Curriculum Vitae - Ahmed H. Qureshi

CONTACT INFORMATION

Assistant Professor
Department of Computer Science
Purdue University
West Lafayette, IN 47907, USA

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RESEARCH INTERESTS

My team is committed to advancing the field of robot task and motion planning for human assistance through both fundamental and applied research. Our primary goal is to develop robots that can understand the general laws of physics and plan their movements in real time, with minimal reliance on expert demonstrations, pre-training in simulators, or trial-and-error interactions with their environment. To achieve this, we address various challenges, such as utilizing Partial Differential Equations (PDEs) to create self-supervised and efficient learning-based motion planning methods. We also tackle integrated task and motion planning (TAMP) challenges by interpreting raw visual observations for everyday tasks, like rearranging unfamiliar objects in cluttered spaces. Ultimately, our objective is to enable effective human-aware task and motion planning for active physical human-robot interaction (pHRI), developing methods that assist people while taking into account their social and biomechanical constraints.

EDUCATION

University of California San Diego, USA **2017 - 2021**

PhD, Intelligent Systems, Robotics and Control

- Thesis topic: Differentiable Neural Motion Planning under Task Constraints

Osaka University, Japan **2015 - 2017**

Master of Engineering

- Thesis topic: Deep Reinforcement Learning for Human-Robot Interaction in the Real-World

National University of Sciences and Technology (NUST), Pakistan 2010 - 2014

Bachelor of Electrical Engineering

- Thesis Topic: Enhanced RRT* for Motion Planning in Complex, Cluttered and Time-varying Environments

PROFESSIONAL EMPLOYMENTS

Purdue University **2021 - Present**

West Lafayette, IN, USA

- Assistant Professor, Department of Computer Science
- Director, Cognitive Robot Autonomy & Learning (CoRAL) Lab
- Affiliate Faculty, Purdue Center for Innovation in Control, Optimization, & Networks

University of California San Diego **2017 - 2021**

La Jolla, CA, USA

- Graduate Student Researcher

NVIDIA Corporation **2020 - 2021**

Robotics Group, Seattle, USA

- Research Intern

Osaka University **2015**

Toyonaka, Japan

- Visiting Researcher

Robotics and Intelligence System Engineering (RISE) Lab **2014- 2015**

National University of Science & Technology, Islamabad, Pakistan

- Research Assistant

Honors and Awards

- Outstanding Associate Editor Award, IEEE/RAS Robotics and Automation Letters (RA-L), 2024.
- Best Paper at ICLR Workshop on Neural Fields across Fields: Methods and Applications of Implicit Neural Representations 2023.
- Two gold medals for outstanding undergraduate research by Pakistan Book of Records, 2019.
- Outstanding Young Researcher by Heidelberg Laureate Forum, 2018.
- Japanese Government MEXT Scholarship, 2015-2017.
- NUST GPA-based scholarship, 2010-2014.

Publications

My undergraduate, graduate, and post-doc students are indicated with superscripts ^{U}, ^{G}, and ^{P}, respectively.

Patents

P6. **A.H.Qureshi**, R.Ni, and Y.Liu, System and System and Methods for Weakly-supervised Learning for Physics-informed Neural Motion Planning via Sparse Roadmap, US App. No. 63/911,955

P5. **A.H.Qureshi**, V. Giammarino, and R.Ni, System and Methods for Physics-informed Value Learning for Goal-conditioned Reinforcement Learning, US App. No. 63/911,978

P4. **A.H.Qureshi**, Y.Liu, W.H.Chen, and A.Buynitsky, Self-Supervised Hierarchical Robot Navigation Policy Learning Using Physics Priors in Unknown Environments, US Provisional App. 63/855,221

P3. **A.H.Qureshi**, R.Ni, and Y.Liu. Systems and Methods for Physics-informed Autonomous Robot Motion Planning, PCT Application No. PCT/US2025/028501; U.S. Application No.: 63/644,362

P2. **A.H.Qureshi**, R.Ni. Systems and Methods for Physics-informed Autonomous Robot Motion Planning, US Provisional App. 63/503,442.

P1. M.C.Yip, M.J.Bency, **A.H.Qureshi**. Machine Learning based Fixed-Time Optimal Path Generation, US Patent App. 16/222,706, 2019.

Peer-reviewed Journal

J16. Y.Liu^G, R.Ni^G, and **A.H.Qureshi**. Physics-informed Neural Mapping and Motion Planning in Unknown Environments , IEEE Transactions on Robotics 2025.

J15. Z.Wang^G and **A.H.Qureshi**. DeRi-IGP: Learning to Manipulate Rigid Objects Using Deformable Linear Objects via Iterative Grasp-Pull , IEEE Robotics and Automation Letters 2025.

