Jun Jin, PhD

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Google Scholar: /citations?user=a6grwUcAAAAJ

Education

University of Alberta — Edmonton, Canada
Ph.D. Computing Science — 2017 – 2021
Thesis: *Learning Geometry from Vision for Robotic Manipulation*
Ph.D. student in Construction Engineering and Management — 2016 – 2017
Wuhan University — Wuhan, China
M.Eng. Geomatics Engineering — 2012
B.A. Geodesy and Geomatics Engineering — 2010
B.A. Computer Science — 2010

Academic Appointment

Assistant Professor, University of Alberta — Aug 2023 – present

Honors and Awards

Fellow, Alberta Machine Intelligence Institute (Amii) — Sep 2023 – present
ICRA 2022 Outstanding Student Paper Finalist (top 3 runner-up) — 2022
IEEE Robotics and Automation Society. Only 1 paper selected each year.
Alberta Graduate Excellence Scholarship, Government of Alberta — 2020
ICRA Travel Award, IEEE Robotics and Automation Society — 2019
KUKA Innovation Award Finalist (Top 5 Global) — 2018
Science&Technology Award, 2nd Prize, Government of Hunan Province, China — 2015
Science&Technology Award, 1st Prize, Nonferrous Metals Society of China — 2014
Science&Technology Award, 2nd Prize, State Bureau of Surveying and Mapping, China — 2012

Research Interests

Robot Learning (reinforcement learning, embodied AI, continual learning).
I am passionate about developing learning architectures and algorithms for physical robots to solve real-world problems.

Peer-reviewed Publications

Refereed Journals:

[1] Y. Hu, M. Tavakoli, and J. **Jin**, "Pretraining using comparable human activities of daily living dataset in robotic surgical task learning," *IEEE Transactions on Medical Robotics and Bionics*, 2025. Accepted May 2025, published June 2025.

[2] Y. Hu, Z. Samadikhoshkho, J. **Jin**, and M. Tavakoli, "Label-free adaptive gaussian sample consensus framework for learning from perfect and imperfect demonstrations," *IEEE Transactions on Medical Robotics and Bionics*, 2024.

Conference Proceedings:

* IEEE ICRA is the most cited venue in robotics (Google Scholar). IEEE IROS is 4th.

[3] X. Ye, R. H. Yang, J. **Jin**, Y. Li, and A. Rasouli, "Ra-dp: Rapid adaptive diffusion policy for training-free high-frequency robotics replanning," in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025. Accepted June 2025, to appear July 2025.

[4] Y. Mu, Q. Zhang, M. Hu, W. Wang, M. Ding, J. **Jin**, B. Wang, J. Dai, Y. Qiao, and P. Luo, "Embodiedgpt: Vision-language pre-training via embodied chain of thought," in *Advances in Neural Information Processing Systems (NeurIPS),* ****Spotlight Paper****, **2023**.

[5] H. Zhang, C. Xiao, H. Wang, J. **Jin**, B. Xu, and M. Muller, "Replay memory as an empirical mdp: Combining conservative estimation with experience replay," in *International Conference on Learning Representations (ICLR)*, **2023**. Presented on May 1st, 2023, Kigali, Rwanda.

[6] A. Karimi, J. **Jin**, J. Luo, A. R. Mahmood, M. Jagersand, and S. Tosatto, "Variable decision-frequency option critic," in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, **2023**.

[7] B. Rafiee, S. Ghiassian, J. **Jin**, R. Sutton, J. Luo, and A. White, "Auxiliary task discovery through generate and test," in *Second Conference on Lifelong Learning Agents (CoLLAs)*, **2023**.

[8] J. **Jin**, D. Graves, C. Haigh, J. Luo, and M. Jagersand, "Offline learning of counterfactual predictions for real-world robotic reinforcement learning," in *2022 IEEE International Conference on Robotics and Automation (ICRA)(* **Oustanding Student Paper Award Finalist**)*, pp. 3616–3623, IEEE, **2022**.

[9] J. **Jin** and M. Jagersand, "Generalizable task representation learning from human demonstration videos: a geometric approach," in *2022 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2504–2510, IEEE, **2022**.

