NAMAN SHAH

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EDUCATION

Ph.D. in Computer Science, Arizona State University 2017 - 2024
Thesis: Autonomously Learning World-Model Representations for Efficient Robot Planning [PDF]
Advisor: Prof. Siddharth Srivastava (www.siddharthsrivastava.net)

B.E. in Computer Engineering, Gujarat Technological University 2013 - 2017

TECHNICAL SKILLS

- **Languages**: Python (advanced), C++, C, Java
- **ML frameworks**: PyTorch, JAX, TensorFlow; distributed multi-GPU training
- **Simulation**: Isaac Lab / Isaac Sim, MuJoCo / MJX, OpenRAVE; GPU-accelerated parallel simulation, domain randomization, sim-to-real transfer
- **Control & robotics**: Low-level joint position and torque control, impedance and operational-space control, inverse kinematics, state estimation, system identification, reinforcement learning for continuous control, task and motion planning, ROS
- **Platforms**: Franka FR3 (7-DoF), KUKA LBR iiwa (7-DoF), dual-arm KUKA iiwa (14-DoF), Flexiv Rizon 4s (7-DoF), bimanual ABB YuMi (14-DoF), Fetch mobile manipulator, Toyota HSR, Amazon Proteus; simulated high-DoF bimanual arm-hand systems

PATENTS

- Learning Abstractions for Multi-Robot Path Planning in Unstructured Environments. **Shah, N.**, Fainekos, G., Hoxha, B., Okamoto, H., Prokhorov, D. V., 2025. Application number 18/614,355. (under review) [Patent]
- Robot programming for non-programmers. Karia, R., Dobhal, D., Nagpal, J., Verma, P., **Shah, N.**, Srivastava, S., 2025. (under review)

PUBLICATIONS

1. Son, D., Shkurti, F., Lee, J., **Shah, N.**, Kim, B., and Fox, D., 2026. TAM: Torque Adaptation Module for Robust Motion Transfer in Manipulation. arXiv preprint [Paper]
2. Hedegaard, B., Yang, Z., Wei, Y., Jaafar, A., Tellex, S., Konidaris, G., and **Shah, N.**, 2026. Beyond Task and Motion Planning: Hierarchical Planning for General-Purpose Robot Skills. In ICRA 2026 (to be presented, June 2026) (also presented in ICRA 2025 Workshop on Language and Semantics of Task and Motion Planning) [Paper]
3. Nayyar, R. K., **Shah, N.**, and Srivastava, S., 2026. Context-Sensitive Abstractions for Reinforcement Learning with Parameterized Actions. In AAAI 2026 [Paper]
4. **Shah, N.**, Nagpal, J., and Srivastava, S., 2025. From the Real World to Logic and Back: Learning Symbolic World Models for Long Horizon Planning. In CoRL 2025 (also presented in AAAI 2025 Workshop on Generalization in Planning (GenPlan) and RSS 2025 Workshop on Robot Representations (RoboReps)) [Paper]
5. Dobhal, D., Nagpal, J., Karia, R., Verma, P., Nayyar, R. K., **Shah, N.**, and Srivastava, S., 2025. Using Explainable AI and Hierarchical Planning for Outreach with Robots. In EAAI/AAAI 2025 [Paper]

6. Yang, Z., Raman, S. S., Hedegaard, B., Fu, H., Zhao, L., Tellex, S., Konidaris, G., Paulius, D., and **Shah, N.**, 2025. SkillWrapper: Autonomously Learning Interpretable Skill Abstractions with Foundation Models. In ICRA 2025 Workshop on Language and Semantics of Task and Motion Planning (**Best Paper Award**) (also presented in CoRL 2024 Workshop on Learning Efficient Abstractions for Planning (LEAP)) [Paper]

7. Wei, Y., Li, X., Liu, J., **Shah, N.**, Quartey, B., Konidaris, G., Tellex, S., and Bagaria, A., 2024. Structured Exploration in Reinforcement Learning by Hypothesizing Linear Temporal Logic Formulas. In CoRL 2024 Workshop on Learning Efficient Abstractions for Planning (LEAP) [Paper]

8. **Shah, N.** and Srivastava, S., 2024. Hierarchical Planning and Learning for Robots in Stochastic Settings Using Zero-Shot Option Invention. In AAAI 2024

9. **Shah, N.** and Srivastava, S., 2023. Learning to Create Abstraction Hierarchies for Motion Planning Under Uncertainty. In IJCAI 2023 Workshop on Bridging the Gap: Planning and Reinforcement Learning (PRL) [Paper]

10. **Shah, N.** and Srivastava, S., 2023. Learning Neuro-Symbolic Abstractions for Motion Planning Under Uncertainty. In IJCAI 2023 Workshop on Neuro-Symbolic Agents (NSA) [Paper]

11. **Shah, N.** and Srivastava, S., 2022. An Anytime Hierarchical Approach for Stochastic Task and Motion Planning. arXiv preprint [Paper]