J14. V.Gupta^G, P.Dhir^G, J.Dani^G, and **A.H.Qureshi**. MANER: Multi-Agent Neural Rearrangement Planning of Objects in Cluttered Environments, IEEE/RAS Robotics and Automation Letters (RA-L) 2023. [Presented at ICRA'24]

J13. Z.Wang^G and **A.H.Qureshi**. DeRi-Bot: Learning to Collaboratively Manipulate Rigid Objects via Deformable Objects, IEEE Robotics and Automation Letters 2023. [Presented at ICRA'24]

J12. H.Ren^G and **A.H.Qureshi**. Robot Active Neural Sensing and Planning in Unknown Cluttered Environments, IEEE Transactions on Robotics, 2023. [Presented at IROS'23] (IF: 7.8)

J11. J.J.Johnson, **A.H.Qureshi**, and M.C.Yip. Learning Sampling Dictionaries for Efficient and Generalizable Robot Motion Planning with Transformers, IEEE/RAS Robotics and Automation Letters (RA-L) 2023.(IF: 5.2)

J10. **A.H.Qureshi**, J.Dong, A.Baig, and M.C.Yip. Constrained Motion Planning Networks X, IEEE Transactions on Robotics 2021. (IF: 6.123)

J9. L.Li, Y.Miao, **A.H.Qureshi**, and M.C.Yip. MPC-MPNet: Model-Predictive Motion Planning Networks for Fast, Near-Optimal Planning under Kinodynamic Constraints, IEEE Robotics and Automation Letters 2021. (IF: 3.608)

J8. **A.H.Qureshi**, J.Dong, A.Choe, and M.C.Yip. Neural Manipulation Planning on the Constraint Manifolds, IEEE/RAS Robotics and Automation Letters 2020. (IF: 3.608)

J7. **A.H.Qureshi**, Y.Miao, A.Simeonov, and M.C.Yip. Motion Planning Networks: Bridging the Gap Between Learning-based and Classical Motion Planners, IEEE Transactions on Robotics 2020. (IF: 6.123)

J6. **A.H.Qureshi**, Y.Nakamura, Y.Yoshikawa and H.Ishiguro. Intrinsically motivated reinforcement learning for humanâ€“robot interaction in the real-world, Neural Networks, Vol 107, pp.23-33, 2018. (IF: 7.197)

J5. Zahid. Tahir, **A.H.Qureshi**, Y.Ayaz and R.Nawaz. Potentially guided bidirectionalized RRT* for fast optimal path planning in cluttered environments, International Journal of Robotics and Autonomous Systems, Elsevier, Vol. 108, pp. 13-27, 2018. (IF: 2.638)

J4. **A.H.Qureshi** and Y.Ayaz. Potential Functions Based Sampling Heuristic for Optimal Motion Planning, Autonomous Robots, DOI 10.1007/s10514-015-9518-0, 2015. (IF: 2.066)

J3. **A.H.Qureshi** and Y.Ayaz. Intelligent Bidirectional Rapidly-Exploring Random Trees for Optimal Motion Planning in Complex Cluttered Environments, International Journal of Robotics and Autonomous Systems, Elsevier, Vol. 68, pp. 1-11, 2015. (IF: 1.256)

J2. **A.H.Qureshi**, S.Mumtaz, Y.Ayaz, O.Hasan, M.S.Muhammad and M.T.Mahmood. Triangular Geometrised Sampling Heuristic For RRT* Motion Planner, International Journal of Advanced Robotic Systems (IJARS), InTech Publishers, 12:10, 2015. (IF: 0.526)

J1. S. A. Khan, Y. Ayaz, M. Jamil, S. O. Gillani, M. Naveed, **A. H. Qureshi** and K. F Iqbal.Collab-orative optimal reciprocal collision avoidance for mobile robots, Journal of Control and Automation, 8(8), 203-212.

Peer-reviewed Conference Proceedings

C40. V. Giammarino^{P}, R. Ni^{G} and **A.H.Qureshi**. Physics-informed Value Learner for Scalable Offline Goal-Conditioned Reinforcement Learning, Neural Information Processing Systems (NeurIPS), 2025.

C39. Anastasios Manganaris^{G}, V. Giammarino^{P}, and **A.H.Qureshi**. Automaton Constrained Q-Learning, Neural Information Processing Systems (NeurIPS), 2025.

C38. W. Chen^{G}, Y. Liu^{G}, A. Buynitsky^{U}, and **A.H.Qureshi**. Self-supervised Hierarchical Robot Navigation Policy Learning using Physics Priors in Unknown Environments, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2025.

C37. Y.Koh^{G} and **A.H.Qureshi**. Manip4Care: Robotic Manipulation of Human Limbs for Solving Assistive Tasks, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2025.

C36. H.Ren^{G}, Ruiqi Ni^{G}, and **A.H.Qureshi**. Physics-informed Neural Time Fields for Prehensile Object Manipulation, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2025.

C35. Y.liu^{G}, A. Buynitsky^{U}, R. Ni^{G}, and **A.H.Qureshi**. Physics-informed Neural Motion Planning via Domain Decomposition in Large Environments, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2025.

C34. R.Ni^{G}, Z. Pan, and **A.H.Qureshi**. Physics-informed Temporal Difference Metric Learning for Robot Motion Planning , International Conference on Learning Representations (ICLR), 2025.

