Lening Li

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RESEARCH INTERESTS

Reinforcement Learning ∘ Optimal Control ∘ Game Theory ∘ Formal Methods

EDUCATION

Carnegie Mellon University (CMU) Pittsburgh, PA, USA
MBA Aug. 2025 - Present

Worcester Polytechnic Institute (WPI) Worcester, MA, USA
Ph.D. *in Robotics Engineering* Aug. 2016 - Dec. 2022

- Thesis: "Optimal Control and Reinforcement Learning for Stochastic Systems under Temporal Logic Specifications"

M.S. *in Robotics Engineering* Aug. 2016 - May 2018
M.S. *in Computer Science* Aug. 2014 - May 2016

- Thesis: "Birrtopt: A combined software framework for motion planning applied on Atlas robot"

Harbin Institute of Technology (HIT) China
B.S. *in Computer Science* Sep. 2010 - Jul. 2014

- Summa Cum Laude (Top 5% of class)
- Thesis: "Contourlet Transform Based Image Compression"

B.A. *in English Language & Literature* Sep. 2011 - Jul. 2014

- Thesis: "A Study on the Male Chauvinism in *Women in Love*"

CERTIFICATIONS

Certified REC Foundation Coach Sep. 2023 - Sep. 2024
Robotics Education & Competition Foundation Online
Coach and mentor robotics teams, fostering student growth in STEM and competitive engineering.

Certified FIRST Tech Challenge (FTC) Coach Nov. 2022 - May 2023
FIRST Robotics Online
Led and mentored FTC robotics teams, guiding students in robot design, programming, and competition strategy.

Certification in College Teaching Jun. 2017 - Aug. 2019
Higher Education Consortium of Central Massachusetts (HECCMA) Worcester, MA, USA
Professionally trained in evidence-based pedagogy to deliver high-quality courses.

INDUSTRY & ADVISORY EXPERIENCE

Robotics Lab Advisor Dec. 2025 - Present
Harvard University Cambridge, MA, USA

- Advise student research projects in robotics, with emphasis on algorithm design, experimental rigor, and reproducible evaluation.
- Provide technical mentorship spanning reinforcement learning, planning/control, and safety-oriented system design, bridging academic research and deployed robotics.

- Support lab execution through research reviews, project scoping, and structured feedback to improve research velocity and quality.

Senior Software Engineer Oct. 2022 - Present
Symbotic Wilmington, MA, USA

- Designed and deployed scalable multi-agent path-planning and coordination algorithms for large-scale robotic warehouse systems in C++.
- Improved fleet-level robustness through advances in control design, state estimation, and fault-tolerant behavior architectures.
- Optimized real-time decision-making pipelines across thousands of autonomous robots operating under strict latency constraints.

Senior Software Engineer Oct. 2021 - Aug. 2022
Berkshire Grey Bedford, MA, USA

- Led the development of perception and manipulation algorithms for picking previously unseen SKUs using ROS, C++, and Python.
- Reduced end-to-end system latency by redesigning inter-process communication and execution pipelines.

Software Engineering Intern Jun. 2015 - Jan. 2016
Rudolph Technologies Tewksbury, MA, USA

- Designed an automated tool to migrate multiple legacy codebases onto a unified platform.
- Developed methods to improve data accuracy in wafer-defect collection and analysis pipelines.

Software Engineering Intern Jul. 2013 - Aug. 2013
Neusoft China

- Built a map management system supporting streamlined insert, delete, and edit operations.

REPRESENTATIVE SKILLS

Programming Languages:	C/C++, Python, MATLAB
Robotics & Control:	Motion Planning, Optimal Control, Reinforcement Learning
Robotic Systems:	ROS, ROS 2, Distributed Robotic Systems
Machine Learning:	PyTorch, TensorFlow
Languages:	English (Fluent), Chinese (Native)

TEACHING

Teaching Assistant Aug. 2022 - Dec. 2022
RBE 549. Computer Vision, WPI Worcester, MA, USA

- Contributed to the design and delivery of a new computer vision course.
- Delivered lectures and supported student learning through structured office hours.
- Course website: `https://nitinjsanket.github.io/teaching/rbe549/fall2022.html`

Teaching Assistant Aug. 2020 - May 2021
RBE 3001 & 3002. Unified Robotics III & IV, WPI Worcester, MA, USA

- Supervised labs on 3D-printed robot-arm control and mobile robot navigation.
- Created and assessed final projects, lab reports, and homework assignments.

