

Masha Itkina

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LinkedIn

Google Scholar

Academic History

- 2016–2022 Stanford University, Ph.D., Aeronautics and Astronautics
GPA: 4.0
- 2011–2016 University of Toronto, B.A.Sc., Engineering Science, Aerospace
Robotics and Mechatronics Minor
High Honors
GPA: 3.9

Research Projects

- 2020–pres. Self-Aware Neural Networks for Robust Trajectory Prediction,
Prof. Mykel J. Kochenderfer, Stanford University
Encoding epistemic uncertainty estimation into neural network-based trajectory prediction architectures in the context of autonomous driving.
- 2019–2020 Sparse Latent Spaces for Conditional Variational Autoencoders (CVAEs),
Prof. Mykel J. Kochenderfer and Prof. Marco Pavone, Stanford University
Using evidential theory to sparsify the discrete latent space within a CVAE network, while maintaining distributional multimodality and network performance.
- 2018–pres. Multi-Agent Variational Occlusion Inference Using People as Sensors,
Prof. Mykel J. Kochenderfer, Stanford University
Inferring occluded obstacles by treating observed human driver behaviors on the road as additional sensor input into the perception system.
- 2017–pres. Occupancy Grid Prediction in Cluttered, Urban Environments,
Prof. Mykel J. Kochenderfer, Stanford University
Predicting future occupancy state in dynamic urban environments by fusing concepts from computer vision (e.g., video frame prediction) with traditional robotics techniques (e.g., occupancy grid maps, particle filtering, and evidential theory).

Teaching Experience

- 2022 Head Teaching Assistant, Machine Learning, Stanford University
- 2021 Student Mentor for AI4ALL
- 2020–2021 Head Teaching Assistant, Engineering Design Optimization, Stanford University

2015 Teaching Assistant, Engineering Mathematics and Computation, University of Toronto
2012–2014 Calculus Tutor, University of Toronto

Employment Record

2022–pres. Research Scientist, Machine Learning Team, Toyota Research Institute (TRI)
2017–2022 Research Assistant, Supervisor: Prof. Mykel J. Kochenderfer,
Stanford Intelligent Systems Laboratory (SISL), Stanford University
2019 Applied Research Intern, Waymo
2017 Research and Development Intern, Autonomous Driving Team,
Renault Innovation Silicon Valley
2014–2015 Design Research Intern, Digital Channels, TD Canada Trust
2014 Summer Research Student, Supervisors: Dr. Leonard Tse and Dean Cristina Amon,
ATOMS Laboratory, University of Toronto
2013 Summer Research Student, Supervisor: Prof. Ofer Levi,
Biophotonics Laboratory, University of Toronto

Publications

MANUSCRIPTS UNDER REVIEW AND PREPRINTS

1. B. Lange, M. Itkina*, and M. J. Kochenderfer, “LOPR: latent occupancy prediction using generative models,” *ArXiv*, 2022.
2. Y.-J. Mun, M. Itkina*, S. Liu, and K. Driggs-Campbell, “Occlusion-aware crowd navigation using people as sensors,” *ArXiv*, 2022.

CONFERENCE PAPERS

1. H. Delecki, M. Itkina*, B. Lange, R. Senanayake, and M. J. Kochenderfer, “How do we fail? Stress testing perception in autonomous vehicles,” in *International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2022.
2. M. Itkina* and M. J. Kochenderfer, “Interpretable self-aware neural networks for robust trajectory prediction,” in *Conference on Robot Learning (CoRL)*, PMLR, 2022.
3. M. Itkina*, Y.-J. Mun, K. Driggs-Campbell, and M. J. Kochenderfer, “Multi-agent variational occlusion inference using people as sensors,” in *International Conference on Robotics and Automation (ICRA)*, IEEE, 2022.
4. P. Chen, M. Itkina*, R. Senanayake, and M. J. Kochenderfer, “Evidential softmax for sparse multimodal distributions in deep generative models,” in *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.
5. B. Lange, M. Itkina*, and M. J. Kochenderfer, “Attention augmented ConvLSTM for environment prediction,” in *International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2021.
6. J. Nitsch, M. Itkina*, R. Senanayake, J. Nieto, M. Schmidt, R. Siegwart, M. J. Kochenderfer, and C. Cadena, “Out of distribution detection for automotive perception,” in *International Conference on Intelligent Transportation Systems (ITSC)*, IEEE, 2021.