C33. Z.Wang^{G} and **A.H.Qureshi**. Implicit Physics-aware Policy for Dynamic Manipulation of Rigid Objects via Soft Body Tools, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2025.

C32. T.Bukhari^{G}, D. Lawson^{U}, and **A.H.Qureshi**. Differentiable Composite Neural Signed Distance Fields for Robot Navigation in Dynamic Indoor Environments, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2025.

C31. H.Ren^{G}, J. Kim^{U}, and **A.H.Qureshi**. Integrating Active Sensing and Rearrangement Planning for Efficient Object Retrieval from Unknown, Confined, Cluttered Environments, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2025.

C30. H.Ren^{G} and **A.H.Qureshi**. Multi-Stage Monte Carlo Tree Search for Non-Monotone Object Rearrangement Planning in Narrow Confined Environments, IEEE/ RSJ International Conference on Intelligent Robot and Systems (IROS), 2024.

C29. R.Ni^{G} and **A.H.Qureshi**. Physics-informed Neural Motion Planning on Constraint Manifolds, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C28. D.Lawson^{U} and **A.H.Qureshi**. Merging Decision Transformers: Weight Averaging for Forming Multi-Task Policies, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C27. Z.Xiong^{G}, J.Eappen^{G}, D.Lawson^{U}, **A.H.Qureshi**, and S.Jagannathan. Co-learning Planning and Control Policies Using Differentiable Formal Task Constraints, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C26. J.J.Johnson, **A.H.Qureshi**, and M.C.Yip. Zero-Shot Constrained Motion Planning Transformers Using Learned Sampling Dictionaries, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C25. W.Chen^{U}, H.Ren^{G}, and **A.H.Qureshi**. Language-guided Active Sensing of Confined, Cluttered Environments via Object Rearrangement Planning, Submitted to the IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C24. V.K.Nivash^{G} and **A.H.Qureshi**. SIMMF: Semantics-aware Interactive Multiagent Motion Forecasting for Autonomous Vehicle Driving, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C23. H.Ren^{G} and **A.H.Qureshi**. Neural Rearrangement Planning for Object Retrieval from Confined Spaces Perceivable by Robot's In-hand RGB-D Sensor, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024.

C22. M. Kulshrestha^{G} and **A.H.Qureshi**. Structural Concept Learning via Graph Attention for Multi-Level Rearrangement Planning, International Conference on Robot Learning (CoRL), 2023

C21. X. Chen[U], A. Iyer[U], Z. Wang[G], and **A.H.Qureshi**. Efficient Q-Learning over Visit Frequency Maps for Multi-agent Exploration of Unknown Environments, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2023

C20. D.Lawson[U] and **A.H.Qureshi**. Control Transformer: Robot Navigation in Unknown Environments through PRM-Guided Return-Conditioned Sequence Modeling, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2023

C19. R.Ni[G] and **A.H.Qureshi**. Progressive Learning for Physics-informed Neural Motion Planning, Robotics: Science & Systems, 2023

C18. R.Ni[G] and **A.H.Qureshi**. NTFields: Neural Time Fields for Physics-Informed Robot Motion Planning, International Conference on Representation Learning (ICLR), 2023 [Spotlight]

C17. A.K.Keshari[G], H.Ren[G], and **A.H.Qureshi**. CoGrasp: 6-DoF Grasp Generation for Human-Robot Collaboration, IEEE/RAS International Conference on Robotics and Automation (ICRA), 2023

C16. Z.Xiong[G], J.Eappen[G], **A.H.Qureshi**, and S.Jagannathan. Model-free Neural Lyapunov Control for Safe Robot Navigation, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), 2022.

C15. **A.H.Qureshi**, A.Mousavian, C.Paxton, M.C.Yip, and D.Fox. NeRP: Neural Rearrangement Planning for Unknown Objects, Robotics: Science & Systems, 2021.

C14. J.Johnson, L.Li, F.Liu, **A.H.Qureshi**, and M.C.Yip. Dynamically Constrained Motion Planning Networks for Non-Holonomic Robots, Proceedings of IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), pp. 6937-6943, Las Vegas, USA (Virtual) 2020.

C13. **A.H.Qureshi**, J. J. Johnson, Y. Qin, T. West, B. Boots, and M.C.Yip. Composing Task-Agnostic Policies via Deep Reinforcement Learning, International Conference on Representation Learning (ICLR), 2020.

C12. **A.H.Qureshi**, B. Boots, and M.C.Yip. Adversarial Imitation Via Variational Inverse Reinforcement Learning, International Conference on Representation Learning (ICLR), 2019.

C11. **A.H.Qureshi**, A.Simeonov, M.J.Bency, M.C.Yip. Motion Planning Networks, IEEE RAS International Conference on Robotics and Automation (ICRA), pp. 2118-2124, Montreal, Canada 2019.

C10. M.J.Bency, **A.H.Qureshi**, M.C.Yip. Neural Path Planning: Fixed Time, Near-Optimal Path Generation via Oracle Imitation, Proceedings of IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), pp. 3965-3972, Macau 2019.