[10] L. Petrich, J. **Jin**, M. Dehghan, and M. Jagersand, "A quantitative analysis of activities of daily living: Insights into improving functional independence with assistive robotics," in *2022 International Conference on Robotics and Automation (ICRA)*, pp. 6999–7006, IEEE, **2022**.

[11] J. **Jin**, H. Zhang, and J. Luo, "Build generally reusable agent-environment interaction models," in *Advances in neural information processing systems (NeurIPS) 2022 Workshop: Foundation Models for Decision Making*, **2022**.

[12] Z. Zhang, J. **Jin**, M. Jagersand, J. Luo, and D. Schuurmans, "A simple decentralized cross-entropy method," in *Advances in neural information processing systems (NeurIPS)*, vol. 34, pp. 29304–29320, **2022**.

[13] B. Rafiee, J. **Jin**, J. Luo, and A. White, "What makes useful auxiliary tasks in reinforcement learning: investigating the effect of the target policy," in *The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making*, RLDM, **2022**.

[14] D. Graves, N. M. Nguyen, K. Hassanzadeh, J. **Jin**, and J. Luo, "Learning robust driving policies without online exploration," in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 13186–13193, IEEE, **2021**.

[15] B. Xie, M. Han, J. **Jin**, M. Barczyk, and M. Jagersand, "A generative model-based predictive display for robotic teleoperation," in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2407–2413, IEEE, **2021**.

[16] J. **Jin**, N. M. Nguyen, N. Sakib, D. Graves, H. Yao, and M. Jagersand, "Mapless navigation among dynamics with social-safety-awareness: a reinforcement learning approach from 2d laser scans," in *2020 IEEE international conference on robotics and automation (ICRA)*, pp. 6979–6985, IEEE, **2020**.

[17] J. **Jin**, L. Petrich, M. Dehghan, and M. Jagersand, "A geometric perspective on visual imitation learning," in *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 5194–5200, IEEE, **2020**.

[18] J. **Jin**, L. Petrich, Z. Zhang, M. Dehghan, and M. Jagersand, "Visual geometric skill inference by watching human demonstration," in *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 8985–8991, IEEE, **2020**.

[19] J. **Jin**, L. Petrich, M. Dehghan, Z. Zhang, and M. Jagersand, "Robot eye-hand coordination learning by watching human demonstrations: a task function approximation approach," in *2019 International Conference on Robotics and Automation (ICRA)*, pp. 6624–6630, IEEE, **2019**.

[20] M. Dehghan, Z. Zhang, M. Siam, J. **Jin**, L. Petrich, and M. Jagersand, "Online object and task learning via human robot interaction," in *2019 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2132–2138, IEEE, **2019**.

[21] X. Qin, S. He, Z. Zhang, M. Dehghan, J. **Jin**, and M. Jagersand, "Real-time edge template tracking via homography estimation," in *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 607–612, IEEE, **2018**.

Workshop Papers & Extended Abstracts:

[22] A. Ebrahimi and J. **Jin**, "Retrospective and structurally informed exploration via cross-task successor feature similarity," in *ICML Workshop on Exploration in AI Today*, 2025. Accepted May 2025, published July 2025.

[23] K. Sun, J. **Jin**, X. Chen, W. Liu, and L. Kong, "Reweighted bellman targets for continual reinforcement learning," in *ICML Workshop on Aligning Reinforcement Learning Experimentalists and Theorists*, 2024. Accepted June 2024, published July 2024.

[24] Q. Li, Y. Cao, J. Kang, T. Yang, X. Chen, J. **Jin**, and M. Taylor, "Laffi: Leveraging hybrid natural language feedback for fine-tuning language models," in *The 38th Annual AAAI Conference on Artificial Intelligence (AAAI 2024) Workshop: Human-Centric Representation Learning, ***Best Paper Runner-up****, 2024. Accepted Dec 2023, published Feb 2024.

[25] Y. Hu, J. **Jin**, and M. Tavakoli, "Learning medical skills by a robot from imperfect demonstrations," in *Alberta Robotics & Intelligent Systems Expo (RISE)*, (Edmonton, AB), 2024.

Submitted / Under Review:

[26] X. S. Ge, J. **Jin**, and M. Lu, "Developing deep-reinforcement-learning-based agent for automated dynamic construction labour dispatching: the union hall problem." Submitted to Automation in Construction (Journal), 2025.

