Mengxue Hou

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Research Interests	Marine robotics, autonomy, human robot interaction

Education

Georgia Institute of Technology, Atlanta, GA, USA

Ph.D., Electrical and Computer Engineering	Aug. 2016 - Jul. 2022
Minor, Mathematics	

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

Advisor: Prof. Fumin Zhang

Shanghai Jiao Tong University, Shanghai, China

B.S., Electrical Engineering	Sept 2012 - June 2016

Research Experience

Purdue University, West Lafayette, IN

Lillian Gilbreth Postdoctoral Fellow, College of Engineering   Aug. 2022 - present
Advisors: Prof. Shaosuai Mou, Prof. Shreyas Sundaram

Georgia Institute of Technology, Atlanta, GA

Research Assistant, Electrical and Computer Engineering,   Aug. 2016 - Jul. 2022
Advisor: Prof. Fumin Zhang

Honors and Awards

1. Best student paper/poster award, MTS/IEEE OCEANS' 19, Marseille, France, June. 2019 (flagship conference in ocean engineering).
2. Chiang Chen overseas graduate fellowship from Chiang Chen Industrial Charity Foundation, Hong Kong, China, 2015. (1 of 10 awardees in China)
3. Meritorious Winner, Mathematical Contest in Modeling, the Consortium for Mathematics and its Application, US, 2015.

Publications

Journal publications

1. **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.
2. 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
3. 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.
4. **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

5 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

6 **Mengxue Hou**, Enlu Zhou and Fumin Zhang, "Mori-Zwanzig Formalism based Belief Abstraction for Uncertainty-aware Decision-making," in preparation for submission.

Conference proceedings

1 **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)*, under review.

2 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)*, under review

3 **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

4 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.

5 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.

5 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.

6 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

7 **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)**

8 **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

9 **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

10 **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

11 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

12 **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

13 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**, Vertically Integrated Projects (VIP), Fall 2018 - Spring 2019 Electrical and Computer Engineering, Georgia Tech

Course Instructor, Summer Undergraduate Research in   Summer 2019
Engineering/Sciences (S.U.R.E.),
Electrical and Computer Engineering, Georgia Tech

Teaching Assistant, Introduction to Signal Processing,   Fall 2016 - Summer 2017
Electrical and Computer Engineering, Georgia Tech

SERVICE

- Student organizer of the 14th International Conference on Underwater Networks & systems (WUWNet 2019).

- Reviewer for IEEE Transactions on Automatic Control, 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, Conference on Control Technology and Applications (CCTA), and Conference on Decision and Control (CDC).