XUESU XIAO

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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**, 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. Ioerger, Suman Chakravorty
- **Master of Science** (Mechanical Engineering, 2015), **Carnegie Mellon University**, Pittsburgh, PA
  Advisor: William (Red) L. Whittaker
- **Bachelor of Engineering** (Mechatronics Engineering, Dual-Degree, 2013),
  Tongji University, Shanghai, P.R. China
  FH Aachen University of Applied Sciences, 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
- **Carnegie Mellon University**, 09/2013-11/2014
  Graduate Research Assistant, Field Robotics Center

Industry

- **Everyday Robots, X (Formerly Google[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

HONORS

- 2024 International Conference on Robotics and Automation (ICRA) Workshop on Exploring Role Allocation in Human-Robot Co-Manipulation, Best Paper Finalist (05/2024)
- 1st Place, 2024 Raytheon Autonomous Vehicle Competition (04/2024)
- 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)

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
- Robotics Business Review, **How Robots and Drones are Changing Rescue Operations**, 11/27/2019
- 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

INVITED TALKS

"Learning Robot Navigation in Challenging Environments"

- Invited Talk @ Center of Excellence in Command, Control, Communications, Computing, Cyber, and Intelligence (C^5I Center) 35-Year Anniversary, Fairfax, VA 04/30/2024

"Deployable Robots that Learn"

- Virginia Tech Computer Science Seminar @ Virginia Polytechnic Institute and State University, Blacksburg, VA 04/26/2024
- Colloquium Series @ Worcester Polytechnic Institute, Worcester, MA 04/05/2024
- National Capital Region Computer Science Seminar Series @ Virginia Polytechnic Institute and State University, Falls Church, VA 03/15/2024
- 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

"Human-Interactive Mobile Robots: from Learning to Deployment"

- Invited Lecture for SoRAIM (Social Robotics, Artificial Intelligence, and Multimedia) Winter School @ Inria Centre at the University Grenoble Alpes, Grenoble, France 02/22/2024

"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
- Invited Talk @ Agile Robotics: Perception, Learning, Planning, and Control Workshop, 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Kyoto, Japan 10/27/2022

"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

"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

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
- **Human-in-the-Loop Machine Learning for Adaptive Robot Navigation Behaviors**, 08/2019-9/2020
  *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
- **NRI: Robotic Scouts: Augmenting Perception for Underground Rescue**, 10/2013-11/2014
  Main Participant, NSF NRI funded project at Carnegie Mellon University

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
- **Robotics 778 Mechatronic Design**
  Teaching Assistant, Carnegie Mellon University, Spring 2015

STUDENT MENTORSHIP

Ph.D. Thesis Committees

Linh Kästner, Technical University of Berlin	Thesis Defense Spring 2023
Zhanteng Xie, Temple University	Thesis Proposal Spring 2023
Jinsoo Park, The University of Texas at Austin	Thesis Proposal Spring 2023

George Mason University

Amirreza Payandeh, Ph.D. student	01/2023-current
Mohammad Nazeri, Ph.D. student	12/2022-current
Dibyendu Das, Ph.D. student	11/2022-current
Aniket Anand Datar, PhD student	10/2022-current
Manshi Limbu, Ph.D. student	10/2022-current
Anuj Pokhrel, Ph.D. student	09/2022-current
Amir Hossain Raj, Ph.D. student	08/2022-current
Chenhui Pan, Ph.D. student	08/2022-current
Duc (Aaron) M. Nguyen, Ph.D. student	08/2022-current
Bhabaranjan Panigrahi, Master student	01/2023-current
Dileep Kumar, Master student	08/2022-current

