Tom Silver

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Education

Ph.D. Massachusetts Institute of Technology — Cambridge, MA
Computer Science (EECS) — May 2020 – May 2024
Advised by Leslie Kaelbling and Joshua Tenenbaum
Thesis: *Neuro-Symbolic Learning for Bilevel Robot Planning*

S.M. Massachusetts Institute of Technology — Cambridge, MA
Computer Science (EECS) — Aug 2018 – May 2020
Thesis: *Few-Shot Bayesian Imitation Learning with Logical Program Policies*
GPA: 5.0/5.0

A.B. Harvard College — Cambridge, MA
Computer Science and Mathematics — Aug 2012 – May 2016
Thesis: *Luna: A Game-Based Rating System for Artificial Intelligence*
Magna cum laude with highest honors

Employment

Princeton University — Princeton, NJ
Assistant Professor, ECE Department — July 2025 – Present
Principal Investigator, Princeton Robot Planning and Learning (PRPL)
Associated Faculty, Center for Statistics and Machine Learning
Core Faculty, Robotics

Cornell University — Ithaca, NY
Postdoctoral Fellow — July 2024 – June 2025
EmPRISE Lab (PI: Tapomayukh "Tapo" Bhattacharjee)
CS Department

Boston Dynamics AI Institute — Cambridge, MA
Research Intern — May 2023 – May 2024
Manager: Jenny Barry

Google Brain Robotics — Mountain View, CA (Remote)
Research Intern — Jun – Aug 2021
Managers: Shane Gu and Saminda Abeyruwan

Vicarious AI — Union City, CA
Research Engineer; Researcher — Jul 2016 – Aug 2018

Google — Cambridge, MA
Software Engineering Intern — Jun – Aug 2014

Conference Publications

* Equal contribution †Students for whom I was the primary supervisor

1. Madan, R., Lin, J., Goel, M., Li, A., Xie, A., Liang, X., Lee, M., Guo, J., Thakkar, P. N., Banerjee, R., Barreiros, J., Tsui, K., **Silver, T.**, Bhattacharjee, T. Not All Contacts are Bad: Adapting to User Contact Preferences for Whole-Arm Manipulation. *Conference on Robot Learning (CoRL) 2025*.

2. Thakkar, P. N., Sinha, S., Baijal, K., Bian, Y., Lackey, L., Dodson, B., Kong, H., Kwon, J., Li, A., Hu, Y., Rekoutis, A., **Silver, T.**, Bhattacharjee, T. CLAMP: Crowdsourcing a LArge, in-the-wild haptic dataset with an open-source device for learning a Multimodal robot Perception model. *Conference on Robot Learning (CoRL) 2025*.

3. Wu, Z., Ai, B., **Silver, T.**, Bhattacharjee, T. SAVOR: Skill Affordance Learning from Visuo-Haptic Perception for Robot-Assisted Bite Acquisition. *Conference on Robot Learning (CoRL) 2025*. **Oral presentation (Top 5%)**.

4. Li, B., **Silver, T.**, Scherer, S., Gray, A. Bilevel Learning for Bilevel Planning. *Robotics: Science and Systems (RSS) 2025*.

5. Jenamani, R., **Silver, T.**, Dodson, B., Tong, S., Song, A., Yang, Y., Liu, Z., Howe, B., Whitneck, A., Bhattacharjee, T. FEAST: A Flexible Mealtime-Assistance System Towards In-the-Wild Personalization. *Robotics: Science and Systems (RSS) 2025*. **Best paper award (Top 1).**

6. Liang, Y., Kumar, N., Tang, H., Weller, A., Tenenbaum, J., **Silver, T.**, Henriques, J., Ellis, K. VisualPredicator: Learning Abstract World Models with Neuro-Symbolic Predicates for Robot Planning. *International Conference on Learning Representations (ICLR) 2025*. **Spotlight presentation (Top 5%)**.

7. Ye, R., Chen, S., Yan, Y., Yang, J., Ge, C., Barreiros, J., Tsui, K., **Silver, T.**, Bhattacharjee, T. CART-MPC: Coordinating Assistive Devices for Robot-Assisted Transferring with Multi-Agent MPC. *ACM/IEEE International Conference on Human-Robot Interaction (HRI) 2025*.

