Derek Ming Siang **Tan**

PH.D. Candidate · Robotics Systems Engineer

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I am both a researcher and engineer, pushing the frontiers of robotics and AI to create practical tools that benefit daily life.

Education

National University of Singapore, Singapore *Jan. 2023 - Present*

Ph.D Mechanical Engineering (Robotics) *GPA: 4.8 / 5.0*

- Research Focus: Vision-Language-Action/Navigation (VLA/VLNs) and RL for robotics systems
- Supervisor: Prof. Guillaume Sartoretti (MARMoT Lab)
- Coursework: Advanced Topics in Reinforcement Learning, Advanced Topics in Vision-Language Models

University of Toronto, Canada *Jan. 2025 - May. 2025*

Visiting Researcher (Robotics Institute) *GPA: – / –*

- Research Focus: Multimodal foundation models for VLNs, Online Adaptation under data constraints
- Supervisor: Prof. Florian Shkurti (Robot Vision & Learning Lab)

University of Michigan, Ann Arbor, USA *Sept. 2016 - May. 2020*

B.S.E Mechanical Engineering, Computer Science (Minor) *GPA: 3.74 / 4.0*

- Coursework: Autonomous Robotics, Web Systems, Data Structures & Algorithms, Deep Learning for Computer Vision

Publications

Search-TTA: A Multimodal Test-Time Adaptation Framework for Visual Search in the Wild *Sept. 2025*

Derek Ming Siang Tan, Shailesh, Boyang Liu, Alok Raj, Qi Xuan Ang, Weiheng Dai, Tanishq Duhan, Jimmy Chiun, Yuhong Cao, Florian Shkurti, Guillaume Sartoretti

- Spotlight (poster) at the Conference for Robot Learning (CoRL).
- In collaboration with the University of Toronto, Robotics Institute.

Privileged Reinforcement Learning for Distributed, Bandwidth-limited Multi-Robot Exploration *Nov. 2024*

Yixiao Ma, Jingsong Liang, Yuhong Cao, **Derek Ming Siang Tan**, Guillaume Sartoretti

- Oral presentation at International Symposium on Distributed Autonomous Robotic Systems (DARS).

IR2: Implicit Rendezvous for Robotic Exploration Teams under Sparse Intermittent Connectivity *Oct. 2024*

Derek Ming Siang Tan, Yixiao Ma, Jingsong Liang, Yi Cheng Chng, Yuhong Cao, Guillaume Sartoretti

- Oral presentation (extended) at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Context Mask Priors via Vision-Language Model for Ergodic Search *May. 2024*

Derek Ming Siang Tan, Ananya Rao, Abigail Breitfeld, Guillaume Sartoretti

- Workshop poster at IEEE International Conference on Robotics and Automation (ICRA).
- In collaboration with Carnegie Mellon University, Robotics Institute.

Work Experience

Embodied AI Systems Engineer *May 2025 - Present*

Singapore Technologies Engineering, Engineering Division HQ (Robotics, Autonomous Vehicles) *Singapore*

- Designing a generic and scalable interface to connect our robotic quadrupeds and UGVs to latest foundation models.
- Acting as a consultant to study and recommend latest multimodal foundation models for speech-to-action and ADAS.
- Co-designing the data lake and compute infrastructure for in-house training and deployment Embodied AI solutions.

Robotics Systems Engineer *Jan. 2024 - Dec. 2024*

Singapore Technologies Engineering, Smart Systems Center *Singapore*

- Managed a team of 8 engineers to deliver a multi-robot collaboration project worth over $1M in revenue.
- Co-formulated a decentralized multi-robot communication framework to enable collaborative navigation and task allocation.
- Designed the system and software architecture for robust mesh communication networks for multi-UAV photogrammetry applications.

Robotics Software Engineer *Aug. 2020 - Dec. 2023*

Singapore Technologies Engineering, Software Engineering Center *Singapore*

- Led a team of 3 engineers to develop a robotic fleet of up to 8x UAV+UGVs to map unknown environments using lidar + vision-based SLAM.
- Developed a map stitching module that merges RGBD map segments via keypoint correspondences and inter-robot visual loop closures.
- Implemented a clustering-based perception algorithm to filter noisy pointcloud for robust autonomous forklift navigation.
- Implemented pallet detection algorithm for autonomous forklifts, achieving 9x inference speed, 65% localization accuracy improvement, and 34% sensor cost reduction.

Student Researcher (Speed Boat Engine Optimization) *Jan. 2018 - Dec. 2018*

Ilmor Engineering, R&D Department *Michigan, USA*

- Redesigned inlet port geometries and vane impellers of the rotary-vane pump system to improve flow rate by 16% and durability by 7 hours.

Artillery Platoon Commander *May 2014 - Mar. 2016*

Singapore Armed Forces *Singapore*

- Mortar Platoon Commander of 35 soldiers under national military conscription.

Talks

2025 **Drones for Conservation and Health Workshop (NUS),** Foundation Models for Ecological Monitoring *Singapore*

2025 **Multimodal Robot Navigation & Search (UToronto),** Test-Time Adaptation for VLM corrections *Toronto, Canada*

Honors & Awards

2025 **Embodied AI Research Collaboration Grant (160k SGD),** Singapore Technologies Engineering *Singapore*

2023 **PhD Full-Ride Scholarship,** Economic Development Board – Industrial Postgraduate Program (EDB-IPP) *Singapore*

2019 **Inter-disciplinary Prize Winner,** Amazon Makeathon *Michigan, USA*

2017 **Academic Excellence Award,** James B. Angell Scholar *Michigan, USA*

2016 **Undergraduate Full-Ride Scholarship,** Singapore Technologies Engineering Overseas Scholarship *Michigan, USA*

2015 **Brigade Commander Coin,** Award for Exceptional Leadership during National Military Conscription *Singapore*

Research Mentorship

Present **Alok Raj,** Undergraduate @ India Institute of Technology *Dhanbad, India*

Present **He Haodong,** Undergraduate @ Fudan University *Shanghai, China*

2024-25 **Shailesh,** Now: Research Assistant, MARMoT Lab *Singapore*

2024-25 **Boyang Liu,** Now: Algorithms Engineer, Baidu *Shenzhen, China*

2023-24 **Yixiao Ma,** Now: Manipulation AI Engineer, ZhiCheng AI *Hangzhou, China*

Other Activities

BLUElab Bangladesh Thermoelectric Cooling Research *Dec. 2017 - April. 2020*

Student Researcher, Co-Founder (Thermodynamics) *Dhaka, Bangladesh*

- Formalized partnership with Spreeha Foundation to provide cost-efficient cooling solutions to urban slum residents in Dhaka.
- Research with Professor M. Kaviany to design a $43 Thermoelectric Cooler prototype, delivering 90 CFM, 2.2m/s air flow, and 3° cooling.

Reviewer Conference on Robot Learning (CoRL 2023, 2025)

Certification Unmanned Aircraft Pilot License (UAPL), Designing Strategy (IDEO U), ABRSM Piano Grade 8