

# Shivam Goel

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## EDUCATION

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### Tufts University

*Ph.D. Candidate in Computer Science*

Medford, MA

*Jan 2020 – Present*

**Advisors:** [Dr. Jivko Sinapov](#) & [Dr. Matthias Scheutz](#)

### Washington State University

*Masters of Science in Computer Science*

Pullman, WA

*Aug 2015 – May 2017*

**Advisor:** [Dr. Matthew E. Taylor](#)

### Uttar Pradesh Technical University

*Bachelors of Engineering in Information Technology*

Noida, UP

*Aug 2011 – June 2015*

## SELECTED PUBLICATIONS

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### Open-World Novelty Handling

2021 – Present

*Novelty detection, adaptation, neurosymbolic reasoning*

- **Shivam Goel**, Panagiotis Lymperopoulos, et al. [A Neurosymbolic Cognitive Architecture Framework for Handling Novelties in Open Worlds](#). AIJ, 2024.
- **Shivam Goel**, Yichen Wei, Panagiotis Lymperopoulos, et al. [NovelGym: A Flexible Ecosystem for Hybrid Planning and Learning](#). AAMAS, 2024.
- **Shivam Goel**, Yash Shukla, Vasanth Sarathy, Matthias Scheutz, Jivko Sinapov. [RAPid-Learn: A Framework for Learning to Recover for Handling Novelties in Open-World Environments](#). ICDL, 2022.

### Generalizability in Robotic Skills (Sim2Real)

2023 – Present

*Force-based skills, object-centric robot-agnostic learning, sim-to-real transfer*

- **Shivam Goel**, Shijie Fang, Wenchang Gao, Matthias Scheutz, Jivko Sinapov. [FLEX: Robot-Agnostic Force-based Skills](#). ICRA, 2025.
- Yash Shukla, Bharat Kesari, **Shivam Goel**, et al. [Few-Shot Policy Transfer through Observation Mapping](#). IROS, 2023.

### Applied Robotics: Agriculture & Healthcare

2017 – 2019

*Computer vision, agricultural robotics, smart homes*

- **Shivam Goel**, Santosh Bhusal, Matthew E Taylor, Manoj Karkee. [Detection and localization of birds for Bird Deterrence using UAS](#). ASABE, 2017.
- Garrett Wilson, Christopher Pereyda, **Shivam Goel**, et al. [Robot-enabled support of daily activities in smart homes](#). Cognitive Systems Research, 2019.

Full publication list available on [Google Scholar](#).

## EXPERIENCE

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### Mulip Lab – Tufts University

Medford, MA

*Researcher*

*Jan 2020 – Present*

- Developed neurosymbolic AI techniques that improved sample efficiency and adaptability in robot learning.
- Led projects on open-world novelty handling and hybrid learning frameworks.
- Published in premier venues including ICRA, IROS, AAMAS, and AIJ.

### HRI Lab – Tufts University

Medford, MA

*Researcher*

*May 2023 – Present*

- Designed on-the-fly adaptation strategies for robotic manipulation and autonomous driving domains.
- Integrated neurosymbolic methods in DIARC Cognitive Architecture to enable adaptive decision-making in dynamic environments.

### IRL Lab – Washington State University

Pullman, WA

*Researcher*

*Oct 2016 – Dec 2019*

- Built computer vision systems for agricultural robotics applications.

- Developed UAV-based bird deterrence systems and contributed to automated fruit harvesting research.
- Co-authored journal and conference papers in agricultural technology and AI for robotics.

## **CASAS Lab – Washington State University**

*Researcher*

Pullman, WA

*Jan 2018 – Dec 2019*

- Developed smart home AI for elder care, focusing on daily activity support.
- Published in healthcare and cognitive systems venues.

## **Center of AI for Social Good – University of Southern California**

*Research Intern*

Los Angeles, CA

*Apr 2018 – Dec 2018*

- Applied AI to wildlife conservation, developing UAV-based thermal vision methods for poacher detection.
- Increased detection accuracy from 30% to 68% through novel computer vision models.

## ACTIVE PROJECTS

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### **Generalizable Robotic Skills** | *Physics-based Learning, Object-centric RL*

- Develop advanced motion primitives (e.g., twisting) to enable transferable robot skills across tasks and platforms.

### **Scalable Frameworks for General-Purpose Robots** | *Neurosymbolic AI, General-purpose Robotics*

- Leverage hybrid neurosymbolic architectures to integrate force-based robot-agnostic skills into larger robotic platforms capable of broad generalization.

### **Reasoning for Open-World Adaptation** | *Novelty Handling, Affordances discovery*

- Incorporate symbolic reasoning to guide skill learning when encountering novel objects and their affordances.

## TECHNICAL DEMONSTRATIONS

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### **Tufts Robotics Open House** | *2024, 2025*

- Showcased neurosymbolic robotic learning systems for novelty handling to cross-disciplinary audience.

### **MassRobotics** | *Boston, 2023*

- Demonstrated VR-based interaction capabilities of a turtlebot

### **Tufts Graduate Showcase** | *2022*

- Presented multimodal robotic interaction systems to cross-disciplinary audiences.

## SKILLS

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**Programming:** Python, Java, C++, R, MATLAB

**Frameworks:** Robot Operating Systems (ROS), Robosuite, CARLA

**Deep Learning frameworks:** PyTorch, Tensorflow

**Developer Tools:** Linux, Git, Docker, VS Code, IntelliJ

**Simulations:** Pybullet, Gazebo, Mujoco

**Relevant Coursework:** Reinforcement Learning, Probabilistic Robotics for HRI, Machine Learning, Artificial Intelligence, Introduction to Robotics, Operating Systems, Pervasive Computing, Robot Kinematics and Dynamics.

## SERVICE & OUTREACH

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**2026** : AAAI-26, ICRA-26, AIJ reviewer

**2025** : IROS-25, ICAPS-25 Reviewer, AIJ reviewer

**2024** : ICAPS-24, IEEE-ICDL, IEEE Transactions on Control Systems Technologies reviewer

**2022** : AAMAS-22 reviewer

**2022** : Co-organizer & Program Committee at 2nd IJCAI Workshop on Artificial Intelligence for Autonomous Driving (AI4AD).

**2020** : Initiated and organized bi-weekly RL reading group at Tufts SAIL-ON program.

**2019**: RL Reading Group Coordinator at WSU

**2016, 2017**: IRL Lab bi-weekly seminar coordinator at WSU

**2018, 2019**: Volunteered as a photographer at the Eastern Washington Aspirations in Computing Award Ceremony and Banquet.