The University of Texas at Austin

Haresh Karnan, Ph.D. student	12/2020-current

Jinsoo Park, Ph.D. student	08/2020-current
Zizhao Wang, Ph.D. student	08/2020-current
Zifan Xu, Ph.D. student	05/2020-current
Bo Liu, Ph.D. student	12/2019-08/2022
Fulin Jiang, Undergraduate student	05/2022-08/2022
Kevin Hou, Undergraduate student	01/2022-08/2022
James Xu, Undergraduate student	01/2022-08/2022
Ruolin Dong, Undergraduate student	01/2022-08/2022
Anirudh Nair, Undergraduate student	05/2020-08/2022
Daniel Perille, Undergraduate student	05/2020-09/2021
Ashwin Kudva, Undergraduate student	01/2021-06/2021
Gauraang Dhamankar, Undergraduate student	05/2020-05/2021
Abigail Truong, Undergraduate student	05/2020-03/2021
William Shi, Undergraduate student	08/2020-12/2020
Yuntong Qu, Undergraduate student	08/2020-12/2020

Texas A&M University

Jan Dufek, Ph.D. student	08/2019-08/2020
Mohamed Suhail, Master student	08/2017-05/2018
Rebecca Schofield, Undergraduate student	08/2017-05/2018

SERVICE

Chair

- IEEE ICRA 2024 Competition The Benchmark Autonomous Robot Navigation (BARN) Challenge
- 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
- AAAI Spring Symposium Series 2021 Machine Learning for Mobile Robot Navigation in the Wild
- 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

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

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)
- IEEE Intelligent Vehicles Symposium (IV)
- 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

PUBLICATIONS

Journal

[1] R. Mirsky, **X. Xiao**, J. Hart, and P. Stone. Conflict Avoidance in Social Navigation - a Survey. *ACM Transactions on Human-Robot Interaction (THRI)*, Vol. 13, Iss. 1, No. 13: 1-36, March 2024.

[2] **X. Xiao**, Z. Xu, G. Warnell, P. Stone, F. Guinjoan, R. Rodrigues, H. Bruyninckx, H. Mandala, G. Christmann, J. Blanco-Claraco, and S. Rai. Autonomous Ground Navigation in Highly Constrained Spaces: Lessons Learned From the Benchmark Autonomous Robot Navigation Challenge at ICRA 2023. *IEEE Robotics & Automation Magazine (RAM)*, Vol. 30, No. 4: 91-97, December 2023.

[3] **X. Xiao**, Z. Xu, Z. Wang, Y. Song, G. Warnell, P. Stone, T. Zhang, S. Ravi, G. Wang, H. Karnan, J. Biswas, N. Mohammad, L. Bramblett, R. Peddi, N. Bezzo, Z. Xie, and P. Dames. Autonomous Ground Navigation in Highly Constrained Spaces: Lessons Learned From the Benchmark Autonomous Robot Navigation Challenge at ICRA 2022. *IEEE Robotics & Automation Magazine (RAM)*, Vol. 29, No. 4: 148-156, December 2022.

[4] H. Karnan, A. Nair, **X. Xiao**, G. Warnell, S. Pirk, A. Toshev, J. Hart, J. Biswas, and P. Stone. Socially CompliAnt Navigation Dataset (SCAND): A Large-Scale Dataset Of Demonstrations For Social Navigation. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 7, No. 4: 11807-11814, October 2022.

[5] **X. Xiao**, Z. Wang, Z. Xu, B. Liu, G. Warnell, G. Dhanmankar, A. Nair, and P. Stone. APPL: Adaptive Planner Parameter Learning. *Robotics and Autonomous Systems*, 154: 104132, August 2022.

[6] **X. Xiao**, B. Liu, G. Warnell, and P. Stone. Motion Planning and Control for Mobile Robot Navigation Using Machine Learning: a Survey. *Autonomous Robots*, 46: 569-597, March 2022.

[7] **X. Xiao**, Y. Zhang, H. Li, H. Wang, and B. Li. Camera-IMU Extrinsic Calibration Quality Monitoring. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 7, No. 2: 4614-4621, April 2022.

[8] Z. Wang, **X. Xiao**, G. Warnell, and P. Stone. APPLE: Adaptive Planner Parameter Learning from Evaluative Feedback. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 6, No. 4: 7744-7749, October 2021.