12. **Shah, N.***, Verma, P.*, Angle, T., and Srivastava, S., 2022. JEDAI: A System for Skill-Aligned Explainable Robot Planning. In Autonomous Agents and Multi-Agent Systems (AAMAS 2022) (Demonstration track, **Best Demo Award**) [Paper] [Demo]

13. **Shah, N.** and Srivastava, S., 2022. Using Deep Learning to Bootstrap Abstractions for Robot Planning. In Autonomous Agents and Multi-Agent Systems (AAMAS 2022) [Paper]

14. **Shah, N.**, Srinet, A., and Srivastava, S., 2021. Learning and Using Abstractions for Robot Planning. In ICAPS 2021 Workshop on Planning and Robotics (PlanRob) [Paper]

15. **Shah, N.**, Vasudevan, D. K., Kumar, K., Kamojjhala, P., and Srivastava, S., 2020. Anytime Integrated Task and Motion Policies for Stochastic Environments. In IEEE International Conference on Robotics and Automation (ICRA 2020), pp. 9285-9291 [Paper] [Presentation] [Source Code] [Videos]

16. **Shah, N.** and Srivastava, S., 2019. Anytime Integrated Task and Motion Policies for Stochastic Environments. In ICAPS 2019 Workshop on Planning and Robotics (PlanRob) [Paper]

RESEARCH EXPERIENCE

Research Scientist - Allen Institute for Artificial Intelligence (Ai2) August 2025 - Current
Supervisor: Prof. Dieter Fox (https://homes.cs.washington.edu/~fox/)

- Developed a system for automatically scaling robot data generation using GPU-accelerated simulation (Isaac Lab and MuJoCo/MJX), generating **4000+ hours of robot interaction data per day** across thousands of parallel simulation environments.
- Generating paired dexterous manipulation and high-level reasoning data at scale, coupling task-level reasoning traces with contact-rich, long-horizon trajectories for high-DoF bimanual arm-hand systems.
- Training hierarchical vision-language-action (VLA) models that decompose language-specified tasks into subgoals and realize them through learned closed-loop low-level control policies.
- Co-developed a torque-level adaptation module (TAM) for robust motion transfer of manipulation policies across robots, compensating for sim-to-real gaps, unknown payloads, and differing dynamics between robot instances to preserve reference-motion tracking in contact-rich, dynamic manipulation.

- Building automated large-scale evaluation infrastructure for robot foundation models, benchmarking policies across hundreds of tasks in parallel to quantify generalization, robustness, and sim-to-real readiness.

Postdoctoral Researcher - Brown University May 2024 - August 2025
Supervisor: Prof. George Konidaris (https://cs.brown.edu/people/gdk/)

- Developed novel methods for learning provably correct and sound world models for robot planning, with a central focus on applicability to robots with only high-dimensional sensory inputs.
- Developed the first hierarchical planning approach that integrates closed-loop controllers learned with reinforcement learning into task and motion planning, enabling long-horizon behavior on top of RL-trained low-level skills.

Research Scientist Intern - Toyota Research Institute of North America May 2023 - August 2023
Mentors: Prof. Georgios Fainekos, Dr. Bardh Hoxha **(Patent filed: US 18/614,355)**

- Worked on learning neuro-symbolic state and action abstractions for multi-robot motion planning systems in continuous environments.
- Developed a multi-agent motion planning and coordination system for the Toyota HSR mobile manipulator and hospital service robots.

Applied Scientist Intern - Amazon Robotics May 2022 - August 2022
Mentor: Dr. Andreas Kolling

- Developed an approach for multi-robot coordination and planning under uncertainty for Amazon Robotics' new Proteus robot.
- Developed a hierarchical approach based on state space decomposition to efficiently plan for a large fleet of robots in the warehouse.

Graduate Research Assistant - AAIR Lab, SCAI, ASU May 2018 - May 2024
Director: Prof. Siddharth Srivastava (www.siddharthsrivastava.net)

- Worked on learning efficient and sound abstractions for task and motion planning.
- Developed an approach that employs deep learning to learn sound abstractions for complex robot motion planning problems and uses them to perform hierarchical robot planning.
- Developed a framework based on hierarchical planning with abstractions to perform task and motion planning in stochastic environments, deployed end-to-end on physical robots: the 7-DoF Fetch mobile manipulator and the 14-DoF bimanual ABB YuMi collaborative robot.
- Implemented and tuned the low-level control and execution stack for these deployments, including joint-level position and impedance control, inverse kinematics, trajectory tracking, and state estimation for closing the loop between symbolic plans and continuous robot motion.

Research Intern - Palo Alto Research Center, Palo Alto, CA May 2019 - August 2019
Supervisor: Dr. Matthew Klenk (www.matthewklenk.com)

- Developed a robotic system using OpenRAVE robot simulator and Robot Operating System (ROS) that performs automated hierarchical planning. The system uses qualitative spatial relations (QSRs) to automatically formulate a manipulation problem and computes a solution for it.