C9. **A.H.Qureshi** and Michael.C.Yip . Deeply Informed Neural Sampling For Robot

Motion Planning, Proceedings of IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), pp. 6582-6588, Madrid, Spain 2018.

C8. **A.H.Qureshi**, Z.Tahir, G.Tariq, Y.Ayaz. Re-planning Using Delaunay Triangulation for Real-Time Motion Planning in Complex Dynamic Environments, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), pp. 905-911, Auckland, New Zealand 2018.

C7. **A.H.Qureshi**, Y.Nakamura, Y.Yoshikawa and H.Ishiguro. Show, Attend and Interact: Perceivable Social Human-Robot Interaction through Neural Attention Q-Network, Proceedings of IEEE/RAS International Conference on Robotics and Automation (ICRA), pp.1639-1645, Singapore 2017.

C6. **A.H.Qureshi**, Y.Nakamura, Y.Yoshikawa and H.Ishiguro. Robot gains social intelligence through multimodal deep reinforcement learning, Proceedings of IEEE/RAS International Conference on Humanoid Robots, pp. 745-751, Cancun Mexico, 2016.

C5. **A.H.Qureshi**, S.Mumtaz, Y. Ayaz, and O. Hasan. Augmenting RRT*-Planner with Local Trees for Motion Planning in Complex Dynamic Environments, Proceedings of IEEE/RAS 19th International Conference on Methods and Models in Automation and Robotics (MMAR), pp. 657-662, Miedzyzdroje, Poland 2014.

C4. **A.H.Qureshi**, S.Mumtaz, Y.Ayaz, O.Hasan and W.Y.Kim. Adaptive Potential guided directional RRT*, Proceedings of International Conference on Robotics and Biomimetics (ROBIO), pp. 1887-1892, China, 2013.

C3. B.Ali, **A.H.Qureshi**, Y.Ayaz, N.Muhammad and W.Y.Kim. Human tracking by a mobile robot using 3D features, Proceedings of International Conference on Robotics and Biomimetics (ROBIO), pp. 2464-2469, Shenzhen, China, 2013.

C2. **A.H.Qureshi**, K.F.Iqbal, S.M.Qamar, F.Islam, Y.Ayaz and N.Muhammad. Potential guided directional-RRT* for accelerated motion planning in cluttered environments, Proceedings of International Conference on Mechatronics and Automation (ICMA), pp. 519-524, Takamatsu, Japan, 2013.

C1. S. M. Qamar, K. F. Iqbal, **A.H.Qureshi**, N. Muhammad, Y. Ayaz, and A. G. Abbasi A solution to Perceptual Aliasing through Probabilistic Fuzzy Logic and SIFT, Proceedings of IEEE/ASME International Conference on Advanced Intelligent Mechatronics (pp. 1393-1398). IEEE.

Workshop Papers

W14. Y.Koh^{G} and **A.H.Qureshi**. Manip4Care: Robotic Manipulation of Human Limbs for Solving Assistive Tasks, CoRL 2025 workshop on iCARE: intelligent Cobodied Assistance and Robotic Empowerment.

W13. Y.Koh^{G} and **A.H.Qureshi**. Manip4Care: Robotic Manipulation of Human Limbs for Solving Assistive Tasks, Humanoids 2025 workshop on ARC: Assistive Robots for Caregiving

through Shared Autonomy and Human-Aware Interaction.

W12. N.Trupin^{U}, Z. Wang^{G}, and **A.H.Qureshi**.Dynamic Robot Tool Use with Vision Language Models, RSS 2025 workshop on R3: Reasoning for Robust Robot Manipulation in the Open World.

W11. Q.Chen^{G} and **A.H.Qureshi**. NeHMO: Neural Hamilton-Jacobi Reachability Learning for Decentralized Safe Multi-Agent Motion Planning, RSS 2025 Workshop on Scalable and Resilient Multi-Robot Systems: Decision-Making, Coordination, and Learning.

W10. R.Ni^{G} and **A.H.Qureshi**. Physics-informed Neural Networks for Robot Motion under Constraints, ICRA 2024 RoboNerF: 1st Workshop On Neural Fields In Robotics.

W9. R.Ni^{G} and **A.H.Qureshi**. Physics-informed Neural Motion Planning on Constraint Manifolds, ICRA 2024 workshop on A Future Roadmap for Sensorimotor Skill Learning for Robot Manipulation.

W8. Z.Wang^{G} and **A.H.Qureshi**. DeRi-Bot: Learning to Collaboratively Manipulate Rigid Objects via Deformable Objects, CoRL 2023 workshop on Learning for Soft Robots 2023. [Spotlight]

W7. K.Norman^{G} and **A.H.Qureshi**. Analysis of Continuous Learning Models for Robot Motion Planning, IEEE/RSJ IROS Workshop on Policy Learning in Geometric Spaces 2023. [Oral Presentation]

W6. R.Ni^{G} and **A.H.Qureshi**. Progressive Learning for Physics-informed Neural Motion Planning, RSS Workshop on Symmetries in Robot Learning 2023. [Oral Presentation]

W5. D.Lawson^{U} and **A.H.Qureshi**. Merging Decision Transformers, ICLR Workshop on Reincarnating Reinforcement Learning 2023. [Spotlight]

W4. R.Ni^{G} and **A.H.Qureshi**. Neural Time Fields for Physics-Informed Motion Planning, ICLR Workshop on Neural Fields across Fields: Methods and Applications of Implicit Neural Representations 2023. [Best Paper]

W3. **A.H.Qureshi**, Y.Miao M.C.Yip. Active Continual Learning for Planning and Navigation, ICML Workshop on Real World Experiment Design and Active Learning 2020.

