

THAI P. DUONG

Email: tduong@ucsd.edu | Website: <https://thaipduong.github.io> | [Google Scholar](#) | [LinkedIn](#)

RESEARCH INTERESTS

Robot Autonomy; Robot Dynamics Learning, Planning and Control; Model-based Reinforcement Learning; Robot Perception and Environment Representation; Robot Exploration and Safety.

EDUCATION

Ph.D. Electrical and Computer Engineering. Track: Intelligent Systems, Robotics & Control.	University of California, San Diego La Jolla, CA	2018 - 2024 (expected)
M.S. Electrical Engineering and Computer Science.	Oregon State University Corvallis, OR	2015
B.S. Electronics and Telecommunications. Advanced Program.	Hanoi University of Science & Technology Hanoi, Vietnam	2011

EXPERIENCE

Graduate Researcher Advisor: Prof. Nikolay Atanasov , Existential Robotics Laboratory Working on machine learning for robotics: robot dynamics learning, planning and control, robot exploration and safety, robot perception, decision making under uncertainty, etc. (ROS, C++, python, pytorch, tensorflow, quadrotors, cars)	University of California, San Diego La Jolla, CA	2018 – Present
Research Intern Working on optimization-based motion planning for robot manipulators.	Amazon Robotics	2022
Software Engineer I/II Working on bugs/anomalies detection and power optimizations (C++/C#).	Microsoft Corporation, Office Performance Team	2015 – 2018

PROJECTS

Robot dynamics learning and control <i>neural ODE, python/C++, aerial and ground robots</i> • Encoding physics knowledge and Lie group constraints in machine learning models for dynamics learning and control. <i>Papers</i> : [P1] [P4] [C2] [C5] . • Adaptive control with disturbance features learned from data. <i>Papers</i> [W1] [J2] . • Safe navigation using physics-guided dynamics learning. <i>Papers</i> [C4] [J3] . • Learning distributed control policies from demonstration. <i>Paper</i> [C3] [P2] .	2020 - Present
Environment understanding for robot navigation <i>ROS, C++, ground robots</i> • Sparse online Bayesian occupancy map of the environment using relevance vector machine and efficient collision checking algorithms for autonomous navigation. <i>Papers</i> [C6] [J1] . • Optimal scene graph planning with large language model guidance. <i>Paper</i> [P3] .	2018 - Present

PUBLICATIONS

Preprints

- [P1] **T. Duong**, A. Altawaitan, J. Stanley, N. Atanasov, “*Port-Hamiltonian-based Neural ODE Networks on Lie Groups For Robot Dynamics Learning and Control*”, submitted to IEEE Transactions on Robotics (**T-RO**), 2023 [[website](#)][[arxiv](#)][[code](#)].
- [P2] E. Sebastian, **T. Duong**, N. Atanasov, E. Montijano and C. Sagues, “*Physics-Informed Multi-Agent Reinforcement Learning for Distributed Multi-Robot Problems*”, submitted to IEEE Transactions on Robotics (**T-RO**), 2023 [[website](#)][[arxiv](#)][[code](#)].
- [P3] Z. Dai, A. Asgharivaskasi, **T. Duong**, S. Lin, M. Tzes, G. Pappas, N. Atanasov, “*Optimal Scene Graph Planning with Large Language Model Guidance*”, submitted to IEEE International Conference on Robotics and Automation (**ICRA**), 2024 [[arxiv](#)].
- [P4] A. Altawaitan, J. Stanley, S. Ghosal, **T. Duong**, N. Atanasov, “*Hamiltonian Dynamics Learning from Point Cloud Observations for Nonholonomic Mobile Robot Control*”, submitted to IEEE International Conference on Robotics and Automation (**ICRA**), 2024 [[website](#)][[arxiv](#)][[code](#)].

Journals

- [J1] **T. Duong**, M. Yip, N. Atanasov, “*Autonomous Navigation in Unknown Environments with Sparse Bayesian Kernel-based Occupancy Mapping*”, IEEE Transactions on Robotics (**T-RO**), 2022 [[website](#)][[arxiv](#)][[code](#)].
- [J2] **T. Duong**, N. Atanasov, “*Adaptive Control of $SE(3)$ Hamiltonian Dynamics with Learned Disturbance Features*”, IEEE Control Systems Letters (**L-CSS**), 2022 [[website](#)][[arxiv](#)].
- [J3] Z. Li, **T. Duong**, N. Atanasov, “*Robust and Safe Autonomous Navigation for Systems with Learned $SE(3)$ Hamiltonian Dynamics*”, IEEE Open Journal of Control System (**OJ-CSYS**), 2022 (*Invited Paper*) [[website](#)][[arxiv](#)].