[27] K. Sun, H. Zhang, J. **Jin**, C. Gao, X. Chen, W. Liu, and L. Kong, "Principled fast and meta knowledge learners for continual reinforcement learning." Submitted to 39th Conference on Neural Information Processing Systems (NeurIPS), 2026.

[28] H. Zhang, F. Bai, S. Cui, J. **Jin**, B. Xu, M. Müller, and C. Gao, "Fpdou: Mastering doudizhu with fictitious play." Submitted to 39th Conference on Neural Information Processing Systems (NeurIPS), 2026.

Patents

[29] D. M. Graves, J. **Jin**, and J. Luo, "Methods and systems for support policy learning," 2021. US Patent App. US20210357782A1. Pending.

[30] J. **Jin** and N. Du, "A precision mining system with gnss integration in autonomous open pit mining," 2016. China Patent App. CN104533528A. Granted. Google Patent Search Link.

[31] J. **Jin** and N. Du, "A geo-robot control system for structural health monitoring," 2015. China Patent App. CN103017824A. Granted. Google Patent Search Link.

Grants and Funding

Principal Investigator (PI) Grants

- **NSERC Discovery Grant (RGPIN-2024-05080)** – "Modeling Embodied Dexterity for Open-ended Robot Learning", Total: $180,000 PI: Jun Jin 2024–2030
- **NSERC Discovery Launch Supplement** – "Modeling Embodied Dexterity for Open-ended Robot Learning", Total: $12,500 PI: Jun Jin 2024–2030
- **CFI JELF** – "Research Infrastructure for Human-level Robotic Manipulation Task Mastering", Total: $164,699 PI: Jun Jin Co-PI: Li Cheng 2025–2027
- **Government of Alberta (GoA) Matching Funds** – "Research Infrastructure for Human-level Robotic Manipulation Task Mastering" (GoA) , Awarded: $164,199 Project Leader: Jun Jin 2025–2027
- **Amii RAP (Research Award Program)** – "Recurrent Neural Agent Models: A Risky but High-Rewarding Way of Building Embodied AI for Robots", Total: $56,659 PI: Jun Jin 2025–2026
- **University of Alberta, Faculty of Engineering Startup Fund** , Total: $175,000 PI: Jun Jin 2023–2025

Invited Talks & Panels

Invited Seminars & Talks & Tutorials:

- *"A Tutorial on Embodied AI from the Perspective of Action Generation,"* Invited Tutorial, CIFAR Deep Learning and Reinforcement Learning (DLRL) Summer School, Edmonton, AB, August 2025.
- *"A Blue Sky Talk: Virtual Cells and the Future of Data-Driven, Biologically Grounded Cell Simulations in Agri-Food Innovation,"* Invited Seminar, NSERC Canadian Agri-food Protein Training, Utilization, and Research Enhancement (CAPTURE) Workshop, Edmonton, AB, June 2025.
- *"Demystifying Embodied AI from the Perspective of Robot Motions,"* Invited Seminar, **Amii Upper Bound 2025**, Edmonton, AB, May 2025.
- *"Seeking Unified Computational Models for Robotics,"* Talk, International Research Center for Neurointelligence (IRCN), The University of Tokyo, Tokyo, Japan, July 2024.
- *"Seeking Universal Computing Models for Robotics,"* Invited Talk, Amii Upper Bound 2024, Edmonton, AB, May 2024.
- *"A Rethink on Geometry, Robotic Reinforcement Learning, and Embodied AI,"* Invited Seminar, **ENSC Robotics Seminar, Simon Fraser University**, Burnaby, BC, May 2024.
- *"Seeking Universal Computing Models for Robotics,"* Invited Seminar, Visual Computing and Robotics Group Seminar, Simon Fraser University, Burnaby, BC, May 2024.

Panels:

- *"AI Reasoning Across Modalities and Immersive Collaboration,"* Panel Moderator, *Cross-Future AI Summit*, Vancouver, BC, July 2025.

Works Deployed on Real-World Robotic Systems

Hannover Messe 2018, Live Demonstration (invited by KUKA AG), Hanover, Germany 2018

- *Interactive Robotic Task Teaching via Online Human-Robot Interaction*. Role: main developer. Global finalist of the **KUKA Innovation Award**. Deployed sensitive vision and force control on a KUKA iiwa to perform 5 days of live demonstrations (cosmetic/personal grooming on a mannequin). Media coverage: MM MaschinenMarkt, KUKA YouTube.

