Curriculum Vitae – Rohan Paleja, Ph.D.

Personal Information

Rohan Paleja
Technical Staff Researcher at MIT Lincoln Laboratory
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Professional Objective

I focus on developing novel machine-learning architectures and algorithms to support robot learning and human-robot collaboration in the diverse and unstructured environments that will be encountered by these agents in the real world.

Education

Ph.D. Georgia Institute of Technology, Atlanta GA. in Robotics. 2018 – 2023
Thesis Title : *Interpretable Artificial Intelligence for Personalized Human-Robot Collaboration.*
Committee : Dr. Matthew Gombolay (Chair), Dr. Peter Stone, Dr. Seth Hutchinson, Dr. Dorsa Sadigh, and Dr. Harish Ravichandar. More details at `www.rohanpaleja.com`
M.Sc. Rutgers University, New Brunswick NJ. in Mechanical Engineering. 2017 – 2018.
Thesis title : *Viability and Performance of Indoor Mapping Using the Velodyne VLP-16 LiDAR.*
Committee : F. Javier Diez-Garias (Chair), Dr. Haim Baruh, Dr. Aaron Mazzeo.
B.Sc. Rutgers University, New Brunswick NJ. in Mechanical Engineering. 2014 – 2017. *Magna Cum Laude.*

Research Experience

Technical Staff Researcher. Artificial Intelligence Technology Group, MIT Lincoln Laboratory   August 2023–Present.
— Investigating new approaches to help operators understand, program, utilize, and safely team with autonomous systems, ranging from large language models to symbolic agents.
— Submitted proposals to facilitate and lead new projects in human-machine teaming.
— Interfaced with sponsors and researchers across the Department of Defense (DoD), presenting research updates and promoting collaboration.

Graduate Research Assistant, Cognitive Optimization and Relational (CORE) Robotics Lab   August 2018 – August 2023
— Published more than fifteen publications across the fields of Explainable AI, Interactive Robot Learning, and Multi-Agent Coordination to prestigious conferences and top-tier journal venues, including NeurIPS, AAAI, AAMAS, HRI, RSS, CoRL, IROS, and RA-L.
— Explainable AI (xAI)
  — Created a novel interpretable reinforcement learning architecture that allows for direct optimization over sparse decision-tree-like representations
  — Conducted novel human-subject experiments quantifying the benefits of deploying xAI techniques within a human-machine teaming scenario.
— Interactive Robot Learning from Suboptimal and Heterogeneous Demonstrators
  — Modeled reward functions across demonstrators, teasing out strategy-specific criteria to produce a new state-of-the-art in heterogeneous inverse reinforcement learning.
  — Inferred an idealized reward function from suboptimal demonstrations by characterizing the relationship between a policy's performance and the amount of injected noise.
— Multi-Agent Coordination
  — Developed Multi-agent Graph Attention Communication (MAGIC) and Heterogeneous Policy Networks (HetNet), two Multi-Agent Reinforcement Learning (MARL) architectures that can be used to learn high-performance team coordination strategies among decentralized agents within partially observable settings.

Summer Research Intern. Advanced Concepts and Technologies Group, MIT Lincoln Laboratory   Summer 2022.
Summer Research Intern. Advanced Concepts and Technologies Group, MIT Lincoln Laboratory   Summer 2019.
Research Assistant, Applied Fluids Laboratory   January 2016 – August 2018
— UAV Simultaneous Localization and Mapping (SLAM) for Indoor Environments using a Velodyne VLP-16 LiDAR, GPS, and IMU

PUBLICATIONS

Conference Proceedings -

— Ye*, S., Natarajan*, M., Wu*, Z., Paleja, R., Chen, L., and Gombolay, M. (2023). "Learning Models of Adversarial Agent Behavior under Partial Observability" In Proceedings of the International Conference on Intelligent Robots and Systems (IROS) [**43.3.% Acceptance Rate**]