[9] J. Dufek, **X. Xiao**, and R. Murphy. Best Viewpoints for External Robots or Sensors Assisting Other Robots. *IEEE Transactions on Human-Machine Systems (THMS)*, Vol. 51, No. 4: 324-334, August 2021.

[10] **X. Xiao**, J. Biswas, and P. Stone. Learning Inverse Kinodynamics for Accurate High-Speed Off-Road Navigation on Unstructured Terrain. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 6, No. 3: 6054-

6060, July 2021.

[11] **X. Xiao**, B. Liu, G. Warnell, and P. Stone. Toward Agile Maneuvers in Highly Constrained Spaces: Learning from Hallucination. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 6, No. 2: 1503-1510, April 2021.

[12] B. Liu, **X. Xiao**, and P. Stone. A Lifelong Learning Approach to Mobile Robot Navigation. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 6, No. 2: 1090-1096, April 2021.

[13] **X. Xiao**, B. Liu, G. Warnell, J. Fink, and P. Stone. APPLD: Adaptive Planner Parameter Learning from Demonstration. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 5, No. 3: 4541-4547, July 2020.

[14] **X. Xiao**, J. Dufek, and R. Murphy. Robot Risk-Awareness by Formal Risk Reasoning and Planning. *IEEE Robotics and Automation Letters (RA-L)*, Vol. 5, No. 2: 2856-2863, April 2020.

[15] K. Tiwari, **X. Xiao**, A. Malik, and N. Y. Chong. A Unified Framework for Operational Range Estimation of Mobile Robots Operating on a Single Discharge to Avoid Complete Immobilization. *Mechatronics*, 57: 173-187, February 2019.

[16] **X. Xiao** and R. Murphy. A Review on Snake Robot Testbeds in Granular and Restricted Maneuverability Spaces. *Robotics and Autonomous Systems*, 110: 160-172, December 2018.

[17] **X. Xiao**, M. Wu, J. Li and H. Zhang. Design and Realization of an Automobile Running Platform with External Panorama Simulation. *Journal of Mechanical & Electrical Engineering*, Vol. 29, No. 5, May 2012.

Conference

[18] A. Datar, C. Pan, M. Nazeri, and **X. Xiao**. Toward Wheeled Mobility on Vertically Challenging Terrain: Platforms, Datasets, and Algorithms. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[19] D. Das, Y. Lu, E. Plaku, and **X. Xiao**. Motion Memory: Leveraging Past Experiences to Accelerate Future Motion Planning. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[20] M. Limbu, Z. Hu, X. Wang, D. Shishika, and **X. Xiao**. Team Coordination on Graphs with Reinforcement Learning. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[21] A. H. Raj, Z. Hu, H. Karnan, R. Chandra, A. Payandeh, L. Mao, P. Stone, J. Biswas, and **X. Xiao**. Targeted Learning: A Hybrid Approach to Social Robot Navigation. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[22] Z. Xu, A. Raj, **X. Xiao**, and P. Stone. Dexterous Legged Locomotion in Confined 3D Spaces with Reinforcement Learning. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[23] J. Liang, P. Gao, **X. Xiao**, A. J. Sathyamoorthy, M. Elnoor, M. C. Lin, and D. Manocha. MTG: Mapless Trajectory Generator with Traversability Coverage for Outdoor Navigation. *Accepted by IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[24] Z. Wang, C. Wang, **X. Xiao**, Y. Zhu, and P. Stone. Building Minimal and Reusable Causal State Abstractions for Reinforcement Learning. *Accepted by 2024 AAAI Conference on Artificial Intelligence (AAAI)*, 2024.

[25] A. Payandeh, D. Pluth, J. Hosier, **X. Xiao**, and V. Gurbani. How susceptible are LLMs to Logical Falla-

cies?. *Accepted by 2024 Joint International Conference on Computational Linguistics, Language Resources and Evaluation (LREC-COLING)*, 2024.

