RESEARCH STATEMENT

I envision future after-disaster missions to be efficiently conducted by fully autonomous robots, which are (1) highly capable of reliably moving through challenging and most likely adversarial environments, and (2) highly intelligent so that involvement of human rescuers, both physically and intellectually, can be effectively minimized. Therefore, my research goal is to **develop highly capable and intelligent mobile robots that are robustly deployable in the real world with minimal human supervision**. As a roboticist with unique expertise evenly grounded in motion planning and machine learning, and vast experience working on real-world problems in the field with disaster responders, I build advanced robot platforms, develop complex sensing and actuation systems, design sophisticated motion planning algorithms, and set up standardized testbeds and metrics in order to create highly capable and intelligent robots to locomote on land, in air, and at sea.

PROFESSIONAL PREPARATION

- **Ph.D.** (Computer Science, 2019), [Texas A&M University](http://www.tamu.edu), College Station, TX
  - Dissertation: *Risk-aware Path and Motion Planning for a Tethered Aerial Visual Assistant in Unstructured or Confined Environments*
  - Thesis Committee: Robin R. Murphy (Chair), Dylan A. Shell, Thomas R. Joerger, Suman Chakravorty
- **Master of Science** (Mechanical Engineering, 2015), [Carnegie Mellon University](http://www.cmu.edu), Pittsburgh, PA
  - Advisor: William (Red) L. Whittaker
- **Bachelor of Engineering** (Mechatronics Engineering, Dual-Degree, 2013), [Tongji University](http://www.tongji.edu.cn), Shanghai, P.R. China
  - [FH Aachen University of Applied Sciences](http://www.fh-aachen.de), Aachen, North Rhine-Westphalia, Germany

APPOINTMENTS

**Academia**

- **George Mason University**, 08/2022-current
  - Assistant Professor, Department of Computer Science
- **University of Texas at Austin**, 06/2021-08/2022
  - Research Affiliate, Learning Agents Research Group (LARG)
- **University of Texas at Austin**, 08/2019-05/2021
  - Postdoctoral Researcher, Learning Agents Research Group (LARG)
- **Texas A&M University**, 08/2015-08/2019
  - Graduate Research Assistant, Center for Robot-Assisted Search and Rescue (CRASAR)
- **Carnegie Mellon University**, 08/2014-05/2015
  - Graduate Research Assistant, Biorobotics Lab
  - Graduate Research Assistant, Field Robotics Center
Industry

• **Everyday Robots, X (Formerly Google\textsuperscript{[X]}), 06/2021-04/2023**  
  *Roboticist*, Mountain View, CA

• **Facebook Reality Labs, 05/2018-08/2018**  
  *Research Intern*, Sausalito, CA

• **Microsoft Research Labs, 05/2017-08/2017**  
  *Research Intern*, Redmond, WA

• **PHOENIX CONTACT GmbH & Co. KG, 02/2013-06/2013**  
  *Intern & Bachelor Thesis Author*, Blomberg, Germany

• **DELPHI China Technical Center, 06/2012-08/2012**  
  *Advanced Intern*, Shanghai, China

• **Siemens Industrial Automation Ltd., Shanghai, 05/2011-09/2011**  
  *Assistant Engineer*, Shanghai, China

• **Luther Attorneys Shanghai, 07/2010-08/2010**  
  *Executive Assistant*, Shanghai, China

**PUBLICATIONS**

**Journal**


Toward Wheeled Mobility on Vertically Challenging Terrain: Platforms, Datasets, and Algorithms. Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2024.

Motion Memory: Leveraging Past Experiences to Accelerate Future Motion Planning. Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2024.

Team Coordination on Graphs with Reinforcement Learning. Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2024.


Dexterous Legged Locomotion in Confined 3D Spaces with Reinforcement Learning. Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2024.

MTG: Mapless Trajectory Generator with Traversability Coverage for Outdoor Navigation. Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2024.


Workshop / Extended Abstract


Preprint

[66] A. Datar, C. Pan, and X. Xiao. Learning to Model and Plan for Wheeled Mobility on Vertically Chal
A Study on Learning Social Robot Navigation with Multimodal Perception. 

A Study on Learning Social Robot Navigation with Multimodal Perception. 

Learning Team Coordination to Traverse Adversarial Environments. 


Using Parallelized Containers for Reinforcement Learning on Large Computer Clusters. 


Energy considerations for wheeled mobile robots operating on a single battery discharge. 

Risk-aware Path and Motion Planning for a Tethered Aerial Visual Assistant in Unstructured or Confined Environments. 

A Multifunctional Automobile Running Simulation System. 

Bus Awning. 

An Automobile Braking System with instant Braking Condition Indication. 

Cold Water Collector for Water Heater. 