— Lee*, K., Krishna*, A., Zaidi, Z., Paleja, R., Chen, L., Hedlund-Botti, E., Schrum, M., and Gombolay, M. (2023) "The Effect of Robot Skill Level and Communication in Rapid, Proximate Human-Robot Collaboration" In Proceedings of the Conference of Human-Robot Interaction (HRI). [**25.2% Acceptance Rate**]

— Chen*, L., Jayanthi*, S., Paleja, R., Martin, D., Zakharov, V., and Gombolay, M. (2022) "Fast Lifelong Adaptive Inverse Reinforcement Learning from Crowdsourced Demonstrations" In Proceedings of Conference on Robot Learning (CoRL). [**39% Acceptance Rate**]

— Paleja*, R., Niu*, Y., Silva, A., Ritchie, C., Choi, S., and Gombolay, M. (2022) "Learning Interpretable, High-Performing Policies for Autonomous Driving" In Proceedings of the Robotics : Science and Systems Conference (RSS). [**32% Acceptance Rate**]

— Seraj*, E., Wang*, Paleja*, R., Z., Martin, D., Sklar, M., Patel, A., and Gombolay, M. (2022) "Learning Efficient Diverse Communication for Cooperative Heterogeneous Teaming" In Proceedings of the Conference on Autonomous Agents and Multiagent Systems (AAMAS). [**26% Acceptance Rate**]

— Paleja, R., Ghuy, M., Ranawaka, N., and Gombolay, M. (2021) "The Utility of Explainable AI in Ad Hoc Human-Machine Teaming" In Proceedings of the Conference on Neural Information Processing Systems (NeurIPS). [**26% Acceptance Rate**]

— Schrum, M., Neville, G., Johnson, M., Moorman, N., Paleja, R., Feigh, K., and Gombolay, M. (2021) "Effects of Social Factors and Team Dynamics on Adoption of Collaborative Robot Autonomy." In Proceedings of the Conference of Human-Robot Interaction (HRI). [**23% Acceptance Rate**]

— Paleja, R., Silva, A., Chen, L., and Gombolay, M. (2020) "Interpretable and Personalized Apprenticeship Scheduling : Learning Interpretable Scheduling Policies from Heterogeneous User Demonstrations." In Proceedings of the Conference on Neural Information Processing Systems (NeurIPS). [**20% Acceptance Rate**]

— Paleja*, R., Niu*, Y., and Gombolay, M. (2021) "Multi-Agent Reinforcement Learning with Graph-Attention Communication." In Proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS). [**25% Acceptance Rate**]

— Chen, L., Paleja, R., Ghuy, L., and Gombolay, M. (2020) "Joint Goal and Strategy Inference across Heterogeneous Demonstrators via Reward Network Distillation." In Proceedings of the Conference of Human-Robot Interaction (HRI). [**24% Acceptance Rate**]

— Chen, L., Paleja, R., and Gombolay, M.. (2020) "Learning from Suboptimal Demonstration via Self-Supervised Reward Regression." In Proceedings of the Conference on Robot Learning (CoRL).[**Best Paper Finalist**] [**Plenary Talk**][**34% Acceptance Rate**]

Journal Papers -

— Paleja*, R., Chen*, L., Niu*, Y., Silva, A., Li, Z., Zhang, S., Ritchie, C., Choi, S., Chang, K.C., Tseng, H.E., Wang, Y., Nageshrao, S., and Gombolay, M. (2023). "Learning Interpretable, High-Performance Policies for Continuous Control." [**In Review**]

— Seraj*, E., Paleja*, R., Pimentel, L., Lee, K.M., Martin, D., Sklar, M., Zhang, J., Kakish, Z., and Gombolay, M. (2023). "Heterogeneous Policy Networks for Composite Robot Team Communication and Coordination." [**In Review**]

— Natarajan*, M., Seraj*, E., Altundas*, B., Paleja*, R., Ye*, S., Chen*, L., Jensen, R., Chang, K.C., and Gombolay, M. (2023). "Human-Robot Teaming : Grand Challenges." *Current Robotics Reports*, pp.1-20.

