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Dexter Ong

Education

2022–Present **Doctoral Program (Ph.D.) in Computer and Information Science**, *University of Pennsylvania*,
I work with Pratik Chaudhari and Vijay Kumar on agile autonomy in cluttered environments with neuromorphic vision and scene understanding

2022–2024 **M.S.E. Robotics**, *University of Pennsylvania*,
Deep Learning, Robotics, Machine Perception, Controls

2015–2019 **Bachelor of Engineering (Honours) in Electrical Engineering**, *National University of Singapore*,
- Dissertation – Dynamic Object Tracking and Classification Using a Multi-Camera System
- NUS Overseas Colleges – Silicon Valley
  Entrepreneurship program involving a year-long internship at a start-up in San Francisco and classes in the MS&E program at Stanford University

Experience

2019–2022 **Robotics Research Engineer**, *DSO National Laboratories*, Singapore
Worked with Dr. Lionel Heng in the Robotics Autonomy Lab
- Developed vision-, LiDAR- and radar-based perception and localisation algorithms for field robots – sensor calibration, 3D vision, scene understanding, autonomy in adverse weather, object detection and tracking
- Contributed to Project AutoVision in collaboration with the Computer Vision and Geometry Lab of ETH Zurich
- Developed a portable stereo vision kit for vision-based autonomy and transited it to a project with industry partners
- Led the development of a data-collection vehicle including specification and integration of the sensor suite and onboard compute.

2018–2018 **Engineering Intern**, *Carbon Robotics*, San Francisco
Contributed to a robotic arm system for machine-tending tasks (12 mos)
- Worked on critical electrical, embedded, software systems, supporting the delivery of critical milestones including deployment and testing on-site on the assembly line
- Designed and integrated the elbow LED board including PCB design and firmware for interfacing with motor driver boards

2017–2017 **Research Intern**, *DSO National Laboratories*, Singapore
Cybersecurity and robotics projects (7 mos)
- Disassembly, tracing and modification of microcontroller firmware
- Unconstrained non-linear optimisation of polynomial-based trajectories
- Localisation through trilateration of multiple ultra-wideband sensors with an Extended Kalman Filter
- Range Image-based Segmentation of LiDAR Data

2016–2016 **Engineering Intern**, *TinyMOS*, Singapore
Firmware development for astrophotography camera (2 mos)

2016–2016 **App Developer**, *Memento Health*, Singapore
UNFRAMED Accelerator for social challenges (2 mos)

Awards

2022 **Soloman M. Swaab Fellowship**
Awarded in recognition of outstanding academic accomplishments and research potential

Publications

Tao, Yuezhan, Dexter Ong, Fernando Cladera, Jason Hughes, Camillo J Taylor, Pratik Chaudhari, and Vijay Kumar (2025). "HALO: High-Altitude Language-Conditioned Monocular Aerial Exploration and Navigation". In: *arXiv e-prints*, arXiv–2511.

Ong, Dexter, Yuezhan Tao, Varun Murali, Igor Spasojevic, Vijay Kumar, and Pratik Chaudhari (2025a). "ATLAS Navigator: Active Task-driven LAnguage-embedded Gaussian Splatting". In: *arXiv preprint arXiv:2502.20386*.

Tao, Yuezhan, Dexter Ong, Varun Murali, Igor Spasojevic, Pratik Chaudhari, and Vijay Kumar (2025). "RT-GuIDE: Real-Time Gaussian Splatting for Information-Driven Exploration". In: *IEEE Robotics and Automation Letters* 10.11, pp. 11594–11601. DOI: 10.1109/LRA.2025.3615039.

Ong, Dexter, Yuezhan Tao, Varun Murali, Igor Spasojevic, Vijay Kumar, and Pratik Chaudhari (2025b). *Gaussian Splatting as a Unified Representation for Autonomy in Unstructured Environments*. arXiv: 2505.11794 [cs.RO]. URL: https://arxiv.org/abs/2505.11794.

He, Siming, Zachary Osman, Fernando Cladera, Dexter Ong, Nitant Rai, Patrick Corey Green, Vijay Kumar, and Pratik Chaudhari (2025). "Estimating the Diameter at Breast Height of Trees in a Forest With a Single 360 Camera". In: *arXiv preprint arXiv:2505.03093*.

Prabhu, Ankit, Xu Liu, Igor Spasojevic, Yuwei Wu, Yifei Shao, Dexter Ong, Jiuzhou Lei, Patrick Corey Green, Pratik Chaudhari, and Vijay Kumar (2024). "UAVs for forestry: Metric-semantic mapping and diameter estimation with autonomous aerial robots". In: *Mechanical Systems and Signal Processing* 208, p. 111050.

Siming, H., Christopher D. Hsu, Dexter Ong, Yifei Simon Shao, and Pratik Chaudhari (2024). "Active Perception using Neural Radiance Fields". In: *2024 American Control Conference (ACC)*, pp. 4353–4358. DOI: 10.23919/ACC60939.2024.10645027.