W2. **A.H.Qureshi**, M.C.Yip. Adversarial Reward and Policy Learning Via Variational Inverse Optimal Control, Bay Area Machine Learning Symposium, August 2018.

W1. **A.H.Qureshi**, Y. Nakamura, Y. Yoshikawa, H. Ishiguro. Robot Learns Responsive Behavior through Interaction with People using Deep Reinforcement Learning, 3rd International Symposium on Cognitive Neuroscience Robotics, Dec 2016.

In submission

S13. X.Chen^{U}, G. V.Avula^{U}, H. Ren^{G}, Z. Wang^{G}, and **A.H.Qureshi**. Multimodal Human-

Intent Modeling for Contextual Robot-to-Human Handovers of Arbitrary Objects, submitted to the Journal of Robotics and Autonomous Systems (2025).

S12. Q.Chen[G] and **A.H.Qureshi**. Scalable Hamilton-Jacobi Reachability Learning for Decentralized Safe Multi-Agent Motion Planning, submitted to IEEE Robotics and Automation Letters 2025.

S11. H.Ren[G], J.Kim[U], A.Tharmasanthiran[G], and **A.H.Qureshi**. Multi-Agent Monte Carlo Tree Search for Makespan-Efficient Object Rearrangement in Cluttered Spaces, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S10. N.Trupin[U], Z.Wang[G] and **A.H.Qureshi**. Physics-Constrained Robot Grasp Planning for Dynamic Tool Use, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S9. M.Bezick[U], V.Giammarino[P], and **A.H.Qureshi**. Robust Point Cloud Reinforcement Learning via PCA-Based Canonicalization, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S8. Q.Chen[G], R.Ni[G], J.Kim[U], and **A.H.Qureshi**. Manifold-constrained Hamilton-Jacobi Reachability Learning for Decentralized Multi-Agent Motion Planning, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S7. R.Ni[G], Y.Liu[G], and **A.H.Qureshi**. Weakly-supervised Learning for Physics-informed Neural Motion Planning via Sparse Roadmap, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S6. A.Manganaris[G], J.Lu[U], **A.H.Qureshi**, and S.Jagannathan. Graph-of-Constraints Model Predictive Control for Reactive Multi-agent Task and Motion Planning, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S5. Z.Wang[G], D.Jha, **Ahmed H. Qureshi**, and D.Romeres. PPGuide: Steering Diffusion Policies with Performance Predictive Guidance, submitted to IEEE RAS International Conference on Robotics and Automation (ICRA) 2025.

S4. X.Wang[G], L.Zhang[P], H.Pu, **A.H.Qureshi**, and Husheng L. Continuous-Time Value Iteration for Multi-Agent Reinforcement Learning, submitted to Conference on Learning Representations (ICLR) 2025.

S3. X.Wang[G], L.Zhang[P], H.Pu, Husheng L, and **A.H.Qureshi**. Safe Continuous-time Multi-Agent Reinforcement Learning via Epigraph Form, submitted to Conference on Learning Representations (ICLR) 2025.

S2. L.Zhang, X.Wang, and **A.H.Qureshi**. Epigraph-Based Multigrid PINNs for Two-Player General-Sum Differential Games, submitted to Conference on Learning Representations (ICLR) 2025.

S1. V.Giammarino[P] and **A.H.Qureshi**. Goal Reaching with Eikonal-Constrained Hierar-

chical Quasimetric Reinforcement Learning, submitted to Conference on Learning Representations (ICLR) 2025.

