Lingheng Meng

Postdoctoral Fellow
DATA61, CSIRO

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PROFESSIONAL SUMMARY

I am a robotics and human-robot interaction (HRI) researcher seeking appointment as Lecturer in Robotics Engineering at UNSW, bringing expertise in deep reinforcement learning (DRL), adaptive robot learning, and real-world system deployment to advance human-centered robotics for medical, assistive, and service robot applications.

- CERC Postdoctoral Fellow (CSIRO DATA61) and Adjunct Lecturer (Monash University) advancing human-centered robot learning and interaction.
- Demonstrated research translation: ACM THRI journal article on field deployment of DRL in public museum (60,000+ visitors); foundational RL methods (IROS, ICPR); road safety computer vision (Transportation Research Part C).
- Foundational DRL contributions: memory-based deep RL for POMDPs (IROS 2021) and multi-step return analysis (ICPR 2020); Neural Networks 2025 paper advancing understanding of multi-step DRL in partially observable environments.
- Infrastructure & capability building: Led upgrade of Monash Robotics learning infrastructure; established Franka Panda platform at CSIRO with camera-integrated simulation and containerized ROS workflows; introduced novel robot models into NVIDIA's Isaac Lab and developed tutorials reducing student onboarding from weeks to days.
- Strong research impact: 465 citations, h-index: 7, i10-index: 7; publications in premier venues (ACM THRI, Neural Networks, IROS, Transportation Research Part C).
- Teaching & supervision: Co-supervising 2 Ph.D. students (both passed confirmation 2025, one HRI 2026 oral presentation); supervised 5-student Final Year Project (high marks, extending to publications); created widely-adopted learning resources.
- Industry engagement: Contributed to establishing partnerships with Boeing Australia and Suburban Connect through collaborative lab tour demonstrations and research showcases.
- Academic service: Reviewer for CoRL, IROS, ICRA, ICPR; journals: ACM THRI, IEEE RA-L, Applied Soft Computing; Session Chair (Reinforcement Learning IV, IROS 2021); Technical Committee (Human-aligned RL Workshop @ ICRA 2024).

WORK EXPERIENCE

CSIRO: Commonwealth Scientific and Industrial Research Organisation, Clayton, Victoria, Australia

- CSIRO Early Research Career (CERC) Fellowship — Apr 2024 – Now
  - Conducting research in Human-Robot Interaction and Robot Learning
  - Supervisors: Dr. Leimin Tian, Dr. David Howard and Prof. Dana Kulić

Monash University, Clayton, Victoria, Australia

- Adjunct Lecturer in Electrical and Computer Systems Engineering — Aug 2024 – Now
  - Engaging in research and teaching activities in the Faculty of Engineering
- Postdoctoral Research Fellow in Electrical and Computer Systems Engineering — Aug 2023 – Apr 2024
  - Worked on upgrading robot learning infrastructure at Monash Robotics
  - Supervisors: Prof. Dana Kulić and Dr. Michael Burke
- Visitor in Electrical and Computer Systems Engineering — May 2023 – Jul 2023
  - Worked on Road Safety Innovation Fund project
  - Host: Prof. Dana Kulić

EDUCATION

University of Waterloo, Waterloo, Ontario, Canada

- Ph.D. in Electrical and Computer Engineering — Sep 2017 – May 2023
  - Thesis: *Learning to Engage: An Application of Deep Reinforcement Learning in Living Architecture Systems*
  - Advisers: Prof. Dana Kulić and A/Prof. Rob Gorbet
  - Committee: Urs Hengartner (Chair), Dana Kulić (Supervisor), Rob Gorbet (Supervisor), Matthew Gombolay (External Examiner), Edith Law (Internal-External), Stephen Smith (Internal), Mark Crowley (Internal)
  - Focus: Reinforcement Learning, Preference Learning, Machine Learning, Human Robot Interaction, Large-scale Interactive Systems.

- Cumulative Marks: 85.50 / 100

Monash University, Clayton, Victoria, Australia

- Visiting Ph.D. Student in Electrical and Computer Systems Engineering — Sep 2022 – May 2023
  - Continue PhD thesis
  - Adviser: Prof. Dana Kulić

China University of Mining and Technology, Xuzhou, Jiangsu, P.R.China

- M.Eng. in Computer Science and Technology — Sep 2014 – May 2017
  - Thesis: *Research on Autoencoder and Its Application*
  - Adviser: Prof. Shifei Ding
  - Focus: Autoencoders, Deep Learning, Machine Learning, Artificial Intelligence.
  - Cumulative Marks: 89.18 / 100
- B.Eng. in Computer Science and Technology — Sep 2010 – Jun 2014
  - Thesis: *3D Scene Perception System Based on Single Static Image*
  - Adviser: Prof. Shifei Ding
  - Focus: Image Processing, Machine Learning.
  - Graduated as Outstanding Graduate.
  - Cumulative GPA: 3.79 / 4.0
  - Ranking: 5 / 165

RESEARCH INTERESTS

Human-Robot Interaction; Deep Reinforcement Learning; Preference Learning; Imitation Learning; Inverse Reinforcement Learning; Robot Learning for Medical & Assistive Robotics; Interactive / Adaptive Robotic Systems; Affective and Personalized Human-Machine Interaction; Road Safety Vision (near-miss cycling event detection); Developmental Robotics; Intrinsic Motivation in Robots.

