Xiao Ma

Staff Research Scientist @ ByteDance Seed

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Bio

I'm a staff research scientist at ByteDance Seed, where I lead the robot foundation model team. My research spans across robotics, reinforcement learning, 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

1. ByteDance Seed GR Team. "GR-RL: Going Dexterous and Precise for Long-Horizon Robotic Manipulation", *Technical Report, 2025*

2. 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*

3. ByteDance Seed GR Team. "GR-3 Technical Report", *Technical Report, 2025*

4. 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*

5. Bingyi Kang*, **Xiao Ma***, Yirui Wang, Yang Yue, Shuicheng Yan. "Improving and Benchmarking Offline Reinforcement Learning Algorithms", *arXiv preprint arXiv:2306.00972* (*equal contribution)

6. 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

1. Huaping Liu, Xinghang Li, Peiyan Li, Minghuan Liu, Dong Wang, Jirong Liu, Bingyi Kang, **Xiao Ma**, Tao Kong, Hanbo Zhang. "Towards generalist robot policies: What matters in building vision-language-action models", *Nature Machine Intelligence (NMI), 2025*

2. 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 Manipula-

tion", *Conference on Neural Information Processing Systems (NeurIPS), 2025*

3. 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*

4. 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*

5. 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*

6. Dong Wang*, Xinghang Li*, Zhengshen Zhang, Jirong Liu, Xiao Ma, Hanbo Zhang, Tao Kong, Huaping Liu. "ProcWorld: Benchmarking Large Model Planning in Reachability-Constrained Environments". *Conference on Empirical Methods in Natural Language Processing (EMNLP), 2025* (*equal contribution)

7. 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*

8. 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)

9. 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)*

10. **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*

11. Pietro Mazzaglia, Nicholas Backshall, **Xiao Ma**, Stephen James. "Redundancy-aware Action Spaces for Robot Learning", *IEEE Robotics and Automation Letters (RA-L), 2024*

12. **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)

13. 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)

14. 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)

15. Siwei Chen, **Xiao Ma**, Zhongwen Xu. "Imitation Learning via Differentiable Physics", *Computer Vision and Pattern Recognition (CVPR), 2023*

16. 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)

17. 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)

18. 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*

19. 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)

20. **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*

21. 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)

22. **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*

23. 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*

24. 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*

25. 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)

26. 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*

27. **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*

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

29. 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**)

30. **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*

31. **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*

32. **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*

Professional Activities

Area Chair

- Conferences: ICLR (2026)

Reviewer

- Conferences: NeurIPS (2020 - 2025), WACV (2021 - 2023), ICRA (2021 - 2025), AAAI (2021 - 2025), CVPR (2021 - 2023), ICLR (2022 - 2026), ICML (2022 - 2025)
- Journals: RA-L (2021 - 2025)