THAI P. DUONG

Contact Information

Duncan Hall 3097
Rice University
6100 Main St.
Houston, TX 77005

Email: thaiduong@rice.edu
Website: thaipduong.github.io
Google Scholar
LinkedIn

Academic Appointments

Postdoctoral Researcher 2024 – present
Department of Computer Science
Rice University, Houston, TX
Advisor: Lydia Kavraki

Education

Ph.D., Electrical and Computer Engineering June 2024
Track: Intelligent Systems, Robotics & Control
University of California San Diego, La Jolla, CA
Dissertation: *Learning Environment and Dynamics Representations for Autonomous Robot Navigation*
Advisor: Nikolay Atanasov

M.S., Electrical Engineering and Computer Science June 2015
Oregon State University, Corvallis, OR

B.S., Electronics and Telecommunications July 2011
Hanoi University of Science & Technology, Hanoi, Vietnam

Research Interests

- General areas: robotics, machine learning (ML), artificial intelligence (AI), control theory and optimization.
- Robot autonomy: task and motion planning, perception-aware planning, robot navigation, optimal control, distributed control, reinforcement learning, robot safety, robot perception, robot mapping and exploration.
- ML/Physical AI in robotics: data-efficient and explainable learning, safety in robot learning, learning from demonstrations, robot dynamics learning, learning with (physics) structure preservation.

Paper Awards

Best Paper Award, IEEE RAS Technical Committee on Robot Control 2025
Honorable Mention, IEEE Trans. on Robotics King-Sun Fu Memorial Best Paper Award 2025

Fellowships and Others

Robotics: Science and Systems (RSS) Pioneers 2026
Awarded to 30 emerging early-career robotics researchers worldwide

Rice's Future Faculty Fellows 2026
Awarded to 11 promising early-career researchers at Rice University

WiscProf: Future Faculty Program 2026
Awarded to 30 emerging scholars in engineering by the University of Wisconsin-Madison

ECE Department PhD Fellowship, University of California San Diego 2018

Jacobs Fellowship, University of California San Diego 2018

First place, Microsoft Coding Competition, Oregon State University 2013

President's and Department's Honors List, Hanoi University of Science & Technology 2010-2011

Grant Proposals

Efficient Robot Planning and Control under GenAI-informed Safety Constraints 2026
(Pending NSF CISE/IIS grant proposal, co-authored with Lydia Kavraki)

Auto. Robotic Cleaning for Maintenance of Surface Power Assets on the Moon and Mars 2026
(Pending NASA SpaceTech REDDI grant proposal, co-authored with Lydia Kavraki)

Professional Experience

Graduate Researcher 2018 – 2024
Department of Electrical and Computer Engineering
University of California San Diego, La Jolla, CA

Research Intern 2022
Amazon Robotics, North Reading, MA

Software Engineer 2015 – 2018
Microsoft Corporation, Redmond, WA

Publications

Preprints

[P1] **T. Duong** and L. E. Kavraki, "*Achieving Efficient Sampling-based Kinodynamic Planning: Challenges and Opportunities*," Science Robotics, 2026. Under Review.

[P2] T. Tyrovouzis, **T. Duong**, and L. E. Kavraki, "*TMPPI: A Fast Model Predictive Path Integral Library on CPUs*," 2026. Under Review.

[P3] E. Flores, **T. Duong**, and L. E. Kavraki, "*Efficient Joint State-Time Optimization for Trajectory Generation Under Temporal Constraints*," 2026. Under Review.

Journal Papers

[J1] **T. Duong**, C. W. Ramsey, Z. Kingston, W. Thomason, and L. E. Kavraki, "*Ultrafast Sampling-based Kinodynamic Planning via Differential Flatness*," IEEE Transactions on Robotics (T-RO), 2026 [pdf].

[J2] Q. Meng, E. Flores, **T. Duong**, V. Unhelkar, and L. E. Kavraki, "*Sampling-Based Motion Planning with Scene Graphs Under Perception Constraints*," IEEE Robotics and Automation Letters (RA-L), 2026 [pdf].

