# Xiao Ma

Dyson Robot Learning Lab
e-mail: xiao.ma@dyson.com Personal Website Google Scholar

## Education

**National University of Singapore (NUS)**, Singapore — Aug. 2017 - Dec. 2021
Doctor of Philosophy in Computer Science
Advisor: Prof. David Hsu

**Shanghai Jiao Tong University (SJTU)**, Shanghai — Sept. 2013 - July 2017
Bachelor of Engineering in Computer Science and Technology
Advisors: Prof. Xiaofeng Gao and Prof. Fan Wu

## Work Experiences

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| Lead Researcher at Dyson Robot Learning Lab | Feb. 2023 - present |
| Research Scientist at SEA AI Lab | Jul. 2021 - Jan. 2023 |
| Research Intern at SEA AI Lab (hosted by Dr. Min Lin) | Apr. 2021 - Jun. 2021 |
| Research Intern at SenseTime Research (hosted by Dr. Shuai Yi) | Oct. 2019 - Sept. 2020 |
| Software Engineer Intern at Intel Asia Pacific R & D Center | May 2016 - Dec. 2016 |

## Research

My research focuses onreinforcement learning, representation learning, graph neural networks and their applications to vision-based decision-making systems, such as robots and games. I aim to build robust models of the world for decision making in unstructured environments.

My work about learning composable robot systems with Differentiable Algorithm Networks (DAN) was selected as the **best system paper finalist** and **best student paper finalist** at the *Robotics: Science and Systems* (RSS), 2019.

## Preprints

Yang Yue, Bingyi Kang, **Xiao Ma**, Zhongwen Xu, Gao Huang, Shuicheng Yan. "Boosting Offline Reinforcement Learning via Data Rebalancing", *arXiv preprint arXiv:2210.09241*

**Xiao Ma***, Bingyi Kang*, Zhongwen Xu, Min Lin, Shuicheng Yan. "Mutual Information Regularized Offline Reinforcement Learning", *arXiv preprint arXiv:2210.07484* (*equal contribution)

Siwei Chen, **Xiao Ma**, Zhongwen Xu. "Imitation Learning via Differentiable Physics", *arXiv preprint arXiv:2206.04873*

## Publications

Siwei Chen*, Cunjun Yu*, Yiqing Xu*, Linfeng Li, **Xiao Ma**, Zhongwen Xu, David Hsu. "Benchmarking Deformable Object Manipulation with Differentiable Physics", *International Conference on Learning Representations (ICLR), 2023* (**oral**, *equal contribution)

Jiawei Ren*, Cunjun Yu*, Siwei Chen, Xiao Ma, Liang Pan, Ziwei Liu. "DiffMimic: Efficient Motion Mimicking with Differentiable Physics", *International Conference on Learning Representations (ICLR), 2023* (*equal contribution)

Wei Qiu, **Xiao Ma**, Bo An, Svetlana Obraztsova, Shuicheng Yan, Zhongwen Xu. "RPM: Generalizable Behaviors for Multi-Agent Reinforcement Learning", *International Conference on Learning Representations (ICLR), 2023*

Hai Nguyen*, Zhihan Yang*, Andrea Baisero, **Xiao Ma**, Robert Platt, Christopher Amato. "Hierarchical Reinforcement Learning under Mixed Observability", *Workshop on the Algorithmic Foundations of Robotics (WAFR), 2022* (*equal contribution)

**Xiao Ma**, David Hsu, Wee Sun Lee. "Learning Latent Graph Dynamics for Visual Manipulation of

Deformable Objects", *International Conference on Robotics and Automation (ICRA), 2022*

Daisheng Jin*, **Xiao Ma***, Chongzhi Zhang, Yizhuo Zhou, Jiashu Tao, Mingyuan Zhang, Zhoujun Li, Xiaolong Liu. "Towards Overcoming False Positives in Visual Relationship Detection", *British Machine Vision Conference (BMVC), 2021* (*equal contribution)