8. Liu, Z., Ju, Y., Da, Y., **Silver, T.**, Thakkar, P., Li, J., Guo, J., Dimitropoulou, K., Bhattacharjee, T. GRACE: Generalizing Robot-Assisted Caregiving with User Functionality Embeddings. *ACM/IEEE International Conference on Human-Robot Interaction (HRI) 2025*.

9. Kumar, N.*†, **Silver, T.***, McClinton, W.†, Zhao, L., Proulx, S., Lozano-Perez, T., Kaelbling, L., Barry, J. Practice Makes Perfect: Planning to Learn Skill Parameter Policies. *Robotics: Science and Systems (RSS) 2024*.

10. **Silver, T.**, Dan, S., Srinivas, K., Tenenbaum, J., Kaelbling, L., Katz, M. Generalized Planning in PDDL Domains with Pretrained Large Language Models. *AAAI Conference on Artificial Intelligence (AAAI) 2024*.

11. Kumar, N.*†, McClinton, W.*†, Chitnis, R., **Silver, T.**, Lozano-Perez, T., Kaelbling, L. Learning Efficient Abstract Planning Models that Choose What to Predict. *Conference on Robot Learning (CoRL) 2023*.

12. Li, A.†, **Silver, T.** Embodied Active Learning of Relational State Abstractions for Bilevel Planning. *Conference on Lifelong Learning Agents (CoLLAs) 2023*. **Oral presentation (Top 12)**.

13. **Silver, T.***, Chitnis, R.*, Kumar, N.†, McClinton, W.†, Lozano-Perez, T., Kaelbling, L., Tenenbaum, J. Predicate Invention for Bilevel Planning. *AAAI Conference on Artificial Intelligence (AAAI) 2023*. **Oral presentation.**

14. **Silver, T.**, Athalye, A.†, Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. Learning Neuro-Symbolic Skills for Bilevel Planning. *Conference on Robot Learning (CoRL) 2022*.

15. Chitnis, R.*, **Silver, T.***, Tenenbaum, J., Kaelbling, L., Lozano-Perez, T. Learning Neuro-Symbolic Relational Transition Models for Bilevel Planning. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022*.

16. Yang, R.*†, **Silver, T.***, Curtis, A., Lozano-Perez, T., Kaelbling, L. PG3: Policy-Guided Planning for Generalized Policy Generation. *International Joint Conference on Artificial Intelligence (IJCAI) 2022*.

17. Gehring, C.*, Asai, M.*, Chitnis, R., **Silver, T.**, Kaelbling, L. Sohrabi, S., Katz, M. Reinforcement Learning for Classical Planning: Viewing Heuristics as Dense Reward Generators. *International Conference on Automated Planning and Scheduling (ICAPS) 2022*.

18. Curtis, A., **Silver, T.**, Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. Discovering State and Action Abstractions for Generalized Task and Motion Planning. *AAAI Conference on Artificial Intelligence (AAAI) 2022*.

19. **Silver, T.***, Chitnis, R.*, Tenenbaum, J., Kaelbling, L., Lozano-Perez, T. Learning Symbolic Operators for Task and Motion Planning. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021*. **Best paper finalist (Top 5).**

20. **Silver, T.***, Chitnis, R.*, Curtis, A., Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. Planning with Learned Object Importance in Large Problem Instances Using Graph Neural Networks. *AAAI Conference on Artificial Intelligence (AAAI) 2021*.

21. Chitnis, R.*, **Silver, T.***, Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. GLIB: Efficient Exploration for Relational Model-based Reinforcement Learning via Goal-Literal Babbling. *AAAI Conference on Artificial Intelligence (AAAI) 2021*.

22. Chitnis, R.*, **Silver, T.***, Kim, B., Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. CAMPs: Learning Context-Specific Abstractions for Efficient Planning in Factored MDPs. *Conference on Robot Learning (CoRL) 2020*. **Plenary talk (Top 20).**

23. Zhi-Xuan, T., Mann J. L., **Silver, T.**, Tenenbaum, J., Mansinghka, V. K. Online Bayesian Goal Inference for Boundedly-Rational Planning Agents. *Conference on Neural Information Processing Systems (NeurIPS) 2020*.

