstacle tracking via Kalman Filter and Hungarian algorithm for obstacle avoidance
- Co-developed an offline speech recognition pipeline, deployed CPU-optimized AI neural networks with whisper
- Built a ROS 2 6-DoF object pose estimator using 3D point cloud registration (MAC, CVPR'23) on RealSense D455.

## Experience

**SHANGHAI JIAO TONG UNIVERSITY, Robotics Autonomy and Planning Lab** Oct 2025 – Present
*Undergraduate Researcher – Multi-robot Robot Navigation in unknown environment*

- Supervised by Prof. Richard Ren and co-supervised by Dr. Shenghai Yuan; developed VADER, a decentralized multi-robot navigation framework that merges robots' visibility graphs on encounter and jointly schedules routes and passage order via conflict based search with a space-time visibility-graph search.
- Evaluated in ROS/Gazebo across 4 environments with 2–10 robots: **87% all-robot success vs. 53%** for the strongest reactive baseline; validated on 4–8 Robotarium robots.

**HYUNDAI MOTOR GROUP INNOVATION CENTER SINGAPORE** Jan 2026 – May 2026
*Robotics SLAM Intern – Perception and Localisation for autonomous mobile robots*

- Researched real-time camera-based obstacle detection using Orbbec Gemini 2 and Femto Bolt to mitigate 2D LiDAR blind spots on autonomous mobile robots (>15 Hz CPU-only).
- Achieved **nearly 100% obstacle detection success rate with zero false positives** across different floor-condition.
- Worked on Cartographer SLAM, AMCL localisation, and Nav2 for autonomous navigation testing and reported trade-off analyses to Korea HQ.

**AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH (A*STAR)** May 2025 – Aug 2025
*Robotics and AI Intern – Scene understanding for human–robot collision avoidance*

- Built a PointNet segmentation model (PyTorch) to remove robot occlusions from ZED 2i point clouds, achieving **98% IoU**; aligned UR16e arm meshes to the point clouds using kinematics and PCL.

## Publications & Academic Service

**VADER: Decentralized Multi-Robot Navigation in Unknown Environments via Encounter-Triggered Visibility Graph Merging.**
**First author**. Submitted to one of the top IEEE robotics conferences.

**Autonomous Ground Navigation in Highly Constrained Spaces: Lessons Learned from the Fifth BARN Challenge at ICRA 2026.**
Co-author. Submitted to *IEEE Robotics and Automation Magazine (RAM)*, 2026.

**Reviewer**, *IEEE International Conference on Robotics and Automation (ICRA)*, 2027.

## Education

**NANYANG TECHNOLOGICAL UNIVERSITY (NTU)** Aug 2023 – May 2027
Bachelor of Engineering in Electrical and Electronic Engineering; CGPA: **4.71/5.00** (Expected First Class Honours)

## Skills

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| **Robotics:** | Multi-Robot Coordination, SLAM, Localisation, State Estimation, Kalman Filtering, Sensor Fusion, 3D Scene Understanding, Kinematics |
| **Planning & Optimisation:** | Motion Planning, Visibility Graphs, Optimization Theory, Optimal Control |
| **Perception & ML:** | RGB-D Perception, Point Cloud Processing, Semantic Segmentation, CNNs, Transformers, PyTorch, OpenCV, Digital Signal Processing, Filtering, Time-Frequency Analysis |
| **Robotics Software:** | ROS/ROS2, Movebase, Nav2, MoveIt 2, Gazebo, RViz, Acados, Git, Linux |
| **Programming:** | C++, Python, C |
| **Hardware:** | NVIDIA Jetson, STM32, ESP32, Arduino, Intel RealSense, ZED, Orbbec, Hokuyo, Livox Mid-360, Velodyne VLP, AutoCAD Electrical |
| **Languages:** | English, Mandarin, Cantonese, Malay |