[26] S. Ravi, S. Satewar, G. Wang, **X. Xiao**, Garrett Warnell, Joydeep Biswas, and Peter Stone. Visually Adaptive Geometric Navigation. *Accepted by IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, 2023.

[27] D. Nguyen, M. Nazeri, A. Payandeh, A. Datar, and **X. Xiao**. Toward Human-Like Social Robot Navigation: A Large-Scale, Multi-Modal, Social Human Navigation Dataset. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 7442-7447, October 2023, **Best Paper Award Nomination of 2023 AAAI Fall Symposium Artificial Intelligence for Human-Robot Interaction (AI-HRI)**.

[28] M. Limbu, S. Oughourli, Z. Hu, X. Wang, **X. Xiao**, and D. Shishika. Team Coordination on Graphs with State-Dependent Edge Cost. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 679-684, October 2023, **Best Paper Award on Cognitive Robotics Finalist**.

[29] Z. Xu, B. Liu, **X. Xiao**, A. Nair, and P. Stone. Benchmarking Reinforcement Learning Techniques for Autonomous Navigation. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 9224-9230, May 2023.

[30] J. Park, **X. Xiao**, G. Warnell, H. Yedidsion, and P. Stone. Learning Perceptual Hallucination for Multi-Robot Navigation in Narrow Hallways. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 10033-10039, May 2023.

[31] **X. Xiao**, T. Zhang, K. Choromanski, E. Lee, A. Francis, J. Varley, S. Tu, S. Singh, P. Xu, F. Xia, S. M. Persson, D. Kalashnikov, L. Takayama, R. Frostig, J. Tan, C. Parada, and V.Sindhwani. Learning Model Predictive Controllers with Real-Time Attention for Real-World Navigation. *Conference on Robot Learning (CoRL)*, December 2022.

[32] A. Nair, F. Jiang, K. Hou, Z. Xu, S. Li, **X. Xiao**, and P. Stone. DynaBARN: Benchmarking Metric Ground Navigation in Dynamic Environments. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 347-352, November 2022.

[33] P. Atreya, H. Karnan, K. Sikand, **X. Xiao**, S. Rabiee, and J. Biswas. High-Speed Accurate Robot Control using Learned Forward Kinodynamics and Non-linear Least Squares Optimization. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 11789-11795, October 2022.

[34] H. Karnan, K. Sikand, P. Atreya, S. Rabiee, **X. Xiao**, G. Warnell, P. Stone, and J. Biswas. VI-IKD: High-Speed Accurate Off-Road Navigation using Learned Visual-Inertial Inverse Kinodynamics. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3294-3301, October 2022.

[35] Z. Wang, **X. Xiao**, Z. Xu, Y. Zhu, and P. Stone. Causal Dynamics Learning for Task-Independent State Abstraction. *International Conference on Machine Learning (ICML)*, July 2022.

[36] H. Karnan, G. Warnell, **X. Xiao**, and P. Stone. VOILA: Visual-Observation-Only Imitation Learning for Autonomous Navigation. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2497-2503, May 2022.

[37] K. Sikand, S. Rabiee, A. Uccello, **X. Xiao**, G. Warnell, and J. Biswas. Visual Representation Learning for Preference-Aware Path Planning. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 11303-11309, May 2022.

[38] Z. Xu, **X. Xiao**, G. Warnell, and P. Stone. Machine Learning Methods for Local Motion Planning: A Study of End-to-End vs. Parameter Learning. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 217-222, October 2021.

[39] Z. Wang, **X. Xiao**, A. Nettekoven, K. Umasankar, A. Singh, S. Bommakanti, U. Topcu, and P. Stone. From Agile Ground to Aerial Navigation: Learning from Learned Hallucination. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 148-153, September 2021.

[40] B. Liu, **X. Xiao**, and P. Stone. Team Orienteering Coverage Planning with Uncertain Reward. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 9728-9733, September 2021.

[41] **X. Xiao**, B. Liu, and P. Stone. Agile Robot Navigation through Hallucinated Learning and Sober Deployment. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 7316-7322, June 2021.