7. M. Toyungyernsub, M. Itkina*, R. Senanayake, and M. J. Kochenderfer, “Double-prong occupancy ConvLSTM: Spatiotemporal prediction in urban environments,” in *International Conference on Robotics and Automation (ICRA)*, IEEE, 2021.
8. M. Itkina*, B. Ivanovic, R. Senanayake, M. J. Kochenderfer, and M. Pavone, “Evidential sparsification of multimodal latent spaces in conditional variational autoencoders,” in *Advances in Neural Information Processing Systems (NeurIPS)*, 2020.
9. M. Itkina*, K. Driggs-Campbell, and M. J. Kochenderfer, “Dynamic environment prediction in urban scenes using recurrent representation learning,” in *International Conference on Intelligent Transportation Systems (ITSC)*, IEEE, 2019.

THESES

1. M. Itkina*, “Uncertainty-aware spatiotemporal perception for autonomous vehicles,” Supervised by Prof. Mykel J. Kochenderfer, PhD Thesis, Stanford University, 2022.
2. M. Itkina*, “Towards multi-agent learning,” Supervised by Prof. Angela Schoellig, B.A.Sc. Thesis, University of Toronto, 2016.

JOURNAL ARTICLES

1. S. A. Crawford, M. Itkina*, M. G. Doyle, L. W. Tse, C. H. Amon, and G. Roche-Nagle, “Structural implications of fenestrated stent graft misalignment,” *Surgeon*, vol. 16, no. 2, pp. 89–93, 2016.

WORKSHOPS, CONSORTIA, AND SYMPOSIA

1. P. Chen, M. Itkina*, R. Senanayake, and M. J. Kochenderfer, “Evidential softmax: A sparse multimodal alternative to softmax,” in *Bay Area Machine Learning Symposium (BayLearn)*, 2021.
2. M. Itkina* and M. J. Kochenderfer, “Perception beyond sensors under uncertainty,” in *26th AAAI/SIGAI Doctoral Consortium*, 2021.
3. M. Itkina*, Y.-J. Mun, K. Driggs-Campbell, and M. J. Kochenderfer, “Multi-agent variational occlusion inference using people as sensors,” in *Bay Area Robotics Symposium (BARS)*, 2021.
4. Y.-J. Mun, M. Itkina*, and K. Driggs-Campbell, “Occlusion-aware crowd navigation using people as sensors,” in *16th Women in Machine Learning Workshop (WiML) co-located with the Conference on Neural Information Processing Systems (NeurIPS)*, 2021.
5. M. Itkina*, Y.-J. Mun, K. Driggs-Campbell, and M. J. Kochenderfer, “Variational occlusion inference using people as sensors,” in *15th Women in Machine Learning Workshop (WiML) co-located with the Conference on Neural Information Processing Systems (NeurIPS)*, 2020.
6. Y.-J. Mun, M. Itkina*, and K. Driggs-Campbell, “Safe crowd navigation in the presence of occlusions,” in *15th Women in Machine Learning Workshop (WiML) co-located with the Conference on Neural Information Processing Systems (NeurIPS)*, 2020.

7. M. Toyungyernsub, M. Itkina*, R. Senanayake, and M. J. Kochenderfer, "Double-prong occupancy ConvLSTM: Spatiotemporal prediction in urban environments," in *15th Women in Machine Learning Workshop (WiML) co-located with the Conference on Neural Information Processing Systems (NeurIPS)*, 2020.
8. M. Itkina*, K. Driggs-Campbell, and M. J. Kochenderfer, "A multi-agent approach to evidential occlusion estimation using people as sensors," in *Bay Area Robotics Symposium (BARS)*, 2019.
9. M. Itkina*, B. Ivanovic, R. Senanayake, M. J. Kochenderfer, and M. Pavone, "Evidential disambiguation of latent multimodality in conditional variational autoencoders," in *Workshop on Bayesian Deep Learning at the Conference on Neural Information Processing Systems (NeurIPS)*, 2019.
10. M. Itkina*, K. Driggs-Campbell, and M. J. Kochenderfer, "Occupancy grid prediction in cluttered, dynamic environments," in *13th Women in Machine Learning Workshop (WiML) co-located with the Conference on Neural Information Processing Systems (NeurIPS)*, 2018.
11. M. Itkina*, K. Driggs-Campbell, and M. J. Kochenderfer, "Unsupervised occupancy grid prediction in occluded urban environments," in *Bay Area Robotics Symposium (BARS)*, 2017.