Seminar and Invited Talks

- Robot Motion Learning with Physics-based PDE Priors, Stanford University, Jan 2026.
- Physics-Informed Learning for Robot Motion Planning, RICE University, Nov 2025.
- Learning Manipulation Policies for Human Assistance, Conference on Robot Learning workshop on iCARE: intelligent Cobodied Assistance and Robotic Empowerment, South Korea, Oct 2025.
- Learning Manipulation Policies for Human Assistance, Humanoids Conference Workshop on ARC: Assistive Robots for Caregiving through Shared Autonomy and Human-Aware Interaction, South Korea, Oct 2025.
- Self-supervised Robot Motion Learning with Physics Priors, Yonsei University, South Korea, Oct 2025.
- Harnessing Physics Priors for Efficient and Scalable Robot Motion Learning, University of Southern California (USC), UC San Diego, USA, June 2025.
- Harnessing Physics Priors for Efficient and Scalable Robot Motion Learning, University of Southern California (USC), UC San Diego, USA, June 2025.
- Towards Resource-Constrained Robot Mapping and Motion learning using Physics Priors, Robotics: Science and Systems Workshop on Resource Constrained Robotics, USA, June 2025.
- Robot Motion Policy Learning using Physics Priors, Robotics Worldwide Workshop, MIT, USA, Apr 2025.
- Neural PDEs for Robot Mapping and Motion Planning, Param-Intelligence (PI) Seminar Series, Worcester Polytechnic Institute (WPI), USA, Nov 2024.
- Self-supervised Learning for Robot Motion Planning, Robotics Seminars, University of Michigan, Ann Arbor, USA, Oct 2024.
- Neural PDEs for Robot Motion Planning, CRUNCH Seminars, Division of Applied Mathematics, Brown University, USA, Aug 2024.
- Physics-informed Neural Time Fields for Robot Motion Planning under Constraints, IEEE/RAS ICRA Workshop on Neural Fields in Robotics (RoboNerF), Yokohama, Japan, May 2024.
- Learning Robot Manipulation Skills with Physics-based Models in the Human-centered Environments, NSF/NRI Meeting Workshop on Challenges and Opportunities for Dexterous Robotic Manipulation, USA, Apr 2024.
- Physics Informed Neural Networks for Robot Motion Planning, IEEE/RSJ IROS Workshop on Policy Learning in Geometric Spaces, USA, Oct 2023.
- Visual Robot Learning for Planning & Control in Unknown Environments, Robotics and Automation Society Chapter of IEEE Eastern North Carolina Section, USA, Mar 2022.
- Neural Task and Motion Planning in Unknown Environments, Brown University, USA, Nov 2021.
- Emergence of a Mutualistic Relationship between Motion Planning and Machine Learning for Scalable Robot Control, Neural Computation Chalk Talk Series, UC San Diego, La Jolla, CA, USA Oct 2020.
- Motion Planning Networks, University of Toronto, Canada (Virtual), Sep 2020.
- Deep Learning For Robotics, Neural Computing & Deep Learning Workshop, 6th Heidelberg Laureate Forum, Germany, Sep 2018.
- Learning-based motion planning and control, CRI Seminars, University of California San

Diego, La Jolla, CA, USA, May 2018.
- Intrinsically Motivated Reinforcement Learning for Human-Robot Interaction in the Real-World, Artificial Intelligence Seminars, Osaka University, Japan, Nov 2017.
- Living with Robots- The Next Generation of Intelligent Machines, Information Technology University, Pakistan, Mar 2016.
- Sampling-based motion planning algorithms, Topics in Robotics Session, Osaka University, Japan, Apr 2015.

Research Group

Current Post Docs and Visiting Scholars

- Vittorio Giammarino, CS, Purdue University — Sep 2024 - Present
- Lei Zhang, CS, Purdue University — Jan 2024 - Present

Current Ph.D. Students

- Hanwen Ren (Ph.D Candidate), CS, Purdue University — Jan 2022 - Present
- Zixing Wang, CS, Purdue University — Jan 2022 - Present
- Ruiqi Ni (Ph.D Candidate), CS, Purdue University — Jan 2022 - Present
- Yubin Koh, CS, Purdue University — Aug 2023 - Present
- Tassos Manganaris, CS, Purdue University — Aug 2023 - Present
- Yuchen Liu, CS, Purdue University — Aug 2023 - Present
- Gokul Prabhakaran, CS, Purdue University — Aug 2025 - Present

Current M.S. Students

- Meenakshi Sundaram Manickam, ICON, Purdue University — Sep 2024 - Present

Current B.S. Students

- Thomas Peterson, CS, Purdue University — Jan 2025 - Present
- Nicholas Kann, CS, Purdue University — Jan 2025 - Present
- Caiyi Zhang, CS, Purdue University — Jan 2025 - Present
- Michael Bezick, CS, Purdue University — Nov 2024 - Present
- Noah Trupin, CS, Purdue University — Sep 2024 - Present
- Jeremy Lu, CS, Purdue University — Jun 2024 - Present
- Jun Kim, CS, Purdue University — Jan 2024 - Present

Visiting Ph.D. Students Alumni

- Qingyi Chen, CS, Purdue University — Aug 2024 - Nov 2025
- Daniel Chen, CS, Purdue University — Aug 2024 - Nov 2025
- Syed Talha Bukhari, CS, Purdue University — Aug 2022 - Aug 2024
- Zikang Xiong, CS, Purdue University — Jan 2022 - Sep 2023
  – co-advised with Prof. Suresh Jagannathan
- Jacob Johnson, ECE, UCSD — Aug 2021 - Oct 2023
  – co-advised with Prof. Michael Yip (ECE, UCSD)
- Manav Kulshrestha, CS, Purdue University — Aug 2022 - Jun 2023
- Zhiquan Wang, CS, Purdue University — Sep 2021 - Sep 2022
  – co-advised with Prof. Bedrich Benes