Food Bag with a Storage Pocket.
SELECTED FUNDING

- **Multi-Modal Perception for Autonomous Mobility and Maneuverability in Degraded Environments**, 02/2024-current
  
  *PI ($249K)*, Award Number: W911NF-24-2-0027, Scalable, Adaptive, and Resilient Autonomy (SARA) Cycle 3 Sprint Topic: Long-Duration Autonomous Maneuver funded by US Army Research Laboratory

- **Clearpath Robotics OutdoorNav Developer Partner Program**, 12/2022
  
  *Selected Partner (~$30K)*, up to 90% discount in software licenses and 30% to 60% in hardware and sensor kits to build innovative off-road autonomous systems

- **Robotics@Google In-Kind Donation Award**, 12/2022
  
  *Grantee (~$300K)*, robot platforms donated by Robotics@Google including two Fetch robots and one Clearpath Husky for collaborative navigation and manipulation research

- **Learning Kinodynamics for Accurate, High-Speed, Off-Road Ground Maneuvers on Unstructured Terrain**, 12/2022-current
  
  *PI ($817K)*, Award Number: W911NF-23-2-0004, AI/ML Research for Expeditionary Maneuver and Air/Ground Reconnaissance funded by US Army Research Laboratory

- **Tactical Team Behavior with Hierarchical Decision Making using Game Theory and Learning**, 09/2022-current
  
  *Co-PI ($481K)*, Award Number: W911NF-22-2-0242, Tactical Behaviors for Autonomous Maneuver Collaborative Research Program (TBAM-CRP)-Cycle 1 Sprint Topic: Coordinated and Adversarial Tactical Maneuver in Complex Terrains funded by US Army Research Laboratory

- **Inspection of City Infrastructure via Peripheral Perception**, 09/2020-08/2021
  
  *Project Lead ($150K)*, Good Systems Grand Challenge funded project at University of Texas at Austin

  
  *Project Lead ($200K)*, Army Research Laboratory (ARL) Collaborative Research Alliance (CRA) funded Distributed and Collaborative Intelligent Systems and Technology (DCIST) project at University of Texas at Austin

- **NRI: A Collaborative Visual Assistant for Robot Operations in Unstructured or Confined Environments**, 09/2016-08/2019
  
  *Project Lead ($609K)*, Department of Energy funded NSF NRI project at Texas A&M University

- **NRI: Collaborative: Exploiting Granular Mechanics to Enable Robotic Locomotion**, 05/2016-08/2019
  
  *Main Participant*, NSF NRI funded project at Texas A&M University

- **NSF RAPID: Using an Unmanned Aerial Vehicle and Increased Autonomy to Improve an Unmanned Marine Vehicle Lifeguard Assistant Robot**, 01/2016-08/2019
  
  *Project Lead*, NSF funded project at Texas A&M University

  
  *Main Participant*, NSF NRI funded project at Carnegie Mellon University

INVITED TALKS

“Learning Navigation in Challenging Environments”

- Invited Talk @ Workshop on Multi-Agent Planning and Navigation in Challenging Environments (MultiAct 2023), Robotics: Science and Systems (RSS) 2023, Daegu, Republic of Korea 07/10/2023
“Learning Agile Ground Maneuvers in Highly Constrained and Off-Road Conditions”

- Invited Talk @ Learning for Agile Robotics Workshop, 2022 Conference on Robot Learning (CoRL), Auckland, New Zealand 12/15/2022

“Motion Planning for Deployable Robots”

- Guest Lecture for CS 700 @ George Mason University, Fairfax, VA 11/07/2022

“Evaluating Motion Planning “in-the-Loops” ”

- Invited Talk @ Evaluating Motion Planning Performance Workshop, 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Kyoto, Japan 10/23/2022

“Deployable Robots that Learn”

- Controls and Robotics Reading Group @ George Mason University, Fairfax, VA 10/04/2022
- Seminar Series @ Harbin Institute of Technology, Harbin, China 09/02/2022
- Kavraki Lab @ Rice University, Houston, TX 06/08/2022
- Maryland Robotics Center @ University of Maryland, College Park, MD 04/29/2022
- IFML Talk Series @ The University of Texas at Austin, Austin, TX 04/08/2022
- Robot Mobility @ Google, Mountain View, CA 03/23/2022
- LCSR Seminar @ Johns Hopkins University, Baltimore, MD 02/02/2022
- DEVCOM ARL Colloquium @ Army Research Laboratory, Adelphi, MD 11/17/2021
- Oxford Robotics Institute @ Oxford University, Oxford, UK 11/12/2021
- Department Seminar @ University of Nebraska-Lincoln, Lincoln, NE 03/17/2021
- Department Seminar @ Illinois Institute of Technology, Chicago, IL 03/08/2021
- Department Seminar @ George Mason University, Fairfax, VA 02/24/2021
- LARRI Seminar @ University of Louisville, Louisville, KY 02/12/2021