[J3] S. Sivaranjani, Y. Shi, N. Atanasov, **T. Duong**, J. Feng, T. Martin, Y. Xu, V. Gupta, F. Allgower, "*Control-Oriented System Identification: Classical, Learning, and Physics-Informed Approaches*," Annual Reviews in Control (ARC), 2026 [pdf].

[J4] A. Altawaitan, J. Stanley, S. Ghosal, **T. Duong**, and N. Atanasov, "*Learned IMU Bias Prediction for Invariant Visual Inertial Odometry*," IEEE Robotics and Automation Letters (RA-L), 2025 [pdf].

[J5] E. Sebastian, **T. Duong**, N. Atanasov, E. Montijano, C. Sagues, "*Physics-Informed Multi-Agent Reinforcement Learning for Distributed Multi-Robot Problems*," IEEE Transactions on Robotics (T-RO), 2025 [website][pdf][code].

[J6] **T. Duong**, A. Altawaitan, J. Stanley, N. Atanasov, "*Port-Hamiltonian-based Neural ODE Networks on Lie Groups For Robot Dynamics Learning and Control*," IEEE Transactions on Robotics (T-RO), 2024 [website][pdf][code].
Honorable Mention of the 2025 T-RO King-Sun Fu Memorial Best Paper Award.
2025 Best Paper Award from the IEEE-RAS Technical Committee on Robot Control.

[J7] C. Nguyen, A. Altawaitan, **T. Duong**, N. Atanasov, Q. Nguyen "*Variable-Frequency Model Learning and Predictive Control for Jumping Maneuvers on Legged Robots*," IEEE Robotics and Automation Letters (RA-L), 2024 [video][pdf][code].

[J8] **T. Duong**, N. Atanasov, "*Adaptive Control of SE(3) Hamiltonian Dynamics with Learned Disturbance Features*," IEEE Control Systems Letters (L-CSS), 2022 [website][pdf].

[J9] 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 [website][pdf].

[J10] **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][pdf][code].

Conference Papers

[C1] S. Beck, C. Nguyen, **T. Duong**, N. Atanasov, Q. Nguyen, "*High Accuracy Aerial Maneuvers on Legged Robots using Variational Integrator Discretized Trajectory Optimization*," IEEE International Conference on Robotics and Automation (ICRA), 2025 [video][pdf][code]

[C2] Z. Dai, A. Asgharivaskasi, **T. Duong**, S. Lin, M. Tzes, G. Pappas, N. Atanasov, "*Optimal Scene Graph Planning with Large Language Model Guidance*," IEEE International Conference on Robotics and Automation (ICRA), 2024 [website][pdf][code].

[C3] A. Altawaitan, J. Stanley, S. Ghosal, **T. Duong**, N. Atanasov, "*Hamiltonian Dynamics Learning from Point Cloud Observations for Nonholonomic Mobile Robot Control*," IEEE International Conference on Robotics and Automation (ICRA), 2024 [website][pdf][code].

[C4] 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][pdf].

[C5] V. Duruisseaux, **T. Duong**, N. Atanasov, M. Leok, "*Lie Group Forced Variational Integrator Networks for Learning and Control of Robot Systems*," Learning for Dynamics and Control Conference (L4DC), 2023 [website] [pdf][code].

[C6] 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][pdf][code].

[C7] 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][pdf] (**equal contribution*).

[C8] **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][pdf] [code].

[C9] **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].

Workshop Papers

[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].

Workshop Organization

Organizing Committee:

RSS'25 workshop on "Fast motion planning and control in the era of parallelism" (Lead organizer).
ICRA'26 keynote tutorial on "The Open Motion Planning Library (OMPL 2.0)" (Lead organizer).