Teaching Assistant Aug. 2018 - Dec. 2018
RBE 549. Computer Vision, WPI Worcester, MA, USA

- Delivered lectures and held office hours to support student learning and project execution.

Teaching Assistant Aug. 2017 - May 2018
RBE 1001. Introduction to Robotics, WPI Worcester, MA, USA

- Managed and mentored a team of five undergraduate peer learning assistants.
- Created and assessed final projects, lab reports, and homework assignments.

REPRESENTATIVE PROJECTS

DARPA Robotics Challenge Aug. 2014 - May 2015
Researcher Worcester, MA, USA

- Collaborated with a Carnegie Mellon University team on the Atlas humanoid robot developed by Boston Dynamics.
- Designed a motion planner for arm manipulation tasks including door opening, valve turning, and tool grasping.
- Led the design of a human-robot interaction interface to improve operator effectiveness and task execution.
- Ranked 7th out of 24 teams.

DARPA SI3-CMD: Serial Interactions in Imperfect Information Games for Complex Military Decision Making Jan. 2019 - Aug. 2020
Researcher Worcester, MA, USA

- Partnered with Scientific Systems Company Inc. (SSCI) to develop a game-theoretic framework and Python software for deceptive planning.
- Increased objective-achievement likelihood by leveraging asymmetric information and strategic deception.
- Formulated a solution concept for dynamic hypergames with temporal objectives.

Optimal Control and Reinforcement Learning for Stochastic Systems under Temporal Logic Specifications Aug. 2016 - Aug. 2022
Researcher Worcester, MA, USA

- Developed a principled framework translating probabilistic temporal logic specifications into chance-constrained control problems with satisfaction guarantees.
- Proposed a scalable, model-free reinforcement learning approach for continuous stochastic systems with improved sample efficiency.

HONORS & AWARDS

Alex F. Backlin Fund Scholarship Jan. 2021
Worcester Polytechnic Institute Worcester, MA, USA

Travel Grant Award Oct. 2019
Lehigh University Bethlehem, PA, USA

Graduate Student Travel Award Oct. 2019
Worcester Polytechnic Institute Worcester, MA, USA

Graduate Student Travel Award Mar. 2019
Worcester Polytechnic Institute Worcester, MA, USA

Graduate Student Travel Award Jun. 2017
Worcester Polytechnic Institute Worcester, MA, USA

EXTRACURRICULAR ACTIVITIES AND LEADERSHIP

President Jan. 2019 - May 2020
Graduate Student Government (GSG) Worcester, MA, USA

- Oversaw governance operations and led the governing body.
- Represented graduate students in day-to-day interactions with university administration.
- Partnered with the Graduate Studies Office to elevate housing concerns to the Board of Trustees.
- Served on the Provost Search Committee and provided recommendations.

Volunteer Jul. 2013 - Sep. 2013
Lhasa Welfare Center for Children China

- Raised funds to support educational services for children from low-income families.
- Tutored children in Chinese, Math, and English.

ORGANIZATION MEMBERSHIPS

- **Member**, IEEE
- **Member**, IEEE Young Professionals
- **Member**, IEEE Robotics and Automation Society
- **Member**, Association for Women in Mathematics
- **Member**, Alpha Chapter of Rho Beta Epsilon (Honor society) at Worcester Polytechnic Institute

SOCIAL MEDIA

LinkedIn:	`https://www.linkedin.com/in/lening-li/`
Profile:	`https://lening.li`
GitHub:	`https://github.com/leelening`
Google Scholar:	`https://scholar.google.com/citations?user=KWUJ10wAAAAJ\&hl=en`

ACADEMIC SERVICES

Journal Reviewer

- IEEE Robotics and Automation Letters (RA-L)
- IET Cyber-Systems and Robotics
- IEEE Transactions on Intelligent Transportation Systems
- Discover Robotics
- The Journal of Supercomputing