“High-Speed Motion Control with Learned Kinodynamic Models for Off-Road Navigation”

- Guess Lecture for CS 378H @ The University of Texas at Austin, Austin, TX 03/21/2022

TEACHING

- **CS580 Introduction to Artificial Intelligence**  
  *Instructor*, George Mason University, Spring 2024
- **CS485 Autonomous Robotics**  
  *Instructor*, George Mason University, Fall 2023
- **CS685 Autonomous Robotics**  
  *Instructor*, George Mason University, Spring 2023
- **CS580 Introduction to Artificial Intelligence**  
  *Instructor*, George Mason University, Fall 2022
- **CS309 Autonomous Intelligent Robotics (FRI II)**  
  *Co-Instructor*, University of Texas at Austin, Fall 2020
- **CS309 Autonomous Intelligent Robotics (FRI I)**  
  *Co-Instructor*, University of Texas at Austin, Spring 2020
- **CSCE 121 Introduction to Program Design and Concepts**  
  *Teaching Assistant*, Texas A&M University, Spring 2016
- **CSCE 121 Introduction to Program Design and Concepts**  
  *Teaching Assistant*, Texas A&M University, Fall 2015
STUDENT MENTORSHIP

Ph.D. Thesis Committees

Linh Kästner, Technical University of Berlin  
Zchantig Xie, Temple University  
Jinsoo Park, The University of Texas at Austin  

Thesis Defense Spring 2023  
Thesis Proposal Spring 2023  
Thesis Proposal Spring 2023

George Mason University

Amirreza Payandeh, Ph.D. student  
Mohammad Nazeri, Ph.D. student  
Dibyendu Das, Ph.D. student  
Aniket Anand Datar, PhD student  
Manshi Limbu, Ph.D. student  
Anuj Pokhrel, Ph.D. student  
Amir Hossain Raj, Ph.D. student  
Chenhui Pan, Ph.D. student  
Duc (Aaron) M. Nguyen, Ph.D. student  
Bhabaranjan Panigrahi, Master student

01/2023-current  
12/2022-current  
11/2022-current  
10/2022-current  
10/2022-current  
09/2022-current  
08/2022-current  
08/2022-current  
08/2022-current  
01/2023-current  
08/2022-current

The University of Texas at Austin

Haresh Karnan, Ph.D. student  
Jinsoo Park, Ph.D. student  
Zizhao Wang, Ph.D. student  
Zifan Xu, Ph.D. student  
Bo Liu, Ph.D. student  
Fulin Jiang, Undergraduate student  
Kevin Hou, Undergraduate student  
James Xu, Undergraduate student  
Ruolin Dong, Undergraduate student  
Anirudh Nair, Undergraduate student  
Daniel Perille, Undergraduate student  
Ashwin Kudva, Undergraduate student  
Gauraang Dhamankar, Undergraduate student  
Abigail Truong, Undergraduate student  
William Shi, Undergraduate student  
Yuntong Qu, Undergraduate student

12/2020-current  
08/2020-current  
08/2020-current  
05/2020-current  
12/2019-08/2022  
05/2022-08/2022  
01/2022-08/2022  
01/2022-08/2022  
01/2022-08/2022  
05/2020-08/2022  
05/2020-09/2021  
01/2021-06/2021  
05/2020-05/2021  
05/2020-03/2021  
08/2020-12/2020  
08/2020-12/2020

Texas A&M University

Jan Dufek, Ph.D. student  
Mohamed Suhail, Master student  
Rebecca Schofield, Undergraduate student

08/2019-08/2020  
08/2017-05/2018  
08/2017-05/2018
SERVICE

Chair

- IEEE ICRA 2023 Competition The Benchmark Autonomous Robot Navigation (BARN) Challenge
- International Joint Conference on Artificial Intelligence (IJCAI) 2023 Robot Exhibition
- IEEE ICRA 2022 Competition The Benchmark Autonomous Robot Navigation (BARN) Challenge
- IEEE ICRA 2021 Workshop Machine Learning for Motion Planning

Organizing Committee

- CoRL 2023 Workshop Bridging the Gap between Cognitive Science and Robot Learning in the Real World: Progresses and New Directions
- CPS-IoT Week 2023 F1Tenth Autonomous Grand Prix
- ACM/IEEE HRI 2023 Workshop Human-Interactive Robot Learning (HIRL)
- CoRL 2022 Workshop Learning for Agile Robotics
- ACM/IEEE HRI 2022 Workshop Human-Interactive Robot Learning (HIRL)
- ACM/IEEE HRI 2021 Workshop Exploring Applications for Autonomous Non-Verbal Human-Robot Interactions

