

Masha Itkina

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LinkedIn

Google Scholar

Academic History

- 2016–pres. 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

- 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

- 2017–pres. 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. M. Itkina*, Y.-J. Mun, K. Driggs-Campbell, and M. J. Kochenderfer, “Multi-agent variational occlusion inference using people as sensors,” *ArXiv*, 2021.

CONFERENCE PAPERS

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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*, “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

- 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 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