M.S. Thesis Students Alumni

- Krishnan N. Vidyaa, ECE, Purdue University (Co-Chair) Aug 2022 - May 2024
  – Title: Multi-agent Trajectory Prediction for Autonomous Vehicles
- Abhinav K. Keshari, ECE, Purdue University (Co-Chair) Oct 2021 - Apr 2023
  – Title: Vision-Language Model for Robot Grasping
- Kendal Norman, CS, Purdue University (Chair) Aug 2021 - Jul 2023
  – Title: Analysis of Continuous Learning Models For Trajectory Representation
- Vivek Gupta, CS, Purdue University (Chair) May 2022 - Jul 2023
  – Title: Multi-agent Neural Rearrangement Planning of Objects in Cluttered Environments

M.S. Students Alumni

- Shaswat Shukla, CS, Purdue University Sep 2024
- Vigneshwaran Dharmalingam, CS, Purdue University Sep 2023 - Sep 2024
- Aathman Tharmasanthiran, CS, Purdue University Sep 2023 - Sep 2024
- Gabriella Giachini, ME, Purdue University Jun 2023 - May 2024
- Veera Adithya Dittakavi, ECE, Purdue University May 2023 - Aug 2023
- Prabhpreet Singh Dir, AAE, Purdue University Sep 2021 - Dec 2022
- Kartik A. Pant, AAE, Purdue University Oct 2021 - May 2022
- Akshaj Uppala, CS, Purdue University Aug 2022 - May 2023
- Shivam Bhat, CS, Purdue University May 2023 - Dec 2023
- Joseph P. Kawiecki, ECE, Purdue University Jan 2023 - Dec 2023
- Shyamvanshikumar Singh, CS, Purdue University Nov 2022 - Dec 2023

B.S. Students Alumni

- Jainam Doshi, CS, Purdue University Jan 2024 - May 2025
- Alexiy Buynitsky, CS, Purdue University Aug 2023 - May 2025
- Guna Avula, CS, Purdue University Jan 2023 - May 2025
- Xuyang Chen, CS, Purdue University Sep 2021 - May 2025
- Vincent Wang, CS, Purdue University Jan 2025 - May 2025
- Wyatt Woker, CS, Purdue University Jan 2025 - May 2025
- George Wang, CS, Purdue University Sep 2024 - Dec 2024
- Aakanksha Shripal, ECE, Purdue University Sep 2023 - May 2024
- Daniel Chen, CS, Purdue University Mar 2022 - May 2024
- Daniel Lawson, CS, Purdue University Aug 2021 - May 2024
- Shyawn Zahid, CS, Purdue University Feb 2022 - May 2022
- Latif Adurzada, Math, Purdue University Feb 2022 - May 2022
- Vlada Volyanskaya, CS, Purdue University May 2022 - Aug 2022
- Andrew Showalter, ME, Purdue University Aug 2022 - Dec 2022
- Jeegn Dani, CS, Purdue University Jan 2022 - Dec 2022
- Jacob Zietek, CS, Purdue University Nov 2022 - Dec 2023
- Ashvin Iyer, CS, Purdue University May 2022 - May 2023

TEACHING

- **Instructor**, CS558 Introduction to Robot Learning, Purdue University Spring, 2026
- **Instructor**, CS458 Introduction to Robotics, Purdue University Fall, 2025

- **Instructor**, CS458 Introduction to Robotics, Purdue University — Fall, 2024
- **Instructor**, CS558 Introduction to Robot Learning, Purdue University — Spring, 2024
- **Guest Lecturer**, CS197: Honors Seminar, Purdue University — Spring, 2024
- **Instructor**, CS49000 Introduction to Robotics, Purdue University — Fall, 2023
- **Instructor**, CS593000 Robotics, Purdue University — Spring, 2023
- **Guest Lecturer**, CS197: Honors Seminar, Purdue University — Spring, 2023
- **Instructor**, CS49000 Introduction to Robotics, Purdue University — Fall, 2022
- **Guest Lecturer**, CS397: Honors Seminar, Purdue University — Fall, 2022
- **Instructor**, CS593000 Robotics, Purdue University — Spring, 2022
- **Instructor**, CS592 Introduction to Robot Motion, Purdue University — Fall, 2021
- **Guest Lecturer**, CS397: Honors Seminar, Purdue University — Fall, 2021
- **Guest Lecturer**, CS591: Research Seminar, Purdue University — Fall, 2021
- **Teaching Assistant**, Advances in Robot Manipulation, UC San Diego — Spring, 2020
- **Co-Instructor**, Robot Reinforcement Learning, UC San Diego — Fall, 2019
- **Teaching Assistant**, Cognitive Neuroscience Robotics, Osaka University — Feb, 2016 - 2017
- **Teaching Assistant**, Circuits Analysis, NUST, PK — Fall, 2011

Professional Activities

University Service:

- Purdue CS Robotics Curriculum Development: Introduced new and Purdue CS department's very first robotics courses for undergraduate (CS 458: Introduction to Robotics) and graduate (CS 558: Introduction to Robot Learning) students.
- Purdue CS Graduate Studies Committee, 2025-26
- Purdue CS Graduate Studies Committee, 2024-25
- Purdue CS Ph.D. Graduate Admissions, 2021-22, 2023-24
- Purdue CS Ph.D. Visit Day Committee, 2024
- Purdue CS Faculty Search, 2022-23
- Purdue CS Space Management Committee, 2021

Undergraduate Research and Outreach Activities:

- Mentor for FIRST Robotics Competition (FRC) at West Lafayette Community School Corporation, Spring 2024
- UG students lab visit: Hosted UG students' lab visit in Fall 2023 to showcase the live demos of ongoing projects. Coverage available https://purduecomputerscience.exposure.co/ahmed-qureshi?source=share-purduecomputerscience
- Participation in Purdue's SURF (Summer Undergraduate Research Fellowship) in Summer 2024.

Ph.D. Committees

- Zixing Wang, CS, Purdue University (Chair)
  - PhD Preliminary Exam (Nov. 2025)
- Hanwen Ren, CS Ph.D, Purdue University (Chair)
  - PhD Preliminary Exam (Nov. 2025)
- Ruiqi Ni, CS Ph.D, Purdue University (Chair)
  - PhD Preliminary Exam (May. 2025)
- Shengqing Xia, CS Ph.D, Purdue University (Member)
  - PhD Preliminary Exam (Jun. 2024)
- Charles W Christoffer, CS PhD, Purdue University (Member)
  - PhD Preliminary Exam (July. 2022)
  - PhD Defense (Nov. 2023)

- Md Masudur Rahman, CS PhD, Purdue University (Member)
  - PhD Preliminary Exam (Mar. 2023)
  - PhD Defense (Sep. 2024)
- Rashmi Bhaskara, CS, Purdue University (Member)
- Shilong Lei, CS, Purdue University (Member)
- Joe K. Eappen, ECE, Purdue University (Member)
- Hojun Lee, ME, Purdue University (Member)
- Syed Hasan Amin Mahmood, CS, Purdue University (Member)

M.S. Committees
- Guna Avula, MS Thesis (Nov. 2025), CS, Purdue University (Member)
- Vidyaa N. Krishnan, MS Thesis (Apr. 2024), ECE, Purdue University (Co-chair)
- Kartik Anand Pant, MS thesis (Jul 2023), AAE, Purdue University (Member)
- Vivek Gupta, MS Thesis (Jul. 2023), CS, Purdue University (Chair)
- Kendal Norman, MS Thesis (Apr. 2023), CS, Purdue University (Chair)
- Abhinav K. Keshari, MS Thesis (Apr. 2023), ECE, Purdue University (Co-chair)

Conference Program Committee
- Area Chair, Robotics: Science and Systems (RSS) 2025.
- Area Chair, International Conference on Robot Learning 2023, 2024.
- Associate Editor*, IEEE International Conference on Intelligent Robots and Systems (IROS) 2023.
- Associate Editor*, IEEE International Conference on Robotics and Automation (ICRA) 2023.
- Deep Learning in Grasping and Manipulation I, Session Co-chair, IEEE International Conference on Robotics and Automation (ICRA) 2024.
- Motion Planning I, Session Co-chair, IEEE International Conference on Robotics and Automation (ICRA) 2024.
- Reactive and Sensor-Based Planning Session Co-chair, IEEE International Conference on Intelligent Robots and Systems (IROS) 2023.

* In IEEE Robotics conferences, the Associate Editor role is equivalent to area chair role in AI/ML conferences.

Journal Editorial Board Member
- Associate Editor, IEEE Transactions on Robotics (TRO) 2023-Present.
- Associate Editor, IEEE Robotics and Automation Letters (RA-L) 2022-Present.

Workshop Organization
- Organizer, workshop on Physics-informed Robot Learning for Motion Planning and Control, in submission to IEEE/RAS International Conference on Robotics and Automation (ICRA) 2025.
- Co-organizer, workshop on Machine Learning for Motion Planning, International Conference on Robotics and Automation (ICRA), May 2021.
- Organizer, workshop on Learning Representations for Planning and Control, IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS), Macau, China, Nov 2019.

Government Activities

- NSF IIS Panelist: 2022

Reviewer

Journals:

- The International Journal of Robotics Research, 2024, 2025
- IEEE Transactions on Robotics 2021, 2022
- IEEE Robotics and Automation Letters 2020, 2022, 2024
- Cambridge Robotica 2014

Conferences:

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2018, 2020, 2022, 2024
- Conference on Neural Information Processing Systems (NeurIPS) 2021, 2022, 2025
- IEEE International Conference on Representation Learning (ICLR) 2019, 2020, 2021, 2022
- IEEE International Conference on Robotics and Automation (ICRA) 2019, 2020, 2022, 2024
- Robotics: Science and Systems (RSS) 2021, 2022
- Thirty-Seventh AAAI Conference on Artificial Intelligence 2022

Society Membership:

- IEEE, Robotics and Automation Society 2021 - Present
- IEEE, Member 2021 - Present

References

Available upon request