**Xiao Ma**, Siwei Chen, David Hsu, Wee Sun Lee. "Contrastive Variational Model-Based Reinforcement Learning for Complex Observations", *The 4nd Conference on Robot Learning (CoRL), 2020*

Jiawei Ren, Cunjun Yu, Shunan Sheng, **Xiao Ma**, Haiyu Zhao, Shuai Yi, Hongsheng Li. "Balanced Meta-Softmax for Long-Tailed Visual Recognition", *Advances in Neural Information Processing Systems (NeurIPS), 2020*

Siwei Chen, **Xiao Ma**, David Hsu. "DinerDash Gym: A Benchmark for Policy Learning in High-Dimensional Action Space", *In IL workshop, Robotics: Science and Systems (RSS), 2020*

Cunjun Yu*, **Xiao Ma***, Jiawei Ren, Haiyu Zhao, Shuai Yi. "Spatio-Temporal Graph Transformer Networks for Pedestrian Trajectory Prediction", *European Conference on Computer Vision (ECCV), 2020* (*equal contribution)

Zuowu Zheng, Xiaofeng Gao, **Xiao Ma**, Guihai Chen. "Predicting Hot Events in the Early Period through Bayesian Model for Social Networks", *IEEE Transactions on Knowledge and Data Engineering (TKDE), 2020*

**Xiao Ma**, Peter Karkus, David Hsu, Wee Sun Lee, Nan Ye. "Discriminative Particle Filter Reinforcement Learning for Complex Partial Observations", *International Conference on Learning Representations (ICLR), 2020*

**Xiao Ma***, Peter Karkus*, David Hsu, Wee Sun Lee. "Particle Filter Recurrent Neural Networks", *AAAI Conference on Artificial Intelligence (AAAI), 2020* (*equal contribution)

Peter Karkus, **Xiao Ma**, David Hsu, Leslie Pack Kaelbling, Wee Sun Lee, Tomas Lozano-Perez. "Differentiable Algorithm Networks for Composable Robot Learning", *Robotics: Science and Systems (RSS), 2019* (**Best Student/System Paper Finalist**)

**Xiao Ma**, Peter Karkus, David Hsu, Wee Sun Lee "PF-LSTM: Belief State Particle Filter for LSTM", *In RLPO Workshop, Advances in Neural Information Processing Systems (NeurIPS), 2018*

**Xiao Ma**, Xiaofeng Gao, Guihai Chen. "BEEP: a Bayesian perspective Early state Event Prediction model for online social networks", *IEEE International Conference on Data Mining (ICDM), 2017*

**Xiao Ma**, Zhenzhe Zheng, Fan Wu and Guihai Chen. "Trust-Based Time Series Data Model for Mobile Crowdsensing", *IEEE International Conference on Communications (ICC), 2017*

## Awards

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| NUS School of Computing Research Achievement Award | 2020 |
| *Robotics: Science and Systems* Best Student Paper Finalist | 2019 |
| *Robotics: Science and Systems* Best System Paper Finalist | 2019 |
| Second Prize in iNTUition Hackathon | 2017 |
| NUS Research Scholarship | 2017 |
| Excellent Project of the *National Undergraduate Training Programs for Innovation* | 2016 |
| Academic Excellence Scholarship, SJTU | 2016, 2014 |
| Honorable Mention of Mathematical Contest In Modeling | 2015, 2016 |

## Professional Activities

**Reviewer**

- Conferences: NeurIPS (2020,2021,2022), WACV (2021, 2022), ICRA (2021, 2022), AAAI (2021), CVPR (2021), ICLR (2022), ICML (2022, 2023)
- Journals: RA-L (2021, 2022)

## Teaching

- CS3243: Introduction to Artificial Intelligence (Spring 2018)
- CS6244: Robot Motion Planning and Control (Winter 2018)
- CS5478: Intelligent Robots: Algorithms and Systems (Spring 2020)