24. **Silver, T.**, Allen, K., Lew, A., Kaelbling, L., Tenenbaum, J. Few-Shot Bayesian Imitation Learning with Logical Program Policies. *AAAI Conference on Artificial Intelligence (AAAI) 2020*. Earlier versions at RLDM 2019 and ICLR SPiRL Workshop 2019.

25. Loula, J., Allen, K., **Silver, T.**, Tenenbaum, J. Learning Constraint-Based Planning Models from Demonstrations. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2020*.

26. Xia, V.*, Wang, Z.*, Allen, K., **Silver, T.**, Kaelbling, L. Learning Sparse Relational Transition Models. *International Conference on Learning Representations (ICLR) 2019*.

27. Loula, J., **Silver, T.,** Allen, K., Tenenbaum, J. Discovering a Symbolic Planning Language from Continuous Experience. *Annual Meeting of the Cognitive Science Society (CogSci) 2019*.

28. Stark, M., Schlegel, A., Wendelken, C., Park, D., Purdy, E., **Silver, T**., Phoenix, S., George, D. Behavior is Everything – Towards Representing Concepts with Sensorimotor Contingencies. *AAAI Conference on Artificial Intelligence (AAAI) 2018*.

29. Kansky, K., **Silver, T.**, Mely, D. A., Eldawy, M., Lazaro-Gredilla, M., Lou, X., Dorfman N., Sidor S., Phoenix S., George, D. Schema Networks: Zero-Shot Transfer with a Generative Causal Model of Intuitive Physics. *International Conference on Machine Learning (ICML) 2017*.

Journal Publications

30. Garrett, C.R., Chitnis, R., Holladay, R., Kim, B., **Silver, T.,** Kaelbling, L., Lozano-Perez, T. Integrated Task and Motion Planning. *Annual Review of Control, Robotics, and Autonomous Systems. Vol. 4 2021.*

31. Colubri, A.*, **Silver, T.***, Fradet, T., Retzepi, K., Fry, B., Sabeti, P. Transforming Clinical Data into Actionable Prognosis Models: Machine-Learning Framework and Field-Deployable App to Predict Outcome of Ebola Patients. *PLoS Neglected Tropical Diseases 2016.*

Workshop Publications

32. Liu, Y, Li, B., Eysenbach, B., **Silver, T.** SLAP: Shortcut Learning for Abstract Planning. *R3: Reasoning for Robust Robot Manipulation in the Open World @ RSS 2025.*

33. Zhao, L., McClinton, W., Curtis, A., Kumar, N, **Silver, T.**, Kaelbling, L, Wong, L. Seeing is Believing: Planning to Perceive with Foundation Models and Act Under Uncertainty. *Workshop on Robot Planning in the Era of Foundation Models @ RSS 2025.*

34. **Silver, T.***, Hariprasad, V.*†, Shuttleworth, R.*†, Kumar, N†., Lozano-Perez, T., Kaelbling, L. PDDL Planning with Pretrained Large Language Models. *Workshop on Foundation Models for Decision Making (FMDM) @ NeurIPS 2022*.

35. **Silver, T.***, Chitnis, R.*, Kumar, N.†, McClinton, W.†, Lozano-Perez, T., Kaelbling, L., Tenenbaum, J. Inventing Relational State and Action Abstractions for Effective and Efficient Bilevel Planning. *Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM) 2022*. Short version of "Predicate Invention for Bilevel Planning" (AAAI 2023). **Spotlight talk.**

36. Zeng, C.†, **Silver, T.** Learning Search Guidance from Failures with Eliminable Edge Sets. *Workshop on Bridging the Gap Between AI Planning and Reinforcement Learning (PRL) @ ICAPS 2021.*

37. **Silver, T.**, Chitnis, R. PDDLGym: Gym Environments from PDDL Problems. *Workshop on Bridging the Gap Between AI Planning and Reinforcement Learning (PRL) @ ICAPS 2020*.

