

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 - 2023 (expected) |
| M.S. Electrical Engineering and Computer Science. | Oregon State University Corvallis, OR | 2015 |
| B.S. Electronics and Telecommunications. Honors 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> [1] [11] [8] [3] . • Adaptive control with disturbance features learned from data. <i>Papers</i> [5] [13] . • Safe navigation using physics-guided dynamics learning. <i>Papers</i> [10] [6] . • Learning distributed control policies from demonstration. <i>Papers</i> [9] . | 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> [12] [4] . • Optimal planning with large language model guidance. <i>Papers</i> [2] . | 2018 - Present |

SELECTED PUBLICATIONS

Preprints

- [1] **T. Duong**, A. Altawaitan, J. Stanley, N. Atanasov, “*Hamiltonian-based Neural ODE Networks on Lie Groups For Dynamics Learning and Control*”, in preparation for T-RO submission, 2023.
- [2] 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 [\[arxiv\]](#).
- [3] 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 [\[arxiv\]](#).

Journals

- [4] **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 [\[code\]](#)[\[pdf\]](#) [\[website\]](#).
- [5] **T. Duong**, N. Atanasov, “*Adaptive Control of SE(3) Hamiltonian Dynamics with Learned Disturbance Features*”, IEEE Control Systems Letters (L-CSS), 2022 [\[pdf\]](#) [\[website\]](#).
- [6] 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*) [\[website\]](#).

Conferences

- [7] 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 [\[website\]](#)[\[arxiv\]](#).
- [8] 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 [\[website\]](#)[\[arxiv\]](#).

- [9] E. Sebastian, **T. Duong**, N. Atanasov, E. Montijano and C. Sagues, “*LEMURS: Learning Distributed Multi-robot Interactions*”, IEEE International Conference on Robotics and Automation (ICRA), 2023 [[website](#)][[arxiv](#)].
- [10] Z. Li*, **T. Duong***, N. Atanasov, “*Safe Autonomous Navigation for Systems with Learned SE(3) Hamiltonian Dynamics*”, Learning for Dynamics & Control Conference (L4DC), 2022 [[pdf](#)] [[website](#)] (*equal contribution).
- [11] **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 [[code](#)][[pdf](#)] [[website](#)].
- [12] **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 [[code](#)][[pdf](#)] [[website](#)].

Workshops

- [13] **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: Tensorflow, Pytorch, Pybullet, Gazebo, Docker.

Hardware 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:

| | |
|--|-------------|
| Dehao Lin(UCSD), Zihang He(UCSD), David Yount(UCSD), Emily Huang(UCSD) | 2023 - 2024 |
|--|-------------|

International student office’s mentorship program:

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