

Tanushree Burman

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RESEARCH OVERVIEW

My research focuses on human-in-the-loop reinforcement learning, investigating how different modalities of human feedback can be used to improve the performance and alignment of reinforcement learning agents. In particular, I study user preferences across different feedback modalities. My previous work explored the development of educational robotics systems designed to introduce Machine Learning and Reinforcement Learning concepts to elementary and high school students.

EDUCATION

Tufts University, Medford, MA August 2022 – Present

Ph.D. Candidate in Computer Science

Advisor: Jivko Sinapov

Tufts University, Medford, MA May 2025

Master of Science in Computer Science

Relevant Coursework: Reinforcement Learning, Human-Robot Interaction, Robot Operating System (ROS), Machine Learning, Probabilistic Robotics

Yale University, New Haven, CT August 2018 – May 2022

Bachelor of Science in Electrical Engineering and Computer Science; GPA: 3.5

RESEARCH EXPERIENCE

Tufts University, Medford, MA August 2022 – Present

Research Assistant

- Conduct research in the Multimodal Learning, Interaction and Perception Lab: Investigating how different modalities of human feedback—demonstrations and preferences over trajectories—can be incorporated into reinforcement learning to improve agent performance, with a central focus on how user experience factors (perceived ease and effort) shape feedback quality and should inform the design of preference-based learning systems.

Tufts Center for Engineering Education and Outreach, Medford, MA September 2022 – August 2024

Research Assistant

- Contributed to the development of Smart Motor, an educational robotics toolkit introducing AI concepts such as supervised machine learning and reinforcement learning to elementary and high school students. The toolkit was used in elementary school robotics summer programs serving more than 200 students.

INDUSTRY EXPERIENCE

Lockheed Martin, Shelton, CT June 2022 – August 2022

AI Machine Learning Engineer Intern

- Worked on customizing the 3D simulation environment used to train and evaluate Multimodal Interactive Deep Reinforcement Learning agents applied to Manned-UnManned Teaming use-cases.
- Supported the research and development of tools and environments used for Deep Reinforcement Learning research, including state-space transformations to improve agent behavior.

AI Machine Learning Engineer Intern June 2021 – December 2021

- Supported the research of deep reinforcement learning techniques applying Population-Based Training to model game balance from player attributes to train a diverse agent population, identifying properties that best supported agent performance.
- Developed interactive agent performance visualizations with Streamlit and Bokeh.

PUBLICATIONS

Peer-Reviewed Conference Papers

- [C-3] **Burman, T.**, Dahal, M., Xu, G., Rogers, C., Cross, J., & Sinapov, J. (2025). Smart Motor: A Low-Cost Hardware and Software Toolkit for Introducing Supervised Machine Learning to Elementary School Students. *Proceedings of the AAAI Conference on Artificial Intelligence*, 39(28), 29128–29136. **Link to Paper.**

- [C-2] **Burman, T.**, Coney, J., Rogers, C., Cross, J., Sinapov, J. (2025). Balancing Act: Mastering Beam-and-Ball Control with Reinforcement Learning. In: Balogh, R., Obdržálek, D., Fachantidis, N. (eds) Robotics in Education. RiE 2025. Lecture Notes in Networks and Systems, vol 1544. Springer, Cham. **Link to Paper.**
- [C-1] Shukla, Y., **Burman, T.**, Kulkarni, A. N., Wright, R., Velasquez, A., & Sinapov, J. (2024). Logical Specifications-guided Dynamic Task Sampling for Reinforcement Learning Agents. *Proceedings of the International Conference on Automated Planning and Scheduling*, 34(1), 532–540. **Link to Paper.**

Peer-Reviewed Journal Articles

- [J-1] Huang, J., Shung, D., **Burman, T.**, Krishnaswamy, S., & Batra, R. K. (2022). Prediction of Death after Terminal Extubation, the Machine Learning Way. *Journal of the American College of Surgeons*, 235(5), S95-S96. **Link to Paper.**

PERSONAL AWARDS

- [2] **Graduate Student Council Service Award**, Tufts University 2026
This award recognizes a GSC executive board member who has made outstanding contributions in a variety of areas to support graduate student life, including academic and/or professional programming, diversity and inclusion, community outreach and service, and social events.
- [1] **Robert P. Guertin Graduate Student Leadership Award Finalist**, Tufts University 2026
This award recognizes outstanding graduate student leadership across the arts, humanities, sciences, and engineering — including contributions like academic/social programming, curricular initiatives and peer support.

TEACHING EXPERIENCE

CS 135 Machine Learning and Data Mining, Tufts University September 2024 – Present
Teaching Assistant

- Conduct weekly office hours to support students with assignments and course material. Topics include supervised machine learning methods including regression, classification, neural networks and recommendation systems.

Pre-College High School Summer Program, Tufts University July 2024 – July 2026
Instructor

- Designed and delivered lessons on reinforcement learning to a class of 35 high school students, leading two hands-on robotics activities to introduce core concepts and promote student engagement.

Girls Who Code June 2023
Instructor

- Managed a virtual class of 50–60 high school students and supervised a team of 5 teaching assistants. Led lessons, facilitated activities, and helped students debug assignments covering web development.

Teaching Assistant July 2020 – August 2020

- Conducted virtual lessons and office hours for a class of 20–30 students, covering web development topics (HTML, CSS, JavaScript) and supporting assignment debugging.

UNIVERSITY SERVICE & LEADERSHIP

Tufts Graduate Student Council April 2025 – May 2026
President

- Led the Tufts Graduate Student Council, expanding orientation programming and institutional partnerships to strengthen graduate student connection to the broader Tufts community. Advocated for increased graduate student funding and worked to formally include post-baccalaureate students within the graduate community.

Student Life Chair April 2023 – April 2025

- Planned and coordinated events for over 1,500 graduate students, focused on fostering graduate student community.

TECHNICAL SKILLS

Programming: Python (PyTorch, NumPy, Pandas), C, Java, SQL, JavaScript, HTML, CSS, Linux, Git

Robotic Frameworks and Simulators: Robot Operating System (ROS), Kinova Gen 3 Lite, OpenAI Gym, PyBullet, Unity

Deep Learning Frameworks: PyTorch, TensorFlow, Keras, OpenCV