IEEE/RSJ IROS 2017, Exhibition Demo (invited by KUKA AG), Vancouver, Canada 2017

- *Hybrid Vision and Force Control*. Role: main developer. Presented 3 days of compliance control demos: audience drew on a touch panel and the KUKA iiwa replicated drawings on a pumpkin. Media coverage: CBC News, Leiphone Robotics Trends.

Robotic Probe for Underground Mining Investigation, CHALIECO, China 2015–2016

- *Robotic Probe for Geological and Environmental Investigation in Mining Pits*. Role: project lead. Deployed in Chuxiong, Yunnan. Designed all-terrain probe equipped with 2D LiDAR, spectrometer, and manipulator. Project presentation.

Autonomous Precision Mining for Open-Pit Mines, CHALIECO, China 2013–2016

- *Autonomous Mining based on 3D GIS Modeling and Differential GNSS*. Role: project lead. Deployed in Pingguo, China; guided fleets of excavators for precision mining with 3D GIS integration. Recognized as one of CHALIECO's **2015 Scientific Breakthroughs**. Patents: CN104533528A, CN106545046A. Project presentation.

Geo-Robot Based Structural Health Monitoring System, CHALIECO, China 2011–2012

- *High-Precision Structural Health Monitoring Using a Geo-Robot*. Role: inventor. Deployed for autonomous civil infrastructure monitoring, including the Bailong Elevator. Patent: CN103017824A. Media coverage: CCTV.com News.

Professional Experience

Staff Senior Researcher, Noah's Ark Lab, Huawei Technologies Canada 2021 – 2023
Vice Director, Department of Intelligent Systems, CHALIECO, China 2011 – 2016

Teaching Experience

- Department of Electrical & Computer Engineering, University of Alberta *Fall 2023, Fall 2024, Fall 2025* **ECE 720 – Robot Learning: Principles and Advances** Creator and sole instructor of a graduate-level course on reinforcement learning, continual learning, and embodied AI for robotics. Developed innovative pedagogical activities (e.g., "Read & Share", "Think & Present") to foster critical discussion of state-of-the-art research and to strengthen students' ability to connect theory with frontier research problems. These initiatives improved classroom engagement and enhanced students' preparedness for independent research projects.
- Department of Electrical & Computer Engineering, University of Alberta *Capstone Project Supervision, 2024–2025* Supervised three capstone project groups (20+ students):
  - Group 25: EcoCar Driver Assist System.
  - Group 11: Dynamometer Data Acquisition Board.
  - Group 29: Smart-Home Bedside Charger and Light Switch.

  Guided project design, technical implementation, and final presentations. One group's project was ranked in the **top tier** at the final Capstone Project Day, evaluated by judges from a diverse panel of professional engineers and professors.

Professional Service

Journal and grant proposal reviewer:

- Reviewer: ICRA, IROS, NeurIPS, ICML, ICLR (2019 – present). The 18th International Symposium on Experimental Robotics(ISER, 2023)
- Journal of Intelligent & Robotic Systems, IEEE Internet of Things Journal (2020). IEEE Transactions on Multimedia (2023).

- Grant Reviewer, Mitacs Accelerate (2025)

Professional society committees:

- Organizing Committee, and Publicity & Communications Chair, AlbertaRISE Conference (2024) – contributed to the inaugural creation and launch of the first AlbertaRISE Conference, the only province-wide conference for robotics research and industry gathering in Alberta; led creation of communication materials (poster, website, social media) and coordinated outreach to departments, faculty chairs, and external stakeholders.
- Invited Sponsorship Chair, AI/CRV 2026 (Canadian AI and Robots & Vision Conference) – currently serving, responsible for sponsorship development and industry engagement.

Departmental/University Service:

- Faculty Hiring Committee Member (2024-2025): Killam Memorial Chair in Robotics for Healthcare – contributed to advertising the position, candidate screening, interviews, lab tours, and faculty hosting activities (meals and campus engagement).

Memberships:

- IEEE Robotics & Automation Society (2019 – present)