[42] Z. Wang, **X. Xiao**, B. Liu, G. Warnell, and P. Stone. APPLI: Adaptive Planner Parameter Learning from Interventions. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 6079-6085, June 2021.

[43] Z. Xu, G. Dhamankar, A. Nair, **X. Xiao**, G. Warnell, B. Liu, Z. Wang, and P. Stone. APPLR: Adaptive Planner Parameter Learning from Reinforcement. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 6086-6092, June 2021.

[44] D. Perille, A. Truong, **X. Xiao**, and P. Stone. Benchmarking Metric Ground Navigation. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 116-121, November 2020.

[45] J. Hart, R. Mirsky, **X. Xiao**, S. Tejeda, B. Mahajan, J. Goo, K. Baldauf, S. Owen, and P. Stone. Using Human-Inspired Signals to DisambiguateNavigational Intentions. *12th International Conference on Social Robotics (ICSR)*, pp. 320-331, November 2020.

[46] **X. Xiao**, J. Dufek, and R. Murphy. Benchmarking Tether-based UAV Motion Primitives. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 51-55, September 2019.

[47] **X. Xiao**, J. Dufek, and R. Murphy. Explicit Motion Risk Representation. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 278-283, September 2019.

[48] **X. Xiao**, J. Dufek, and R. Murphy. Autonomous Visual Assistance for Robot Operations Using a Tethered UAV. *12th Conference on Field and Service Robotics (FSR)*, pp. 15-29, August 2019.

[49] **X. Xiao**, J. Dufek, M. Suhail, and R. Murphy. Motion Planning for a UAV with a Straight or Kinked Tether. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 8486-8492, October 2018.

[50] K. Tiwari, **X. Xiao**, and N. Y. Chong. Estimating Achievable Range of Ground Robots Operating on Single Battery Discharge for Operational Efficacy Amelioration. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3991-3998, October 2018.

[51] **X. Xiao**, Y. Fan, J. Dufek, and R. Murphy. Indoor UAV Localization Using a Tether. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 1-6, September 2018, **Best Paper Finalist**.

[52] **X. Xiao** and S. Zarar. A Wearable System For Articulated Human Pose Tracking Under Uncertainty of Sensor Placement. *IEEE International Conference on Biomedical Robotics and Biomechatronics (Biorob)*, pp. 1144-1150, August 2018.

[53] **X. Xiao** and S. Zarar. Machine Learning for Placement-insensitive Inertial Motion Capture. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 6716-6721, May 2018.

[54] **X. Xiao** and S. Zarar. Packet Loss Concealment with Recurrent Neural Networks for Wireless Inertial Pose Tracking. *IEEE International Conference on Wearable and Implantable Body Sensor Networks (BSN)*, pp. 25-29, March 2018.

[55] **X. Xiao**, J. Dufek, and R. Murphy. Visual Servoing for Teleoperation using a Tethered UAV. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 147-152, October 2017.

[56] J. Dufek, **X. Xiao**, and R. Murphy. Visual Pose Stabilization of Tethered Small Unmanned Aerial System to Assist Drowning Victim Recovery. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 116-122, October 2017.

[57] **X. Xiao**, J. Dufek, T. Woodbury, and R. Murphy. UAV Assisted USV Visual Navigation for Marine Mass Casualty Incident Response. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 6105-6110, September 2017.

[58] R. Murphy, J. Dufek, T. Sarmiento, G. Wilde, **X. Xiao**, R. Smith, S. Allred, A. Wright, J. Braun, L. Mullen, J. Adams, and J. Gingrich. Two Case Studies and Gaps Analysis of Flood Assessment for Emergency Management with Small Unmanned Aerial Systems. *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 54-61, October 2016.

[59] **X. Xiao**, E. Cappo, W. Zhen, J. Dai, K. Sun, C. Gong, and H. Choset. Locomotive Reduction for Snake Robots. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3735-3740, May 2015.

