

Derek Ming Siang Tan

PH.D. STUDENT · ROBOTICS SOFTWARE ENGINEER

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My long-term goal is to bring multi-robot systems into everyday life through fundamental research.

Education

National University of Singapore, Singapore

Jan. 2023 - Present

PH.D MECHANICAL ENGINEERING (ROBOTICS)

GPA: 4.8 / 5.0

- Research Focus: Distributed Robotics System, Reinforcement Learning, Multi-Modal Foundation Models
- Coursework: Advanced Topics in Reinforcement Learning, Advanced Topics in Vision-Language Models

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

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.

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).

Work Experience

Singapore Technologies Engineering, Smart Systems Center

Jan. 2024 - Present

ROBOTICS SYSTEM ARCHITECT (MULTI-ROBOT SYSTEM DESIGN)

Singapore

- Formulated a decentralized multi-robot communication framework to enable collaborative perception, navigation, and task allocation.
- Designed the system and software architecture for robust mesh communication networks for multi-UAV photogrammetry applications.

Singapore Technologies Engineering, Software Engineering Center

Aug. 2020 - Dec. 2023

ROBOTICS SOFTWARE ENGINEER (MULTI-ROBOT SLAM)

Singapore

- Spearheaded the development of a heterogenous robotic fleet 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.

Ilmor Engineering, R&D Department

Jan. 2018 - Dec. 2018

STUDENT RESEARCHER (SPEED BOAT ENGINE OPTIMIZATION)

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.

Honors & Awards

2022 **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

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. Kaviani 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)

Certification Unmanned Aircraft Pilot License (UAPL), DRL Udacity Nanodegree, Sensor Fusion Udacity Nanodegree