Conferences

- [C1] E. Sebastian, **T. Duong**, N. Atanasov, E. Montijano and C. Sagues, “*Learning to Identify Graphs from Node Trajectories in Multi-Robot Networks*”, International Symposium on Multi-Robot & Multi-Agent Systems (**MRS**), 2023 [[website](#)][[arxiv](#)][[code](#)].

- [C2] V. Duruisseaux, **T. Duong**, N. Atanasov, M. Leok, “*Lie Group Forced Variational Integrator Networks for Learning and Control of Robot Systems*”, Learning for Dynamics & Control Conference (L4DC), 2023 [[website](#)][[arxiv](#)][[code](#)].
- [C3] E. Sebastian, **T. Duong**, N. Atanasov, E. Montijano and C. Sagües, “*LEMURS: Learning Distributed Multi-robot Interactions*”, IEEE International Conference on Robotics and Automation (ICRA), 2023 [[website](#)][[arxiv](#)][[code](#)].
- [C4] Z. Li*, **T. Duong***, N. Atanasov, “*Safe Autonomous Navigation for Systems with Learned SE(3) Hamiltonian Dynamics*”, Learning for Dynamics & Control Conference (L4DC), 2022 [[website](#)][[arxiv](#)] (*equal contribution).
- [C5] **T. Duong**, N. Atanasov, “*Hamiltonian-based Neural ODE Networks on the SE(3) Manifold For Dynamics Learning and Control*”, Robotics: Science and Systems (RSS), Virtual, 2021 [[website](#)][[arxiv](#)] [[code](#)].
- [C6] **T. Duong**, N. Das, M. Yip, N. Atanasov, “*Autonomous Navigation in Unknown Environments using Sparse Kernel-based Occupancy Mapping*”, International Conference on Robotics and Automation (ICRA), Virtual, 2020 [[website](#)][[pdf](#)] [[code](#)].

Workshops

- [W1] **T. Duong**, N. Atanasov, “*Physics-guided Learning-based Adaptive Control on the SE(3) Manifold*”, Physical Reasoning and Inductive Biases for the Real World Workshop at [NeurIPS](#), Virtual, 2021 [[pdf](#)].

TALKS

- “Learning and Control of Hamiltonian Dynamics on the SE(3) Manifold”, 2022 SIAM Conference on Mathematics of Data Science (MDS’22)
- “Autonomous Navigation in Unknown Environments with Sparse Bayesian Kernel-based Occupancy Mapping”, 2023 International Conference on Robotics and Automation (ICRA’23)
- “Learning Environment and Dynamics Representations for Autonomous Robot Navigation”, Robograd Seminar, UCSD, 2023

SERVICES

Reviewers: IEEE Transactions on Robotics (T-RO), IEEE Robotics and Automation Letters (RAL), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), American Control Conference (ACC), Learning for Dynamics and Control (L4DC).

Program Committee:

[AAAI’23](#) workshop “When Machine Learning meets Dynamical Systems: Theory and Applications”.

TECHNICAL SKILLS

Programming: C++/Python/Matlab, Object-oriented Design.

Operating Systems: Linux, ROS.

Libraries and Toolbox: CasADi, Pytorch, Pybullet, Gazebo, Docker.

Robot Platforms: RaceCar, PX4 Quadrotors.

HONORS AND AWARDS

ICRA 2023 Travel Grant , IEEE Robotics and Automation Society	2023
ECE Department Fellowships , University of California, San Diego	2018-2019
Jacobs Fellowships , University of California, San Diego	2018
First place, Microsoft Coding Competition , Oregon State University	2013
Phi Kappa Phi Society , Oregon State University	2013
President’s Honors List , Hanoi University of Science & Technology	2011
Department’s Honors List , Hanoi University of Science & Technology	2010

TEACHING EXPERIENCE

Teaching Assistant , Planning & Learning in Robotics, University of California, San Diego	Spring 2021
Teaching Assistant , Sensing & Estimation in Robotics, University of California, San Diego	Winter 2020
Teaching Assistant , Stochastic Signals & Systems, Oregon State University	Fall 2014
Teaching Assistant , Discrete Structures in Computer Science, Oregon State University	Summer 2014
Teaching Assistant , Intro. to Probability & Random Signals, Oregon State University	Winter 2014

MENTORING

M.S. students:

Sambaran Ghosal (UCSD)	2022-present
Rishabh Bhattacharya (UCSD)	2023
Quan Lou (UCSD)	2022

Undergraduate students:

Jason Stanley (UCSD)	2022-present
Yuchen Zhang, Behrad Rabiei, Adin Ackerman, Anthony Tseng (UCSD)	2022
Minh Pham (UCSD)	2020-2022

MAE Women’s Mentoring Program:

Zihang He (UCSD), David Yount (UCSD), Emily Huang (UCSD)	2023 - 2024
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International Student Office’s Mentorship Program:

Iman Sayyadzadeh (UCSD), Taiga Morioka (UCSD)	2023
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