

Xiao Ma

Staff Research Scientist @ ByteDance Seed

e-mail: xiao.ma@bytedance.com

[Personal Website](#)

[Google Scholar](#)

BIO

I'm a staff research scientist at ByteDance Seed, where I lead the robot foundation model team. My research spans across general decision making, robotics, and multi-modal models. My long-term goal is to develop intelligent embodied agents that perceive, interact with, and adapt to unstructured physical environments in a shared autonomy with humans.

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.

EDUCATION

National University of Singapore (NUS)	Aug. 2017 - Dec. 2021
Doctor of Philosophy in COMPUTER SCIENCE	
Advisor: Prof. David Hsu	
Shanghai Jiao Tong University (SJTU)	Sept. 2013 - July 2017
Bachelor of Engineering in COMPUTER SCIENCE AND TECHNOLOGY	

WORK EXPERIENCES

Staff Research Scientist at ByteDance Seed	July 2024 - present
Lead Researcher at Dyson Robot Learning Lab	Feb. 2023 - July 2024
Research Scientist at SEA AI Lab	Jul. 2021 - Jan. 2023
Research Intern at SEA AI Lab (hosted by Dr. Min Lin and Dr. Shuicheng Yan)	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

PREPRINTS

- Jiawen Tian, Liqun Huang, Zhongren Cui, Jingchao Qiao, Jiafeng Xu, **Xiao Ma**, Zeyu Ren. "ByteWrist: A Parallel Robotic Wrist Enabling Flexible and Anthropomorphic Motion for Confined Spaces", *Technical Report*, 2025
- ByteDance Seed GR-3 Team. "GR-3 Technical Report", *Technical Report*, 2025
- Dong Wang, Jirong Liu, Zilong Chen, Qiao Ziqing, Xin Xiao, Bingyi Kang, Hongtao Wu, **Xiao Ma**, Tao Kong, Huaping Liu. "RoboOmni: Actions Are Just Another Modality for Your Vision-Language Models". *Technical Report*, 2025
- Bingyi Kang*, **Xiao Ma***, Yirui Wang, Yang Yue, Shuicheng Yan. "Improving and Benchmarking Offline Reinforcement Learning Algorithms", *arXiv preprint arXiv:2306.00972* (*equal contribution)
- Eugene Teoh*, Sumit Patidar*, **Xiao Ma**, Stephen James. "Green Screen Augmentation Enables Scene Generalisation in Robotic Manipulation", *arXiv preprint arXiv:2407.07868* (*equal contribution)

PUBLICATIONS

- Wenbo Zhang, Tianrun Hu, Yanyuan Qiao, Hanbo Zhang, Yuchu Qin, Yang Li, Jiajun Liu, Tao Kong, Lingqiao Liu, **Xiao Ma**. "Chain-of-Action: Trajectory Autoregressive Modeling for Robotic Manipulation", *Conference on Neural Information Processing Systems (NeurIPS)*, 2025
- Lei Lv, Yunfei Li, Yu Luo, Fuchun Sun, Tao Kong, Jiafeng Xu, **Xiao Ma**. "Flow-Based Policy for Online Reinforcement Learning". *Conference on Neural Information Processing Systems (NeurIPS)*, 2025
- Peiyan Li, Yixiang Chen, Hongtao Wu, **Xiao Ma**, Xiangnnan Wu, Yan Huang, Liang Wang, Tao Kong, Tieniu Tan. "BridgeVLA: Input-Output Alignment for Efficient 3D Manipulation Learning with Vision-