38. **Silver, T.***, Chitnis, R.*, Tenenbaum, J., Lozano-Perez, T., Kaelbling, L. Learning Skill Hierarchies from Predicate Descriptions and Self-Supervision. *Workshop on Generalization in Planning (GenPlan) @ AAAI 2020.*

39. Loula, J., **Silver, T.**, Allen, K., Tenenbaum, J. Learning Models for Mode-based Planning. *Workshop on Generative Modeling and Model-Based Reasoning for Robotics and AI (MBRL) @ ICML 2019*.

Preprints and Others

40. **Silver, T.,** Jenamani, R., Liu, Z., Dodson, B., Bhattacharjee, T. Coloring Between the Lines. *arXiv 2025*.
41. **Silver, T.***, Allen, K.*, Tenenbaum, J., Kaelbling, L. Residual Policy Learning. *arXiv 2018*.
42. **Silver, T.** Luna: A Game-Based Rating System for Artificial Intelligence. *Undergraduate thesis with Professor Stuart M. Shieber*, Harvard College 2016.

Teaching

ECE 531 / COS 531: Robot Planning Meets Machine Learning — Princeton University
Instructor; Course Creator — Aug – Dec 2025

6.s058 / 16.420: Representation, Inference and Reasoning in AI — MIT
Co-instructor — Aug – Dec 2021

6.882: Structured Models for AI — MIT
Teaching Assistant — Aug – Dec 2020

CS 121: Theory of Computation — Harvard College
Head Teaching Fellow; Teaching Fellow — Sep – Dec 2014; Sep – Dec 2015

CS 20: Discrete Math — Harvard College
Head Teaching Fellow; Teaching Fellow — Jan – May 2015; Jan – May 2016

Invited Talks

RSS 2025 Workshop: Robot Planning in the Era of Foundation Models (FM4RoboPlan)	Jun 2025
Summer School on Neurosymbolic Programming	Jun 2024
Cornell Tech (Rush Group)	Nov 2023
Cornell University (Bhattacharjee Group)	Oct 2023
Yale University (Scassellati Group)	Sep 2023
Princeton University (Griffiths Group)	Mar 2023
Rutgers University (CS Department Colloquium)	Mar 2023
Columbia University (Song Group)	Feb 2023
George Mason University (Controls and Robotics Seminar)	Feb 2023
AAAI AI & Robotics Bridge Session	Feb 2023
Oxford University (CS Department Seminar)	Jan 2023
DeepMind London (Shanahan Group)	Jan 2023
New York University (Pinto Group)	Jan 2023
Massachusetts Institute of Technology (Andreas Group)	Nov 2022
Northeast Robotics Colloquium (NERC) (Poster)	Oct 2022
University of New Hampshire (Ruml Group)	Sep 2022
Meta Reality Labs Research (Desai Group)	Sep 2022
Stanford University (BEHAVIOR Group)	Sep 2022
Technical University of Berlin (TU Berlin) (Toussaint Group)	Dec 2021
CogSci 2021 Workshop: Minds At Play	Jul 2021
Allen Institute for AI (AI2)	Mar 2021
Delft University of Technology (TU Delft) (Oliehoek Group)	Feb 2021
Brown University (Konidaris, Tellex, Littman Groups)	Jan 2021
Arizona State University (Srivastava Group)	Jan 2021
Brown University (Konidaris, Tellex, Littman Groups)	Mar 2020

Fellowships, Honors, and Awards

Outstanding MIT UROP Mentor Awards (Nominated)	Apr 2023
IJCAI-ECAI 2022 Distinguished PC (Top 3% Reviewer)	Sep 2022
MIT EECS Hazen Teaching Award	June 2022
NSF Graduate Research Fellowship	Aug 2018 – May 2023
MIT Stata Family Presidential Fellowship	Aug 2018 – May 2019
Blumberg Creative Science Prize (Mather House, Harvard)	May 2016
Derek Bok Certificate of Distinction in Teaching (Harvard)	Jan 2015, May 2015, Jan 2016
Harvard College PRISE Fellowship	May – June 2013
Research Science Institute (RSI)	May – June 2011

Workshop and Competition Organizing Committees

Learning Effective Abstractions for Planning (LEAP) @ CoRL 2025 — Seoul, Korea, Oct 2025
Co-organizers: Naman Shah, Utkarsh Mishra, Lucy Shi, Gregory Stein, Beomjoon Kim, Georgia Chalvatzaki