Seminars and Talks

- "*Toward Fast Motion Planning with OMPL 2.0 Library*," Invited Talk, Workshop on Open Robotics Software at IROS, 2026
- "*Developing Accessible and Advanced Software for Robotics: the Case of OMPL*," Invited Talk, Workshop on Reproducing Robot Manipulation: Developing Guidelines to Improve Accessibility and Reproducibility of Open-Source at IROS, 2026
- "*Ultrafast Sampling-based Kinodynamic Planning via Differential Flatness*," Invited Talk, Workshop on Robotics Acceleration with Computing Hardware and Systems (RoboARCH) at ICRA, 2026
- "*Exploiting Dynamics Structures in Learning, Planning and Control for Effective Robot Autonomy*," Department of Electrical and Computer Engineering, University of Wisconsin-Madison (WiscProf Program), 2026
- "*Preserving Structures in Dynamics Learning and Control for Autonomous Robot Navigation*," Spotlight Talk, Texas Regional Robotics Symposium (TEROS'25), 2025
- "*Learning Dynamics and Control for Autonomous Robot Navigation*," Invited Talk, Algorithmic Robotics (COMP450), Rice University, 2024
- "*Learning Dynamics and Control for Autonomous Robot Navigation*," Graduate Seminar (COMP600), Rice University, 2024
- "*Autonomous Navigation in Unknown Environments with Sparse Bayesian Kernel-based Occupancy Mapping*," IEEE International Conference on Robotics and Automation (ICRA'23), 2023
- "*Learning Environment and Dynamics Representations for Autonomous Robot Navigation*," Robograd Seminar, University of California San Diego, 2023
- "*Learning and Control of Hamiltonian Dynamics on the SE(3) Manifold*," Invited Talk, SIAM Conference on Mathematics of Data Science (MDS'22), 2022

Professional Service

Reviewer: IEEE Transactions on Robotics (T-RO), International Journal of Robotics Research (IJRR), IEEE Robotics and Automation Letters (RA-L), Autonomous Robots, Robotics: Science and Systems (RSS), 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), Conference on Robot Learning (CoRL).

Program Committee:

AAAI'23 workshop on "When Machine Learning meets Dynamical Systems: Theory and Applications."

ICRA'25 workshop on "Robot safety under uncertainty from "intangible" specifications."

Session Chair:

Diffusion for Manipulation, IEEE International Conference on Robotics and Automation (ICRA), 2025.

Teaching Experience

Co-Instructor, Algorithmic and AI-Enabled Robotics, Rice University	Fall 2026
Guest Lecturer, Algorithmic Robotics, Rice University	Fall 2025
Teaching Assistant, Planning & Learning in Robotics, UC San Diego	Spring 2021
Teaching Assistant, Sensing & Estimation in Robotics, UC 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 Activities

PhD students:

Qingxi Meng (Rice University)	2024-present
Theodoros Tyrovouzis (Rice University)	2025-present
Emiliano Flores (Rice University)	2025-present
Arden Knoll (Rice University)	2025-present
Abdullah Altawaitan (UC San Diego)	2021-2024
Chuong Nguyen (University of Southern California)	2023-2024

M.S. students:

Sambaran Ghosal (UC San Diego)	2022-2024
Jason Stanley (UC San Diego)	2023-2024

Undergraduate students:

Jason Stanley (UC San Diego)	2022-2023
Minh Pham (UC San Diego)	2020-2022
Yuchen Zhang, Behrad Rabiei, Adin Ackerman, Anthony Tseng (UC San Diego)	2022

Outreach Activities

The Rice Reach: STEM Exploration, Rice University 2026
For high school students in the Greater Houston area.

Career Day at Silvercrest Elementary, Pearland, Texas 2026
Presentation on career in robotics with real demos for elementary students.

MAE Women's Mentoring Program, UC San Diego 2023 - 2024
Mentees: Zihang He, David Yount, Emily Huang.

Women in ECE's Sun God Robot Workshop, UC San Diego 2024
Robot-building activities for middle schoolers in San Diego.

International Student Office's Mentorship Program, UC San Diego 2023
Mentoring new international Ph.D. students: Iman Sayyadzadeh, Taiga Morioka.