Conference Reviewer

- International Conference on Robotics and Automation (ICRA)
- American Control Conference (ACC)
- IEEE Conference on Decision and Control (CDC)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- International Conference on Ubiquitous Robots (UR)
- European Control Conference (ECC)

PUBLICATIONS

Manuscripts in Preparation

U.1 **L. Li** and Z. Qian, "Topological guided actor-critic modular learning of continuous systems with temporal objectives," *arXiv preprint arXiv:2304.10041*, 2023

U.2 **L. Li** and J. Fu, "Policy synthesis for metric interval temporal logic with probabilistic distributions," *arXiv preprint arXiv:2105.04593*, 2021

Conferences

C.1 C. G. Atkeson, B. P. W. Babu, N. Banerjee, D. Berenson, C. P. Bove, X. Cui, M. DeDonato, R. Du, **L. Li**, P. Franklin, *et al.*, "No falls, no resets: Reliable humanoid behavior in the darpa robotics challenge," in *2015 IEEE-RAS 15th International Conference on Humanoid Robots (Humanoids)*, pp. 623–630, IEEE, 2015

C.2 **L. Li**, X. Long, and M. A. Gennert, "Birrtopt: A combined sampling and optimizing motion planner for humanoid robots," in *2016 IEEE-RAS 16th International Conference on Humanoid Robots (Humanoids)*, pp. 469–476, IEEE, 2016

C.3 **L. Li** and J. Fu, "Sampling-based approximate optimal temporal logic planning," in *2017 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1328–1335, IEEE, 2017

C.4 **L. Li** and J. Fu, "Topological approximate dynamic programming under temporal logic constraints," in *2019 IEEE 58th Conference on Decision and Control (CDC)*, pp. 5330–5337, IEEE, 2019

C.5 **L. Li** and J. Fu, "Approximate dynamic programming with probabilistic temporal logic constraints," in *2019 American Control Conference (ACC)*, pp. 1696–1703, IEEE, 2019

C.6 **L. Li**, H. Ma, S. Han, and J. Fu, "Synthesis of proactive sensor placement in probabilistic attack graphs," in *2023 American Control Conference (ACC)*, pp. 3415–3421, IEEE, 2023

C.7 **L. Li**, H. Rahmani, and J. Fu, "Probabilistic planning with prioritized preferences over temporal logic objectives," in *32nd International Joint Conference on Artificial Intelligence*, 2023(Acceptance rate: **15%**)

Journals

J.1 M. DeDonato, F. Polido, K. Knoedler, B. P. Babu, N. Banerjee, C. P. Bove, **L. Li**, R. Du, P. Franklin, J. P. Graff, *et al.*, "Team wpi-cmu: Achieving reliable humanoid behavior in the darpa robotics challenge," *Journal of Field Robotics*, vol. 34, no. 2, pp. 381–399, 2017

J.2 Z. Chen, **L. Li**, and X. Huang, "Building an autonomous lane keeping simulator using real-world data and end-to-end learning," *IEEE Intelligent Transportation Systems Magazine*, vol. 12, no. 1, pp. 47–59, 2018

J.3 **L. Li**, H. Ma, A. N. Kulkarni, and J. Fu, "Dynamic hypergames for synthesis of deceptive strategies with temporal logic objectives," *IEEE Transactions on Automation Science and Engineering*, 2022

Chapters

Ch.1 C. G. Atkeson, P. B. Benzun, N. Banerjee, D. Berenson, C. P. Bove, X. Cui, M. DeDonato, R. Du, **L. Li**, P. Franklin, *et al.*, "Achieving reliable humanoid robot operations in the darpa robotics challenge: Team wpi-cmu's approach," in *The DARPA Robotics Challenge Finals: Humanoid Robots To The Rescue*, pp. 271–307, Springer, 2018

Ch.2 C. G. Atkeson, P. B. Benzun, N. Banerjee, D. Berenson, C. P. Bove, X. Cui, M. DeDonato, R. Du, **L. Li**, P. Franklin, *et al.*, "What happened at the darpa robotics challenge finals," in *The DARPA Robotics Challenge Finals: Humanoid Robots To The Rescue*, pp. 667–684, Springer, 2018