Associate Editor

- IEEE Robotics and Automation Letters (RA-L)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)

Senior Program Committee

- International Joint Conferences on Artificial Intelligence (IJCAI)

Program Committee

- AAAI-2023 Student Abstract and Poster Program
- NeurIPS 2022 Workshop on Reinforcement Learning for Real Life
- The AAAI Conference on Artificial Intelligence (AAAI)
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
- IEEE ICRA 2020 Workshop Machine Learning in Planning and Control of Robot Motion

Advisory Committee

- IEEE ICRA 2022 Workshop Debates on the Future of Robotics Research

Reviewer Board

- MDPI Applied Sciences
- MDPI Sensors

Grant Reviewer

- Natural Sciences and Engineering Research Council of Canada (NSERC)
- National Science Foundation (NSF)

Journal Reviewer

- IEEE Robotics and Automation Letters (RA-L)
IEEE Transactions on Robotics (T-RO)
IEEE Robotics and Automation Magazine (RAM)
IEEE Transactions on Automation Science and Engineering (T-ASE)
IEEE Transactions on Mobile Computing (TMC)
IEEE Transactions on Cybernetics (TCYB)
IEEE Transactions on Cognitive and Developmental Systems (TCDS)
IEEE Transactions on Intelligent Vehicles (TIV)
IEEE Access
Springer Autonomous Robots
Springer Machine Learning
ACM Transactions on Human-Robot Interaction (THRI)
Elsevier Robotics and Autonomous Systems (RAS)
Wiley Journal of Field Robotics (JFR)
SAGE International Journal of Robotics Research (IJRR)
Journal of Machine Learning Research (JMLR)
SAGE Measurement and Control (MAC)
AI Access Foundation Journal of Artificial Intelligence Research (JAIR)
MDPI Journal of Marine Science and Engineering (JMSE)
SCIENCE CHINA Information Sciences

Conference Reviewer
- Robotics: Science and Systems (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS)
- IEEE European Conference on Mobile Robots (ECMR)
- International Conference on Machine Learning (ICML)
- International Conference on Learning Representations (ICLR)
- Conference on Neural Information Processing Systems (NeurIPS)

Departmental and University Committee
- PhD Admissions Committee 2023-2024, Department of Computer Science, George Mason University
- Tenure-Track Recruitment Committee 2022-2023, Department of Computer Science, George Mason University

PRESS COVERAGE
- Google AI Blog, Performer-MPC: Navigation via real-time, on-robot transformers, 03/03/2023
- Google AI Blog, Google Research, 2022 & beyond: Robotics, 02/14/2023
- Clearpath Robotics, Jackal UGV Shines in ICRA 2022 Autonomous Navigation Challenge, 06/07/2022
- IEEE Spectrum, How the US Army is Turning Robots into Team Players, 09/23/2021
- US Army, Soldiers could teach future robots how to outperform humans, 08/12/2020
- Tech Briefs, Drones and AI Improve 'EMILY' Lifesaver Robot for Large-Scale Water Rescues, 06/30/2018
- NSF Science Nation, Water rescue robot EMILY gets some help from the sky, 02/26/2018
- WIRED, Marsupial Robots Ain't Cuddly, But They Are Totally Brilliant, 04/08/2017
- KBTX, Search and rescue workers, drones, robots, gather in Grimes County for training, 01/28/2017
HONORS

• 2023 AAAI Fall Symposium Artificial Intelligence for Human-Robot Interaction (AI-HRI), Best Paper Award Nomination (10/2023)
• 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Best Paper Award on Cognitive Robotics Finalist (10/2023)
• George Mason University Teaching Excellence Award Nomination (11/2022)
• 2018 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), Best Paper Finalist (08/2018)
• 2018 IEEE International Conference on Wearable and Implantable Body Sensor Networks (BSN), Student Travel Award (03/2018)
• The Excellent Graduate of Shanghai (06/2013)
• DAAD Scholarship (German Ministry of Education) (09/2012)
• National Scholarship (Chinese Ministry of Education) (09/2012)
• Learning Scholarship of Tongji University (09/2012)
• The Excellent Student of Tongji University (09/2012)
• National Scholarship (Chinese Ministry of Education) (09/2011)
• Learning Scholarship of Tongji University of the School Year 2010-2011 (09/2011)
• The Excellent Student of the School Year 2010-2011 of Tongji University (09/2011)
• Ni-Li-Shi Scholarship (awarded to the best students) (09/2010)
• Learning Scholarship of Tongji University of the School Year 2009-2010 (09/2010)
• The Excellent Student of the School Year 2009-2010 of Tongji University (09/2010)

PERSONAL

Languages:
• Chinese (native)
• English (fluent)
• German (fluent)