Fellowships and Awards

2019–2021	Enhancing Diversity in Graduate Education (EDGE) Fellowship
2016–2018	Five-Quarter Graduate Engineering Fellowship
2014–2015	Trenwith and Galipeau Aerospace Science Award
2011–2015	Queen Elizabeth II Aiming for the Top Scholarship
2013, 2014	Natural Sciences and Engineering Research Council of Canada's Undergraduate Research Award (NSERC USRA)
2013–2014	J. Frank Guenther Scholarship
2011	University of Toronto Scholar Award
2011	Faculty of Applied Science and Engineering Admission Scholarship

Volunteer and Outreach Experience

2021	Student Panel Chair for the department faculty search, Stanford University
2021	Co-Organizer for the NeurIPS 4th Robot Learning Workshop: Self-Supervised and Lifelong Learning
2020	Co-Organizer for the NeurIPS 3rd Robot Learning Workshop: Grounding Machine Learning Development in the Real World
2020–2021	Alumnus Mentor, University of Toronto
2019–2021	Judge, Stanford Research Conference, Stanford Undergraduate Research Association
2019–2020	Technical Development Co-Chair, Women of Aeronautics and Astronautics (WoAA), American Institute of Aeronautics and Astronautics (AIAA)
2019	Student Panelist for the department faculty search, Stanford University
2018–2019	Co-President, Women in Aeronautics and Astronautics (WIAA), Stanford University
2018–pres.	Mentor, Women in Aeronautics and Astronautics (WIAA), Stanford University

2017–pres. Member, Aero/Astro Student Advisory Committee (SAC), Stanford University
2017–pres. Member, AI Women, Stanford University
2011–2016 Co-President, Club for Undergraduate Biomedical Engineers (CUBE), University of Toronto
2012–2016 Engineering Science Ambassador, University of Toronto
2013–2015 Science Director, Robotics for Space Exploration (RSX), University of Toronto
2013–2014 Member, Engineers Without Borders (EWB), University of Toronto
2012–2013 Organizer, University of Toronto High School Design Competition (UTHSDC),
University of Toronto

Mentorship and Collaboration

Harrison Delecki, Mentee, Master's student at Stanford University
Phil Chen, Mentee, Undergraduate/Master's student at Stanford University
Maneekwan Toyungyernsub, Mentee, Ph.D. student at Stanford University
Bernard Lange, Mentee, Master's/Ph.D. student Stanford University
Ye-Ji Mun, Mentee, Ph.D. student at University of Illinois at Urbana-Champaign
Boris Ivanovic, Collaborator, Ph.D. student at Stanford University
Julia Nitsch, Collaborator, Ph.D. student at ETH Zurich

Successful Funding Proposals

2021 Self-Aware Neural Networks for Robust Prediction, Waymo
2020 Multimodal Occlusion Prediction and Control for Autonomous Vehicles,
Ford-Stanford Alliance
2018 Perception Beyond Sensors, Ford-Stanford Alliance

Invited Talks

2022 Uncertainty-Aware Learning Algorithms for Human-Robot Systems,
Control and Learning Systems Seminar, University of British Columbia (UBC)
2021 Evidential Sparsification of Multimodal Latent Spaces in Generative Models,
Unbabel AI Seminar, University of Lisbon
2019 Perception Beyond Sensors, Ford-Stanford Alliance Seminar
2018 Self-Supervised Deep Perception to Inform Planning, Ford-Stanford Alliance Seminar

Invited Reviewer

International Conference on Machine Learning (ICML)
International Conference on Learning Representations (ICLR)
Advances in Neural Information Processing Systems (NeurIPS)
IEEE International Conference on Robotics and Automation (ICRA)
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
IEEE Robotics and Automation Letters (RA-L)
IEEE International Conference on Intelligent Transportation Systems (ITSC)
IEEE Intelligent Vehicles Symposium (IV)
Women in Machine Learning (WiML) Workshop

Technical Skills

Programming languages: Python, C++, MATLAB, Julia

Frameworks: Robot Operating System (ROS), TensorFlow, PyTorch

Operating Systems: Linux, Windows