Mengxue Hou

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Research Interests

Robotics, Autonomy, AI, Machine Learning, Control Theory, Human Robot Teaming

Appointments

University of Notre Dame, South Bend, IN, USA   Jul. 2023 - present

Tenure-track Assistant Professor, Electrical Engineering

Purdue University, West Lafayette, IN   Aug. 2022 - Jul. 2023

Lillian Gilbreth Postdoctoral Fellow, College of Engineering
Advisors: Prof. Shaosuai Mou, Prof. Shreyas Sundaram

Education

Georgia Institute of Technology, Atlanta, GA, USA   Aug. 2016 - Jul. 2022

Ph.D., Electrical and Computer Engineering

Minor, Mathematics

Thesis: Mori-Zwanzig formalism based reduced-order modeling for decision-making in marine autonomy

Committee: Prof. Fumin Zhang(Advisor), Prof. Catherine R. Edwards, Prof. Haomin Zhou, Prof. Ye Zhao, Prof. Enlu Zhou, Prof. Seth Hutchinson

Shanghai Jiao Tong University, Shanghai, China   Sept 2012 - June 2016

B.S., Electrical Engineering

Honors and Awards

1. Lillian Gilbreth postdoctoral fellowship, Purdue University, August 2022.
2. Best student paper/poster award, MTS/IEEE OCEANS' 19, Marseille, France, June 2019 (flagship conference in ocean engineering).
3. Chiang Chen overseas graduate fellowship from Chiang Chen Industrial Charity Foundation, Hong Kong, China, 2015. (1 of 10 awardees in China)

Publications

Journal publications

J8 **Mengxue Hou**, Enlu Zhou and Fumin Zhang, "Mori-Zwanzig Approach for Belief Abstraction with Application to Belief Space Planning," in *Autonomous Robots*, under review. preprint.

J7 Xueming Zhang, **Mengxue Hou** and Zhongsheng Hou, "Data-Driven High-Order Point-to-Point ILC With Higher Computational Efficiency," in *IEEE Transactions on Automation Science and Engineering*, pp. 1-16. DOI: 10.1109/TASE.2023.3321038

J6 **Mengxue Hou**, Qiuyang Tao and Fumin Zhang, "Human Pointing Motion during Interaction with an Autonomous Blimp," in *Scientific Reports*, 12, 11402, 2022. DOI: 10.1038/s41598-022-15016-w

J5 Yingke Li, **Mengxue Hou**, Enlu Zhou and Fumin Zhang, "Dynamic Event-triggered Integrated Task and Motion Planning for Process-aware Source Seeking," in *Autonomous Robots*, under review.

J4 Haoyan Zhai, **Mengxue Hou**, Fumin Zhang and Haomin Zhou, "Method of Evolving Junction on Optimal Path Planning in Flow Fields," in *Autonomous Robots*, 1-19, 2022. DOI: 10.1007/s10514-022-10058-5

J3 Meriam Ouerghi, **Mengxue Hou** and Fumin Zhang, "Laplacian Regularized Motion Tomography for Underwater Vehicle Flow Mapping with Sporadic Localization Measurements", in *Autonomous Robots*, under review. preprint.

J2 **Mengxue Hou**, Sungjin Cho, Haomin Zhou, Catherine R. Edwards and Fumin Zhang,"Bounded Cost Path Planning for Underwater Vehicles Assisted by a Time-invariant Partitioned Flow Field Model," in *Frontiers in Robotics and AI*, 8, 2021. DOI: 10.3389/frobt.2021.575267

J1 Meriam Ouerghi, Sean Maxon, **Mengxue Hou** and Fumin Zhang, "Improved Trajectory Tracing of Underwater Vehicles for Flow Field Mapping," in *International Journal of Intelligent Robotics and Applications*, 1-17, Jul. 2021, pp. 1-17. DOI: 10.1007/s41315-021-00189-w

