

Jumman Hossain

Robot learning | Reinforcement learning | Reliable autonomy

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Research

Research focuses on reinforcement learning and embodied AI under uncertainty and physical constraints. Learned representations of motion cost, risk, and recoverability guide decisions in navigation and whole-body control.

Current work studies how to use demonstrations selectively for humanoid locomotion and manipulation, manage risk in language-guided navigation, and transfer policies from simulation to physical robots.

Education

PhD candidate, Information Systems | 2021 - present

University of Maryland, Baltimore County

Advisor: Prof. Nirmalya Roy. Research in reinforcement learning, robot navigation, and reliable autonomy.

MS, Artificial Intelligence and Machine Learning | 2021 - 2023

University of Maryland, Baltimore County

Bachelor of Engineering, Computer Science and Engineering | 2009 - 2013

Shahjalal University of Science and Technology

Specialization in machine learning.

Research experience

Research Assistant | Aug 2025 - Present

Center for Research in Use-Inspired Cyber-Physical Systems (CYPRESS)

University of Maryland, Baltimore County | Baltimore, MD

Research Assistant | Aug 2022 - Aug 2025

Center for Distributed Sensing and Autonomy (CARDS)

University of Maryland, Baltimore County | Baltimore, MD

PhD Research Internship | May 2024 - Aug 2024

Stormfish Scientific Corporation | Baltimore, MD

Developed reinforcement learning models for navigation and connected ROS-based robots with AuroraXR and Unity simulations.

Research Assistant | Aug 2021 - Present

Mobile, Pervasive and Sensor Computing Lab (MPSC)

University of Maryland, Baltimore County | Baltimore, MD

Publications and manuscripts

1. CoGeL: Constraint-to-Geometry Learning from Demonstrations and Failures for Safe Long-Horizon Robot Navigation

Jumman Hossain, Nirmalya Roy

CoRL 2026

2. Learning Anisotropic Value Geometry with Finsler Reinforcement Learning

Jumman Hossain, Nirmalya Roy

ICML 2026 | [Paper](#)

3. SERN: Bandwidth-Adaptive Cross-Reality Synchronization for Simulation-Enhanced Robot Navigation

Jumman Hossain, Emon Dey, Snehalraj Chugh, Masud Ahmed, MS Anwar, Abu-Zaher Faridee, Jason Hoppes, Theron Trout, Anjon Basak, Rafidh Chowdhury, Rishabh Mistry, Hyun Kim, Jade Freeman, Niranjani Suri, Adrienne Raglin, Carl Busart, Timothy Gregory, Anuradha Ravi, Nirmalya Roy

ICCCN 2026 | [Paper](#)

4. QPRL: Learning Optimal Policies with Quasi-Potential Functions for Asymmetric Traversal

Jumman Hossain, Nirmalya Roy

ICML 2025 | [Paper](#)

5. QuasiNav: Asymmetric Cost-Aware Navigation Planning with Constrained Quasimetric Reinforcement Learning

Jumman Hossain, Abu-Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, Theron Trout

ICRA 2025 | [Paper](#)

6. TopoNav: Topological Navigation for Efficient Exploration in Sparse Reward Environments

Jumman Hossain, Abu-Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, Theron Trout

IROS 2024 | [Paper](#)

7. EnCoMP: Enhanced Covert Maneuver Planning with Adaptive Target-Aware Visibility Estimation using Offline Reinforcement Learning

Jumman Hossain, Abu-Zaher Faridee, Nirmalya Roy, Jade Freeman, Timothy Gregory, Theron Trout

ACSOS 2024 | [Paper](#)

8. CoverNav: Cover Following Navigation Planning in Unstructured Outdoor Environment with Deep Reinforcement Learning

Jumman Hossain, Abu-Zaher Faridee, Anjon Basak, Derrik Asher, Nirmalya Roy

ACSOS 2023 | [Paper](#)

9. SynchroSim: An Integrated Co-simulation Middleware for Heterogeneous Multi-robot System

Emon Dey, Jumman Hossain, Nirmalya Roy, Carl Busart

IEEE DCOSS 2022 | [Paper](#)

10. GapNav: Margin-Aware Gap Entry and Traversal Control for Legged Robots

Jumman Hossain, Snehalraj Chugh, Abu-Zaher Faridee, Nirmalya Roy

Under review

Ongoing research

Reliable language-guided robot navigation

Learning whole-body humanoid skills

Fellowships, Honors, and Awards

ICML Travel Award	2025
UMBC COEIT Research Day Student Poster Award	2025
ICRA Travel Award	2025
UMBC GSA Professional Development Grant	2022-2026
IEEE Student Travel Grant (ACSOS)	2023-2024

Peer Review

International Conference on Robotics and Automation (ICRA)	2025, 2026
International Conference on Intelligent Robots and Systems (IROS)	2024, 2025, 2026
Robotics: Science and Systems (RSS)	2025, 2026
International Conference on Machine Learning (ICML)	2025, 2026
Conference on Neural Information Processing Systems (NeurIPS)	2025, 2026
International Conference on Learning Representations (ICLR)	2026
AAAI Conference on Artificial Intelligence (AAAI)	2025
Conference on Robot Learning (CoRL)	2024, 2025, 2026
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)	2024, 2025
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2025
IEEE International Conference on Pervasive Computing and Communications (PerCom)	2022, 2023, 2025
IEEE/ACM Conference on Connected Health (CHASE)	2023, 2026
Pervasive and Mobile Computing Journal (PMC)	2023

Service

Student Organizer, NSF TRACE Testbed Workshop, Spring 2026	2026
Local Organizer, IEEE PerCom	2025
Local Organizer, NSF-TIH Principal Investigators' Meeting	2023
Moderator, RL and Robotics Group, ML Collective	2021-present

Teaching and mentoring

Teaching

Teaching assistant at UMBC for IS 420, Database Application Development, and IS 620, Advanced Database Projects (2021-2024). Led lab sessions for undergraduate and graduate students.

Mentoring

Mentored students through NSF Research Experiences for Undergraduates in 2022 and 2023, and MPS Data Science research at UMBC from 2024.

Selected Research Training Programs

NSF IAIFI Summer School | Aug 2026

NSF Institute for Artificial Intelligence and Fundamental Interactions (IAIFI)

MIT, Cambridge, MA

Intensive training covering modern machine learning, generative models, reinforcement learning, and AI for scientific discovery.

Deep Learning for Science (DL4SCI) Summer School | Jun 2025

Lawrence Berkeley National Laboratory

Berkeley, CA

Intensive training in generative AI, transformers, diffusion and flow models, world models, multimodal learning, and large-scale deep learning.

Technical experience

Research tools

PyTorch, JAX, Stable-Baselines3, RLlib, ROS 1/2, Isaac Sim/Lab, MuJoCo, Unity, Gazebo

Programming

Python, C/C++, Java, MATLAB, shell scripting

Robot platforms

Unitree G1, Boston Dynamics Spot, Clearpath Husky and Jackal, Ghost Robotics Vision 60, TurtleBot

Industry experience

Senior Software Engineer, BJIT Limited

Oct 2018 - Aug 2021 | Dhaka, Bangladesh

Worked on the PockeTalk translation SDK, image translation integration, and the JAJA TV application.

Software Engineer, IPvision Canada Inc.

Sept 2015 - Sept 2018 | Dhaka, Bangladesh

Developed distributed cloud storage systems using OpenStack Swift.

Software Engineer, Eyeball Networks Inc.

July 2014 - Aug 2015 | Dhaka, Bangladesh

Developed the Android uGrow Smart Baby Monitor application for Philips Avent hardware.