- Language Models”. *Conference on Neural Information Processing Systems (NeurIPS)*, 2025
4. Wenke Xia, Yichu Yang, Hongtao Wu, **Xiao Ma**, Tao Kong, Di Hu. “Robotic Policy Learning via Human-assisted Action Preference Optimization”. *Conference on Neural Information Processing Systems (NeurIPS)*, 2025
 5. Wenbo Zhang, Yang Li, Yanyuan Qiao, Siyuan Huang, Jiajun Liu, Feras Dayoub, **Xiao Ma**, Lingqiao Liu. “Effective Tuning Strategies for Generalist Robot Manipulation Policies”, *International Conference on Robotics and Automation (ICRA)*, 2025
 6. Nikita Chernyadev*, Nicholas Backshall*, **Xiao Ma***, Yunfan Lu, Younggyo Seo, Stephen James. “Bi-Gym: A Demo-Driven Mobile Bi-Manual Manipulation Benchmark”, *Conference on Robot Learning (CoRL)*, 2024 (*equal contribution)
 7. Yang Yue, Bingyi Kang, **Xiao Ma**, Qisen Yang, Gao Huang, Shiji Song, Shuicheng Yan. “Decoupled Prioritized Resampling for Offline RL”, *IEEE Transactions on Neural Networks and Learning Systems*, (TNNLS)
 8. **Xiao Ma**, Sumit Patidar, Iain Haughton, Stephen James. “Hierarchical Diffusion Policy for Kinematics-Aware Multi-Task Robotic Manipulation”, *Computer Vision and Pattern Recognition (CVPR)*, 2024
 9. Pietro Mazzaglia, Nicholas Backshall, **Xiao Ma**, Stephen James. “Redundancy-aware Action Spaces for Robot Learning”, *IEEE Robotics and Automation Letters (RA-L)*, 2024
 10. **Xiao Ma***, Bingyi Kang*, Zhongwen Xu, Min Lin, Shuicheng Yan. “Mutual Information Regularized Offline Reinforcement Learning”, *Conference on Neural Information Processing Systems (NeurIPS)*, 2023 (*equal contribution)
 11. Bingyi Kang*, **Xiao Ma***, Chao Du, Tianyu Pang, Shuicheng Yan. “Efficient Diffusion Policies for Offline Reinforcement Learning”, *Conference on Neural Information Processing Systems (NeurIPS)*, 2023 (*equal contribution)
 12. Jiawei Ren*, Mingyuan Zhang*, Cunjun Yu*, **Xiao Ma**, Liang Pan, Ziwei Liu. “InsActor: Instruction-driven Physics-based Characters”, *Conference on Neural Information Processing Systems (NeurIPS)*, 2023 (*equal contribution)
 13. Siwei Chen, **Xiao Ma**, Zhongwen Xu. “Imitation Learning via Differentiable Physics”, *Computer Vision and Pattern Recognition (CVPR)*, 2023
 14. 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)
 15. 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)
 16. 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
 17. 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)
 18. **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
 19. 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)
 20. **Xiao Ma**, Siwei Chen, David Hsu, Wee Sun Lee. “Contrastive Variational Model-Based Reinforcement Learning for Complex Observations”, *The 4th Conference on Robot Learning (CoRL)*, 2020

21. 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
22. 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
23. 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)
24. 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
25. **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
26. **Xiao Ma***, Peter Karkus*, David Hsu, Wee Sun Lee. “Particle Filter Recurrent Neural Networks”, *AAAI Conference on Artificial Intelligence (AAAI)*, 2020 (*equal contribution)
27. 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**)
28. **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
29. **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
30. **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

NUS School of Computing Research Achievement Award	2020
<i>Robotics: Science and Systems</i> Best Student Paper Finalist	2019
<i>Robotics: Science and Systems</i> Best System Paper Finalist	2019
NUS Research Scholarship	2017
Excellent Project of the <i>National Undergraduate Training Programs for Innovation</i>	2016
Academic Excellence Scholarship, SJTU	2016, 2014
Honorable Mention of Mathematical Contest In Modeling	2015, 2016

PROFESSIONAL ACTIVITIES

Reviewer

- Conferences: NeurIPS (2020 - 2024), WACV (2021 - 2023), ICRA (2021 - 2023), AAAI (2021 - 2023), CVPR (2021 - 2023), ICLR (2022 - 2023), ICML (2022 - 2024)
- Journals: RA-L (2021 - 2023)

Teaching

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