Graduate Student Assistant - SESE, ASU March 2018 - December 2018
Director: Prof. Sanchayeeta Borthakur (www.borthakur.asu.edu)

- Contributed towards developing an automated approach that identifies absorbers in the inter-galactic medium through spectral analysis of data obtained from the Hubble Space Telescope.
- Used deep learning techniques such as segmentation and CNNs to identify absorptions in the visual spectrum, and Bayesian logic and probabilistic approaches to identify the absorbers once absorption locations were known.

SERVICE

- Co-chair - 3^{rd} Workshop on Learning Efficient Abstractions for Planning (LEAP) at CoRL 2025 [Website]
- Co-chair - 8^{th} Workshop on Generalization in Planning (GenPlan) at AAAI 2025 [Website]
- Co-chair - 2^{nd} Workshop on Learning Efficient Abstractions for Planning (LEAP) at CoRL 2024 [Website]
- Co-chair - 1^{st} Workshop on Learning Efficient Abstractions for Planning (LEAP) at CoRL 2023 [Website]
- Co-organizer - Tutorial on "Integrated Task and Motion Planning: Foundations and Research Frontiers" at IJCAI 2023 [Website]
- Journal reviewer - International Journal of Robotics Research (IJRR), IEEE Robotics and Automation Letters (RA-L), Artificial Intelligence Journal (AIJ), Journal of Artificial Intelligence Research (JAIR), IEEE Transactions on Robotics (T-RO)
- Associate Editor / Area Chair - CoRL 2026, ICRA 2026
- Conference reviewer / PC member - RSS 2026, ICAPS 2026, ICRA 2026, AAAI 2026, IROS 2025, CoRL 2025, AAAI 2025, ICLR 2025, ICLR 2024, RSS 2024, IROS 2024, NeurIPS 2023, AAMAS 2022, ICRA 2022, ICRA 2021, ICAPS 2021, AAAI 2021, RSS 2021, IJCAI 2021, AAAI 2020
- Workshop reviewer / PC member - NYRL 2025, RSS 2025 Workshop on RoboReps, CoRL 2025 Workshop on LEAP, AAAI 2025 Workshop on GenPlan, CoRL 2024 Workshop on LEAP, CoRL 2023 Workshop on LEAP, NeurIPS 2023 Workshop on GenPlan
- Volunteer - ICAPS 2019, KR 2018

TEACHING EXPERIENCE

Graduate Teaching Assistant - CSE 571 [Graduate-level AI course] Fall 2018, Spring 2019 & 2023
Instructor: Siddharth Srivastava, ASU

- Conducted tutorials on Robot Operating System (ROS), First Order Logic (FOL), Planning Domain Definition Language (PDDL).
- Led development of ROS-based course projects (and auto-grader) to evaluate students' skills on various AI algorithms such as directed and undirected search, automated planning, and reinforcement learning (RL).

Graduate Teaching Assistant - CSE 205 [Object-Oriented Programming] Spring 2022
Instructor: Farideh Tadayon-Navabi, ASU

- Conducted 4 hours of recitations each week on object-oriented programming topics in Java.
- Designed midterms and homework assignments, along with their grading rubrics, for the class.

MENTORING EXPERIENCE

1. Benned Hedegaard - Ph.D. student at Brown University, working on learning for task and motion planning
2. Ziyi Yang - Ph.D. student at Brown University, working on foundation models for learning interpretable robot models
3. Yichen Wei - M.Sc. student at Brown University, working on learning for task and motion planning
4. Ahmed Jaafar - R.A. at Brown University, working on robot learning - Air Force Research Laboratory (AFRL)
5. Jayesh Nagpal - Ph.D. student at ASU, working on learning abstractions for task and motion planning
6. Kyle Atkinson - B.Sc. at ASU, thesis on hierarchical planning - Raytheon Technologies
7. Abhyudaya Srinet - M.Sc. at ASU, thesis on learning abstractions of motion planning - MiM-Essay
8. Deepak Kala Vasudevan - M.Sc. at ASU, thesis on generalization in planning - Amazon Robotics
9. Kiran Prasad - Learning abstractions for motion planning - Amazon Robotics

HONORS AND AWARDS

- SCAI ASU Doctoral Fellowship 2022, 2023
- GPSA, SCAI, and ASU Graduate College Travel Grants for IJCAI 2023
- AAMAS 2022 Best Demo Award
- Excellence Award - Gujarat Technological University, 2016, 2017

REFERENCES

1. Prof. Siddharth Srivastava, Associate Professor, Arizona State University, siddharths@asu.edu - Ph.D. advisor
2. Prof. George Konidaris, Associate Professor, Brown University, gdk@brown.edu - Postdoc supervisor
3. Prof. Georgios Fainekos, Principal Research Scientist, Toyota Research Institute of North America, previously Associate Professor at Arizona State University, fainekos@gmail.com
4. Dr. Alberto Speranzon, Chief AI Scientist, Lockheed Martin, alberto.speranzon@lmco.com
5. Prof. Dieter Fox, Professor, University of Washington and Ai2, dieterf@allenai.org