— Zaidi, Z., Martin, D., Belles, N., Zakharov, V., Krishna, A., Lee, K.M., Wagstaff, P., Naik, S., Sklar, M., Choi, S., Kakehi, Y., Patil, R., Mallemadugula, D., Pesce, F., Wilson, P., Hom, W., Diamond, M., Zhao, B., Moorman, N., Paleja, R., Chen, L., Seraj, E., and Gombolay, M. (2022). "Athletic Mobile Manipulator System for Robotic Wheelchair Tennis." *IEEE Robotics and Automation Letters (RA-L)*, Volume 8, Issue 4, pages 2245-2252.

— Dias, D., Zenati, M., Srey, R., Arney, D., Chen, L., Paleja, R., Kennedy-Metz, L., and Gombolay, M.. (2021) "Using Machine Learning to Predict Perfusionists' Critical Decision-Making during Cardiac Surgery." *Computer Methods in Biomechanics and Biomedical Engineering. Imaging & Visualization*, 10(3), 308-312.

Workshop Papers, Symposium Papers, and Doctoral Consortia -

— Sreeramdass, V., Paleja, R. R., Chen, L., van Waveren, S., and Gombolay, M. (2023). "Generalized Behavior Learning from Diverse Demonstrations." In Proceedings of the CoRL Workshop on Out-of-Distribution Generalization in Robotics.

— Wu, Z., Ye, S., Natarajan, M., Chen, L., Paleja, R., and Gombolay, M. (2023). "Adversarial Search and Tracking with Multiagent Reinforcement Learning in Sparsely Observable Environments" In Proceedings of the International Symposium on Multi-Robot and Multi-Agent Systems (MRS 2023) [**35% Acceptance Rate**]
— Pimentel, L.*, Paleja, R.*, Wang, Z., Seraj, E., Pagan, J., and Gombolay, M. (2022). "Scaling Multi-Agent Reinforcement Learning via State Upsampling." In Proceedings of the Robotics Science and Systems Workshop on Scaling Robot Learning (RSS22-SRL).
— Paleja, R., and Gombolay, M. (2022). "Mutual Understanding in Human-Machine Teaming." In Proceedings of the Association for the Advancement of Artificial Intelligence Conference (AAAI) Doctoral Consortium.
— Niu*, Y., Paleja*, R., and Gombolay, M. (2021) "Multi-Agent Graph-Attention Communication and Teaming." In Proceedings of the ICCV 2021 Workshop on Multi-Agent Interaction and Relational Reasoning. **[Spotlight Talk] [Best Workshop Paper Award]**
— Chen, L., Paleja, R., and Gombolay, M.. (2021) "Towards Sample-efficient Apprenticeship Learning from Suboptimal Demonstration." In Proceedings of Artificial Intelligence for Human-Robot Interaction (AI-HRI), AAAI Fall Symposium Series.
— Paleja, R., Silva, A., Chen, L., and Gombolay, M. (2021) "Interpretable and Personalized Apprenticeship Scheduling : Learning Interpretable Scheduling Policies from Heterogeneous User Demonstrations." In Proceedings of the AAMAS Autonomous Robots and Multirobot Systems (ARMS) Workshop.
— Paleja, R., and Gombolay, M. (2020) "Heterogeneous Learning from Demonstration." In Proceedings of the Conference of Human-Robot Interaction (HRI) Pioneers Workshop. [**32% Acceptance Rate**]

Thesis -
— Paleja, R. (2023) "Interpretable Artificial Intelligence for Personalized Human-Robot Collaboration." *Ph.D. Thesis*, Georgia Institute of Technology.
— Paleja, R. (2018) "Viability and Performance of Indoor Mapping using the Velodyne VLP-16 LiDAR." *M.Sc. Thesis*, Rutgers University.