PhyRC: Physical Robotic Caregiving Challenge @ ICRA 2025 — Atlanta, GA, May 2025
Co-organizers: Ruolin Ye, Shuaixing Chen, Justin Guo, Martin Leroux, Binit Shah, and Tapomayukh Bhattacharjee

Learning Effective Abstractions for Planning (LEAP) @ CoRL 2023 — Atlanta, GA, Nov 2023
Co-organizers: Naman Shah, Eric Rosen, David Paulius, Beomjoon Kim, Georgia Chalvatzaki

Learning for Task and Motion Planning @ RSS 2023 — Daegu, Korea, Jul 2023
Co-organizers: Danfei Xu, Danny Driess, Jeannette Bohg, Rohan Chitnis, Shuo Cheng, Zhutian Yang

Learning, Perception, and Abstraction for Long-Horizon Planning @ CoRL 2022 — Auckland, NZ, Dec 2022
Co-organizers: Gregory Stein, Jana Kosecka, Rohan Chitnis, Yezhou Yang

Advisees

Isabel Liu (Princeton Undergrad)	Fall 2024 - Present
Nishanth Kumar (MIT PhD Student)	Fall 2021 – May 2024
Willie McClinton (MIT PhD Student)	Fall 2021 – May 2024
Ryan Yang (MIT Undergrad → Applied Intuition)	Spring 2021 – May 2024
Reece Shuttleworth (MIT Undergrad)	Summer 2022 – Spring 2023
Ashay Athalye (MIT Master's Student → Boston Dynamics AI)	Fall 2021 – Spring 2023
Lilian Luong (MIT Master's Student → Applied Intuition)	Fall 2022 – Spring 2023
Jagdeep Bhatia (MIT Undergrad → Berkeley PhD Student)	Fall 2021 – Spring 2023
Amber Li (MIT Master's Student → CMU PhD Student)	Fall 2021 – Fall 2022
Varun Hariprasad (RSI → MIT Undergrad)	Summer 2022
Abraham Mitchell (University of Arkansas Undergrad, MSRP)	Summer – Fall 2022
Wester J Aldarondo-Torres (UPR Undergrad, MSRP)	Summer – Fall 2022
Catherine Zeng (Harvard Undergrad → CMU PhD Student)	Fall 2020 – Spring 2022
Shariqah N Hossain (MIT Undergrad → InterSystems)	Fall 2020 – Spring 2021

Reviewing

AAAI Conference on Artificial Intelligence (AAAI)	2021, 2022, 2023, 2024
Autonomous Robots	2024
Conference on Robot Learning (CoRL)	2022, 2023, 2024, 2025
Frontiers in Robotics and AI	2024
Generalization in Planning (GenPlan Workshop)	2021, 2022, 2023
International Conference on Human-Robot Interaction (HRI)	2025
International Conference on Learning Representations (ICLR)	2021, 2022
International Conference on Machine Learning (ICML)	2022, 2023
International Conference on Neurosymbolic Learning and Reasoning (NeSy)	2025
International Conference on Robotics and Automation (ICRA)	2021, 2022, 2023, 2025
International Joint Conference on Artificial Intelligence (IJCAI)	2022, 2023
International Journal of Robotics Research (IJRR)	2025
International Conference on Intelligent Robots and Systems (IROS)	2023, 2024
International Symposium on Robotics Research (ISRR)	2022
Journal of Artificial Intelligence Research (JAIR)	2022
Conference on Neural Information Processing Systems (NeurIPS)	2021, 2022, 2023, 2025
Planning and Robotics (PlanRob @ ICAPS)	2023
Programmatic Representations for Agent Learning (PRAL @ ICML)	2025
Bridging Planning and Reinforcement Learning (PRL @ IJCAI)	2023
Robotics and Automation Letters (RA-L)	2021, 2022, 2023, 2025
Reinforcement Learning Conference (RLC)	2025
Robotics: Science and Systems (RSS)	2024, 2025
Transactions on Human-Robot Interaction (THRI)	2025
Transactions on Machine Learning Research (TMLR)	2022, 2023