Workshop / Extended Abstract

[60] Z. Xu, A. Nair, **X. Xiao**, and P. Stone. Learning Real-World Autonomous Navigation by Self-Supervised Environment Synthesis. *First Workshop on Photorealistic Image and Environment Synthesis for Robotics (PIES-Rob), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, October 2023.

[61] S. Pirk, E. Lee, **X. Xiao**, L. Takayama, A. Francis, and A. Toshev. A Protocol for Validating Social Navigation Policies. Social Robot Navigation: Advances and Evaluation. *Workshop "Social Robot Navigation: Advances and Evaluation", IEEE International Conference on Robotics and Automation (ICRA)*, May 2022.

[62] Z. Wang, **X. Xiao**, and P. Stone. Task-Independent Causal State Abstraction. *4th Robot Learning Workshop: Self-Supervised and Lifelong Learning, Conference on Neural Information Processing Systems (NeurIPS)*, December 2021.

[63] **X. Xiao**, B. Liu, G. Warnell, and P. Stone. Extended Abstract: Safe Learning from Hallucination for Navigation in the Wild. *AAAI Spring Symposium Series 2021 Machine Learning for Mobile Robot Navigation in the Wild*, March 2021.

[64] **X. Xiao**, B. Liu, G. Warnell, Z. Wang, Z. Xu, G. Dhamankar, A. Nair, and P. Stone. Extended Abstract: Adaptive Planner Parameter Learning for Mobile Robot Navigation in the Wild. *AAAI Spring Symposium Series 2021 Machine Learning for Mobile Robot Navigation in the Wild*, March 2021.

[65] B. Liu, **X. Xiao**, and P. Stone. Extended Abstract: Lifelong Learning for Resource-Constrained Robot Navigation in the Wild. *AAAI Spring Symposium Series 2021 Machine Learning for Mobile Robot Navigation in the Wild*, March 2021.

[66] **X. Xiao**, B. Liu, and P. Stone. Motion Planners Learned from Geometric Hallucination. *Workshop "Bring Geometric Methods to Robot Learning, Optimization and Control", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, October 2020.

[67] **X. Xiao**, H. Astley, J. Dai, W. Zhen, C. Gong, D. Goldman, and H. Choset. How Compound-Wave Control Alleviates Hyper-Redundant Control Complexity. *Workshop "Robotics-inspired Biology", IEEE International Conference on Robotics and Automation (ICRA)*, May 2015.

Preprint

[68] A. Datar, C. Pan, M. Nazeri, A. Pokhrel, and **X. Xiao**. Terrain-Attentive Learning for Efficient 6-DoF Kinodynamic Modeling on Vertically Challenging Terrain. *under review*, 2024.

[69] S. A. Ghani, Z. Wang, P. Stone, and **X. Xiao**. Dyna-LfLH: Learning Agile Navigation in Dynamic Environments from Learned Hallucination. *under review*, 2024.

[70] Y. Lu, D. Das, E. Plaku, and **X. Xiao**. Multi-Goal Motion Memory. *under review*, 2024.

[71] M. Nazeri, J. Wang, A. Payandeh, and **X. Xiao**. VANP: Learning Where to See for Navigation with Self-Supervised Vision-Action Pre-Training. *under review*, 2024.

[72] M. Limbu, Y. Zhou, G. Stein, X. Wang, D. Shishika, and **X. Xiao**. Team Coordination on Graphs: Problem, Analysis, and Algorithms. *under review*, 2024.

[73] B. Panigrahi, A. H. Raj, M. Nazeri, and **X. Xiao**. A Study on Learning Social Robot Navigation with Multimodal Perception. *under review*, 2024.

[74] J. Liang, A. Payandeh, D. Song, **X. Xiao**, and D. Manocha. DTG: Diffusion-based Trajectory Generation for Mapless Global Navigation. *under review*, 2024.

[75] D. Song, J. Liang, A. Payandeh, **X. Xiao**, and D. Manocha. Socially Aware Robot Navigation through Scoring Using Vision-Language Models. *under review*, 2024.