Conference proceedings

C18 Ruochu Yang, **Mengxue Hou**, Junkai Wang, and Fumin Zhang, "OceanChat: Piloting Autonomous Underwater Vehicles in Natural Language", in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, under review, preprint

C17 Ruochu Yang, **Mengxue Hou**, Chad Lembke, Catherine R. Edwards and Fumin Zhang, "Real-time Autonomous Glider Navigation Software", in *Proc. of MTS/IEEE OCEANS' 23*, Limerick, UK, Jun. 2023, in press, preprint

C16 Shaojun Ma, **Mengxue Hou**, Xiaojing Ye, and Haomin Zhou, "High-dimensional Optimal Density Control with Wasserstein Metric Matching", in *2023 Conference on Decision and Control (CDC)*, accepted preprint

C15 **Mengxue Hou**, Yingke Li, Fumin Zhang, Shreyas Sundaram and Shaoshuai Mou, "An Interleaved Algorithm for Integration of Robotic Task and Motion Planning", in *2023 American Control Conference (ACC)*, San Diego, CA, USA, Jun. 2023, pp. 539-544, DOI: 10.23919/ACC55779.2023.10156651.

C14 Yingke Li, **Mengxue Hou**, Enlu Zhou and Fumin Zhang, "Dynamic Event-triggered Integrated Task and Motion Planning for Process-aware Source Seeking," in *2023 American Control Conference (ACC)*, San Diego, CA, USA, Jun. 2023, pp. 527-532, DOI: 10.23919/ACC55779.2023.10156291.

C13 Ruochu Yang, **Mengxue Hou**, Chad Lembke, Catherine R. Edwards and Fumin Zhang, "Anomaly Detection of Underwater Gliders Verified by Deployment Data", in *2023 IEEE Underwater Technology (UT)*, Tokyo, Japan, Mar. 2023, pp. 1-10, DOI: 10.1109/UT49729.2023.10103445

C12 **Mengxue Hou**, Tony X. Lin, Haomin Zhou, Wei Zhang, Catherine R. Edwards and Fumin Zhang, "Belief Space Partitioning for Symbolic Motion Planning, " in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, Jun. 2021, pp. 8245-8251. DOI: 10.1109/ICRA48506.2021.9561121

C11 Sravya Kondrakunta, Venkatsampath R. Gogineni, Michael Cox, Demetris Coleman, Xiabao Tan, Tony Lin, **Mengxue Hou**, Fumin Zhang, Frank McQuarrie, and Catherine R. Edwards, "The Rational Selection of Goal Operations and the Integration of Search Strategies with Goal-driven Marine Autonomy," in *Proceedings of the Ninth Annual Conference on Advances in Cognitive Systems*, 2021. in press.

C10 Qiuyang Tao, **Mengxue Hou** and Fumin Zhang, "Modeling and Identification of Coupled Translational and Rotational Motion of Underactuated Indoor Miniature Autonomous Blimps," in *2020 16th International Conference on Control, Automation, Robotics and Vision (ICARCV)*, Dec. 2020, pp. 339-344. DOI: 10.1109/ICARCV50220.2020.9305371

C9 Tony X. Lin, **Mengxue Hou**, Catherine R. Edwards, Michael Cox and Fumin Zhang, "Bounded Cost HTN Planning for Marine Autonomy," in *Global Oceans 2020: Singapore – U.S. Gulf Coast*, Oct. 2020, pp. 1-6. DOI: 10.1109/IEEECONF38699.2020.9389201

C8 Ziqiao Zhang, **Mengxue Hou**, Fumin Zhang, and Catherine R. Edwards, "An LSTM based Kalman Filter for Spatio-temporal Ocean Currents Assimilation," in

Proc. of ACM International Conference on Underwater Networks and Systems, Atlanta, US, Oct. 2019, pp. 1-7. DOI: 10.1145/3366486.3366522

