Thien Hoang Nguyen, PhD | Sydney, Australia

Research Lead, ELO2 Project | Australian Centre for Robotics, University of Sydney

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Profile

Robotics researcher and engineer specialising in localisation, sensor fusion, spatial mapping and planning under uncertainty. Develops algorithms in Python and C++ and integrates them with real sensors and robots. Experience spans Hyundai warehouse UGVs, agricultural sensing with soil scientists and NSW farmers, and lunar-rover planning research. Combines mathematical modelling with field evaluation, open-source software and invention development.

Professional Experience

Research Lead, ELO2 Project Feb 2026–present
Australian Centre for Robotics, The University of Sydney

Lead global path-planning research for the Roo-ver lunar mission. Develop Monte Carlo tree search and belief-space planning in simulation. Coordinate planning research, technical documentation and system requirements with the robotics team.

Vonwiller Postdoctoral Research Associate Feb 2024–Feb 2026
Australian Centre for Robotics, The University of Sydney

Led sensing, mapping and robotic integration for Integrated AgriSense. Coordinated a five-person engineering and research team. Worked directly with soil scientists and NSW farmers. Evaluated a semi-autonomous prototype through a three-day pasture trial with 30 samples and laboratory comparisons. Developed ROS2 mission, navigation and arm-control software.

Project Officer / Research Fellow Nov 2022–Jan 2024
CARTIN, Nanyang Technological University, Singapore

Worked directly with Hyundai to adapt visual-range SLAM to a warehouse UGV in Singapore. Led localisation development using camera, IMU, LiDAR and UWB measurements.

Google Summer of Code Lead Developer 2019 and 2020
ArduPilot open-source project

Developed external-vision navigation and object-avoidance integrations using Intel RealSense cameras. Delivered software, documentation and community support. The `vision_to_mavros` package is referenced in official ArduPilot documentation.

Project Officer Oct 2017–Jul 2018
ST Engineering–NTU Corporate Laboratory, Singapore

Developed robotic hardware and vision/UWB algorithms for autonomous UAV landing.

Embedded Engineer Jan–Sep 2017
PIFLAB Co., Ltd, Vietnam

Designed a Pixhawk–Jetson TX1 carrier board for RTRobotics. Developed smart-farming firmware and software prototypes for MimosaTEK.

Education

PhD, Electrical and Electronic Engineering 2018–2023
Nanyang Technological University, Singapore. Thesis: *Ultra-wideband-aided Localization for Autonomous Robots*.

BEng (Hons.), Automation and Control 2012–2017
Ho Chi Minh City University of Technology, Vietnam. Salutatorian, Class of 2017.

Technical Expertise

Software: Python, C++, MATLAB, Linux, ROS1/ROS2, OpenCV, Docker, Git and CMake.
GPU and video: CUDA, TensorRT, FFmpeg/GStreamer, multithreading; NVIDIA Jetson.
Estimation: Visual SLAM, visual-inertial odometry, LiDAR/UWB fusion, point clouds, coordinate transforms, Eigen, Ceres and GTSAM.
Mapping and planning: Gaussian processes, active learning, stochastic planning and field validation.

Selected Publications

All four entries below are first-author papers. Full publication list: Google Scholar.

- **Nguyen, T.H.**, et al. "A Semi-Autonomous Robotic System for In Situ Soil Sampling, Analysis, and Mapping in Precision Agriculture." *IEEE Transactions on Field Robotics*, 3, 22–39, 2026. DOI.
- **Nguyen, T.H.**, et al. "A heterogeneous sensing system for soil moisture mapping in agricultural environments." *Computers and Electronics in Agriculture*, 2025. DOI.
- **Nguyen, T.H.**, et al. "Multivariate Active Learning and Adaptive Sampling With Multi-Kernel Gaussian Processes." *IEEE Robotics and Automation Letters*, 2025. DOI.
- **Nguyen, T.H.**, Xie, L. "Relative Transformation Estimation Based on Fusion of Odometry and UWB Ranging Data." *IEEE Transactions on Robotics*, 2023. DOI.

Intellectual Property

Mobile Sample Analysis System for Real-time In-situ Soil Nutrient Measurements
Lead inventor. Submitted IP, The University of Sydney (2025). Led mechanical and sensing design, algorithms, software, system integration, invention drafting and submission preparation.

UWB Anchor Deployment
Lead inventor. Published international patent application WO2022086446A1. Nanyang Technological University, Singapore (2022). Led algorithms, software, integration, invention drafting and application preparation.

Co-inventor on five NTU technical disclosures

- Visual-Range Simultaneous Localization and Mapping (TD2022-317).
- UAV Localization Using UWB Ranging and Onboard Sensors (TD2019-246).
- Autonomous Vision-UWB-Aided Landing UAV System (TD2019-007).
- Hardware Design for UWB-Aided Autonomous Landing System (TD2019-008).
- Autonomous UWB-Aided Landing UAV System (TD2018-334).

Selected Research Software

ORB-SLAM3 integrations | orb_slam3_ros, orb_slam3_ros_wrapper
Developed ROS interfaces, sensor configurations, pose and point-cloud outputs, transforms, map services, Docker support and documentation.

External-vision flight-controller integration | vision_to_mavros
Developed MAVROS/MAVLink interfaces for visual odometry, RealSense and AprilTag workflows. Provided installation guidance and community support.

GPU visual SLAM on Jetson | ORB_SLAM2_CUDA
Adapted an existing GPU-enhanced ORB-SLAM2 implementation for Jetson TX1. Resolved build compatibility and added ROS outputs.

Professional Service

- Associate Editor, *IEEE Robotics and Automation Letters* (Aug 2026–present).
- Grant assessor, NSERC Alliance–Mitacs Accelerate, Canada (Oct 2025).
- Grant assessor, BARD, USA (Sep 2025).

Selected Recognition

- Emerging Researcher spotlight, ICRA Field Robotics Workshop (2025).
- Team third place, ICCV SLAM Challenge (2023).
- Team second place, Hilti SLAM Challenge (2021).

Teaching and Research Supervision

- PhD co-supervisor at the University of Sydney.
- Technical advisor to six Honours projects at the University of Sydney.
- Develops planetary-rover teaching materials for AERO3760.
- Provides technical guidance on localisation, navigation, sensing and research software.