[76] A. J. Mahmud, A. H. Raj, D. Nguyen, **X. Xiao**, and X. Wang. Human-Robot Co-Transportation with Human Uncertainty-Aware MPC and Pose Optimization. *under review*, 2024.

[77] Z. Hu, D. Shishika, **X. Xiao**, and X. Wang. Bi-CL: A Reinforcement Learning Framework for Robots Coordination Through Bi-level Optimization. *under review*, 2024.

[78] J. Berneburg, X. Wang, **X. Xiao**, and D. Shishika. Multi-Robot Coordination Induced in Hazardous Environments through an Adversarial Graph-Traversal Game. *under review*, 2024.

[79] Z. Hu, M. Limbu, D. Shishika, **X. Xiao**, and X. Wang. Learning Coordinated Maneuver in Adversarial Environments. *under review*, 2024.

[80] A. Pokhrel, M. Nazeri, A. Datar, and **X. Xiao**. CAHSOR: Competence-Aware High-Speed Off-Road Ground Navigation in SE(3). *under review*, 2024.

[81] A. Datar, C. Pan, and **X. Xiao**. Learning to Model and Plan for Wheeled Mobility on Vertically Challenging Terrain. *under review*, 2023.

[82] A. Francis, C. Perez-D'Arpino, C. Li, F. Xia, A. Alahi, R. Alami, A. Bera, A. Biswas, J. Biswas, R. Chandra, H. L. Chiang, M. Everett, S. Ha, J. Hart, J. P. How, H. Karnan, W. E. Lee, L. J. Manso, R. Mirksy, S. Pirk, P. T. Singamaneni, P. Stone, A. V. Taylor, P. Trautman, T. Tsoi, M. Vazquez, **X. Xiao**, P. Xu, N. Yokoyama, A. Toshev, and R. Martin-Martin. Principles and Guidelines for Evaluating Social Robot Navigation Algorithms. *under review*, 2023.

Technical Report

[83] A. Nair, Z. Xu, G. Dhamankar, and **X. Xiao**. Using Parallelized Containers for Reinforcement Learning on Large Computer Clusters. *Technical Report 2021*, March 2021.

[84] **X. Xiao** and R. Whittaker. Energy Utilization and Energetic Estimation of Achievable Range for Wheeled

Mobile Robots Operating on a Single Battery Discharge. *tech. report CMU-RI-TR-14-15, Robotics Institute, Carnegie Mellon University*, June 2015.

[85] R. Whittaker, U. Wong, H. Jones, S. Huber, C. Cunningham, W. Whittaker, S. Mcguire, **X. Xiao**, R. Shanor, A. Solorzano, T. Carlone, W. Tabib, C. Greve, L. Schneider, and N. Otten. Exploration of Planetary Skylights and Tunnels. *NASA Technical Report*, September 2014.

[86] **X. Xiao** and R. Whittaker. Energy considerations for wheeled mobile robots operating on a single battery discharge. *tech. report CMU-RI-TR-14-16, Robotics Institute, Carnegie Mellon University*, August 2014.

Dissertation

[87] **X. Xiao**. Risk-aware Path and Motion Planning for a Tethered Aerial Visual Assistant in Unstructured or Confined Environments. *Ph.D. Thesis, Texas A&M University*, December 2019.

Patent

[88] **X. Xiao**. A Multifunctional Automobile Running Simulation System. *Chinese Patent*, Application Number: 201120456535.1.

[89] **X. Xiao**. Bus Awning. *Chinese Patent*, Publication Number: CN101607541 A.

[90] **X. Xiao**. An Automobile Braking System with instant Braking Condition Indication. *Chinese Patent*, Publication Number: CN202345519 U.

[91] **X. Xiao**. Cold Water Collector for Water Heater. *Chinese Patent*, Publication Number: CN201177356 Y.

[92] **X. Xiao**. Food Bag with a Storage Pocket. *Chinese Patent*, Publication Number: CN201086890 Y.

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