C7 **Mengxue Hou**, Haoyan Zhai, Haomin Zhou and Fumin Zhang, "Partitioning Ocean Flow Field for Underwater Vehicle Path Planning," in *Proc. of MTS/IEEE OCEANS' 19*, Marseille, France, Jun. 2019, pp. 1-8.
DOI: 10.1109/OCEANSE.2019.8867327 **(best student paper/poster award)**

C6 **Mengxue Hou**, Qiuyang Tao, Paul Varnell and Fumin Zhang, "Modeling Pointing Tasks in Human-Blimp Interactions," in *Proc. of the 3rd IEEE Conference on Control Technology and Applications (CCTA)*, Hong Kong, China, Aug. 2019, pp. 73-78. DOI: 10.1109/CCTA.2019.8920528

C5 **Mengxue Hou**, Shijie Liu, Fumin Zhang and Catherine R. Edwards, "Path Tracking Error Analysis for Underwater Glider Navigation in a Spatially and Temporally Varying Flow Field", in *Proc. of MTS/IEEE OCEANS' 18*, Charleston, US, Oct. 2018, pp. 1-6. DOI: 10.1109/OCEANS.2018.8604585

C4 **Mengxue Hou**, Shijie Liu, Fumin Zhang and Catherine R. Edwards, "A Combined Path Planning and Path Following Method for Underwater Glider Navigation in a Strong, Dynamic Flow Field", in *Proc. of MTS/IEEE OCEANS' 18*, Kobe, Japan, May. 2018, pp. 1-8. DOI: 10.1109/OCEANSKOBE.2018.8559348

C3 Qiuyang Tao, Jaeseok Cha, **Mengxue Hou** and Fumin Zhang, "Parameter Identification of Blimp Dynamics through Swinging Motion", in *Proc. of International Conference on Control, Automation, Robotics and Vision (ICRAV)*, Singapore, Nov. 2018, pp. 1186-1191. DOI: 10.1109/ICARCV.2018.8581376

C2 **Mengxue Hou** and Shangtai Jin, "Simulation Comparison among Three Data-Driven Control Methods for the Planar Manipulator", in *Proc. of 10th Asian Control Conference (ASCC)*, Sabah, Malaysia, May. 2015, pp. 1-6.
DOI: 10.1109/ASCC.2015.7244440

C1 Shangtai Jin and **Mengxue Hou**, "An Improved Full-Form-Dynamic-Linearization based MFAC for a Class of Nonlinear Systems", in *Proc. of 34th Chinese Control Conference(CCC)*, Hangzhou, China, Jul. 2015, pp. 3045-3050.
DOI: 10.1109/ChiCC.2015.7260108

TEACHING EXPERIENCE	**Course Instructor**, EE 67074 AI Planning: from Graph Search to Reinforcement Learning, Electrical Engineering, University of Notre Dame	Fall 2023
	Course Instructor, Vertically Integrated Projects (VIP), Electrical and Computer Engineering, Georgia Tech	Fall 2018 - Spring 2019
	Course Instructor, Summer Undergraduate Research in Engineering/Sciences (S.U.R.E.), Electrical and Computer Engineering, Georgia Tech	Summer 2019
	Teaching Assistant, Introduction to Signal Processing, Electrical and Computer Engineering, Georgia Tech	Fall 2016 - Summer 2017

SERVICE

- Reviewer for IEEE Transactions on Automatic Control, IEEE Transaction on Cybernetics, IEEE Transaction on Robotics, IEEE Journal of Oceanic Engineering, IEEE Transactions on Control of Network Systems, Autonomous Robots, and IEEE Robotics and Automation Letters.

- Reviewer for International Conference on Underwater Networks & systems (WUWNet), MTS/IEEE OCEANS, International Conference on Robotics and Automation (ICRA), Conference on Control Technology and Applications (CCTA), American Control Conference (ACC) and Conference on Decision and Control (CDC).