TEACHING
EXPERIENCE

Teaching Assistantship
— Introduction to Robotics Research (CS 7785), School of Interactive Computing (IC), Georgia Institute of Technology (Spring 2022) | Supervisor : Dr. Sean Wilson
— Robot Intelligence : Planning (CS 7469-A) – Graduate Section, School of Interactive Computing (IC), Georgia Institute of Technology (Fall 2020) | Supervisor : Prof. Matthew C. Gombolay
— Robot Intelligence : Planning (CS 4649-A) – Undergraduate Section, School of Interactive Computing (IC), Georgia Institute of Technology (Fall 2020) | Supervisor : Prof. Matthew C. Gombolay
— Dynamics of Rigid Bodies (ME 2202), School of Mechanical Engineering (ME), Georgia Institute of Technology (Summer 2020) | Supervisor : Prof. Nader Sadegh
— Alternative Energy Systems (ME 474), School of Mechanical Engineering (ME), Rutgers University (Fall 2017) | Supervisor : Prof. Sara Moghtadernejad
— Aerospace Propulsion (ME 459), School of Mechanical Engineering (ME), Rutgers University (Spring 2018) | Supervisor : Prof. Doyle Knight

Advising & Mentorship
— Mentor for the MIT Beaver Works CRE[AT]E Assistive Technology Challenge
— Research Mentorship (9 Graduate and 7 Undergraduate)
— Varshith Sreeramdas, M.Sc. Student, Georgia Tech. January 2022 – August 2022
— Arjun Krishna, M.Sc. Student, Georgia Tech. May 2022–May 2023 (*Co-First Author Paper* : [Krishna et al. ; HRI'23])
— Kin Man Lee, M.Sc. Student, Georgia Tech. May 2022–May 2023 (*Co- First Author Paper :* [Krishna et al. ; HRI'23])
— Daniel Martin, M.Sc. Student, Georgia Tech. August 2021–May 2022 (*Co-Author on Two Papers :* [Seraj et al. ; AAMAS'22, Zaidi et al. ; ICRA-RAL])
— Matthew Sklar, M.Sc. Student, Georgia Tech. May 2021–December 2021 (*Co-Author on Two Papers :* [Seraj et al. ; AAMAS'22, Zaidi et al. ; ICRA-RA-L])
— Luis Pimentel, M.Sc. Student, Georgia Tech. January 2022–August 2023 (*First-Author Workshop Paper :* [Pimentel et al. ; RSS22-SRL])
— Michael Munje, M.Sc. Student, Georgia Tech. September 2022–May 2023
— John Zhang, M.Sc. Student, Georgia Tech. January 2022–August 2022
— Yaru Niu, M.Sc. Student, Georgia Tech. August 2020-May 2022 (*Two Co-First Author Papers :* [Niu et al. ; AAMAS'21, Paleja et al. ; RSS'22])
— Chace Ritchie, Undergraduate Student, University of Kentucky. *Under the NSF SURE Robotics Program.* May 2021–August 2021 (*Co-Author Paper :* [Paleja et al. ; RSS'22])

— Ruturaj Patil, Undergraduate Student, Georgia Tech. May 2021–August 2021 (
— *Co-Author on Paper :* [Zaidi et al. ; In Review'22])
— Sugju Choi, Undergraduate Researcher, Georgia Tech. May 2021–August 2021 (*Co-Author on Paper :* [Paleja et al. ; RSS'22])
— Nadun Ranawaka Arachchige, Undergraduate Student, Georgia Tech. January 2021–May 2021 (*Co-Author on Paper :* [Paleja et al. ; NeurIPS'21])
— William Silva, Undergraduate Student, Georgia Tech. May 2021–August 2021
— Erik Scarlatescu, Undergraduate Student, Georgia Tech. August 2022–December 2022
— Lokranjan Laksmikanthan, Undergraduate Student, Georgia Tech. May 2022–August 2022
— Sergey Savelyev, Undergraduate Student, Georgia Tech. January 2019–May 2019 (*Undergraduate Thesis :* Mastering Reconnaissance Blind Chess with Reinforcement Learning)

SKILLS

Operating Systems : Windows, Unix and Linux.
Programming Languages : Python, C++, LaTeX, Java, HTML.
Noted Libraries : PyTorch, TensorFlow, DGL, Pygame
Scientific Softwares Maple, Matlab, Simulink, Mathematica, LabVIEW, Unreal Engine, ROS.
Languages : English, Spanish.

AWARDS

Awarded Sponsorship for our ICRA 2023 Explainable Robotics Workshop, Artificial Intelligence Journal, 2023
Attendance Scholarship, Autonomous Agents and Multiagent Systems (AAMAS), 2022
Interactive Computing Graduate Teaching Assistant of the Year, Georgia Institute of Technology, 2021
Best Workshop Paper Award, International Conference on Computer Vision (ICCV) Workshop on Multi-Agent Interaction and Relational Reasoning (MAIR2), 2021
Best Paper Finalist Award, Conference of Robot Learning (CoRL), 2020
Technology Ventures Award, Rutgers University, 2016
James J. Slade Research Scholar Award, Rutgers University, 2016
General Engineering Scholarship, Rutgers University, 2015

LEADERSHIP & ACADEMIC SERVICE

Workshop Organizer, CoRL 2023 Workshop on Robot Learning in Athletics, Atlanta, Georgia, USA.
Public Relations Vice President, Executive Board of the Robotics Graduate Student Organization, Georgia Institute of Technology.
Workshop Organizer, ICRA 2023 Workshop on Explainable Robotics, London, United Kingdom.
Sponsorship Chair, Human-Robot Interaction (HRI) 2020 Pioneers Workshop, Cambridge, United Kingdom.
Technical Manuscript Reviewer for,
— International Conference on Learning Representations (ICLR)
— International Conference on Human-Robot Interaction (HRI)
— International Conference on Neural Information Processing Systems (NeurIPS)
— International Conference on Artificial Intelligence and Statistics (AISTATS)
— Association for the Advancement of Artificial Intelligence Conference (AAAI)
— Special Track on Safe, Robust and Responsible AI (SRRAI)
— Special Track on AI for Social Impact (AISI)
— Autonomous Agents and Multiagent Systems (AAMAS)
— International Conference on Robotics and Automation (ICRA)
— Robotics : Science and Systems Conference (RSS)
— International Journal of Human-Computer Interaction (IJHCI)
— International Conference on Advanced Robotics (ICAR)
— IEEE Transactions on Pattern Analysis and Machine Intelligence
— IEEE Transactions on Cybernetics
— International Conference on Robot & Human Interactive Communication (ROMAN)

MEMBERSHIPS **IEEE Student Member**
RoboGrads, Robotics Graduate Student Organization
Pi Tau, Mechanical Engineering Honor Society
American Society of Mechanical Engineers

SELECTED PRESS
COVERAGE

This tennis-playing robot could one day win Wimbledon | USA Today | IEEE Spectrum | Tyler Morning Paragraph | News on the Neck | The News Times | Talker News | Daily Mail | Metro UK | Independent Record | Kenosha News | Tennis

Georgia Tech College of Computing (US) *Tennis Robot Could Pave Way for Advancement in Fast-Movement Robotics* Video | Blog | Mashable | IOT World Today | Interesting Engineering | Watson

Georgia Tech College of Computing (US) *Georgia Tech Researchers Teach a Robot How to Improve at Ping Pong on Its Own* Video | Blog

Georgia Tech Daily Digest (US) *Georgia Tech Researchers Use Table Tennis to Understand Human-Robot Dynamics* Blog

INVITED TALKS **Transformative Science and Technology Lecture Series**, Temple University.
Robot Learning Seminar, Mila.

REFERENCES References can be provided upon request