PUBLICATIONS

JOURNALS

- L. Meng, R. Gorbet, M. Burke, and D. Kulić, 2025. Experimental Study on The Effect of Multi-step Deep Reinforcement Learning in POMDPs. *Neural Networks*, Accepted, Dec 2025.
- M. Li, B. Beck, T. Rathnayake, L. Meng, Z. Chen, A. Cosgun, X. Chang, and D. Kulić, 2025. A benchmark for cycling close pass detection from video streams. *Transportation Research Part C: Emerging Technologies*, vol. 174, p.105112, May 2025.
- L. Meng, D. Lin, A. Francey, R. Gorbet, P. Beesley, and D. Kulić, "Learning to Engage with Interactive Systems: A Field Study on Deep Reinforcement Learning in a Public Museum" *ACM Transactions on Human-Robot Interaction (THRI)* vol. 10, no. 5, pp. 1–29, Feb 2021.
- L. Meng, S. Ding, N. Zhang and J. Zhang, "The Research of Stacked Denoising Sparse Autoencoder," *Neural Computing and Applications*, vol. , no. , pp. 1–18, Oct 2018.
- S. Ding, L. Meng, Y. Han, Y. Xue, "A Review on Feature Binding Theory and Its Applications in Perceptual Learning," *Cognitive Computation*, vol. 9, no. 2, pp. 194–206, Apr 2017.
- L. Meng, S. Ding, and Y. Xue, "Research on denoising sparse autoencoder," *International Journal of Machine Learning and Cybernetics*, vol. 8, no. 5, pp. 1719–1729, Oct 2017.
- L. Meng and S. Ding, "Research on Depth Perceptual Model Based on Single Image," *Journal of Shandong University (Engineering Science)*, vol. 46, no. 3, pp. 37–43, May 2016. (in Chinese)
- H. Jia, S. Ding, L. Meng, S. Fan, "A density-adaptive affinity propagation clustering algorithm based on spectral dimension reduction," *Neural Computing & Applications*, vol. 25, no. 7-8, pp. 1557–1567, Dec 2014.

CONFERENCES

- E. Fashae, M. Burke, L. Tian, L. Meng, and P. Carreno-Medrano, "Explaining Why Things Go Where They Go: Interpretable Constructs of Human Organizational Preferences", *ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2026*, Edinburgh, Scotland, UK, Mar 2026. (Accepted)
- B. Beck, T. Rathnayake, D. Kulic, M. Li, L. Meng, Z. Chen, and A. Cosgun, "Detecting near-miss events with cyclists using computer vision approaches", *Australasian Road Safety Conference, 2023*, Cairns, Queensland, Australia, Sep 2023.

- L. Meng, R. Gorbet, D. Kulić, "Memory-based Deep Reinforcement Learning for POMDPs", *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*, Prague, Czech Republic, Sep 2021.
- L. Meng, R. Gorbet, D. Kulić, "The Effect of Multi-step Methods on Overestimation in Deep Reinforcement Learning", *2020 25th International Conference on Pattern Recognition (ICPR)*, Milan, Italy, Jan 2021.
- K. Kumagai, D. Lin, L. Meng, A. Blidaru, P. Beesley, D. Kulić, and I. Mizuuchi, "Towards individualized affective human-machine interaction," *IEEE International Symposium on Robot and Human Interactive Communication: IEEE*, Aug 2018.

RESEARCH ACTIVITIES

ITTC in Optimal Ageing Micro-Training Workshop Program

- Participant — Nov 2025 – Nov 2025

HRI2025 Robots for a Sustainable World

- Participant — Mar 2025 – Mar 2025

Workshop on Human-aligned Reinforcement Learning for Autonomous Agents and Robots held in Yokohama, Japan. Accepted at ICRA 2024

- Member of the technical committee — May 2024 – May 2024

2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021), Virtual

- Attendee, Paper Presenter, and chair of session: Reinforcement Learning IV — Sep 2021 – Oct 2021

The CIFAR 2021 Deep Learning + Reinforcement Learning Summer School, Virtual

- Attendee — Jul 2021 – Jul 2021

25th International Conference On Pattern Recognition (ICPR 2020), Virtual-Milano

- Poster — Jan 2021 – Jan 2021

The 2019 IEEE-RAS International Conference on Humanoid Robots, Toronto

- Volunteer — Oct 2019 – Oct 2019

LASG Symposium 2019 at OCAD University in downtown Toronto

- Participant — Mar 2019 – Mar 2019
  - Attending Research Workshop: Scoping the Future of Design, Architecture and Living Systems
  - Attending Research Workshop: Collaborative Capacity Building Through Structured Dialogue
  - Poster: Learning to Engage with Interactive Systems

Living Architecture System Group Workshop in Toronto

- Participant — Dec 2018 – Dec 2018
  - Presentation: Learning to Engage With Interactive System: A Field Study
  - Work with engineering team developing new software.

Curiosity Workshop between Univ. Waterloo, Potioc and Flowers

- Participant — Feb 2018 – Feb 2018
  - Presentation: Distributed Learning Systems - applying to Living Architecture Systems Project

TEACHING & SUPERVISION

- Teaching Assistant experience (Object Oriented Program Analysis and Design) at China University of Mining and Technology with responsibilities in lab leadership, discussions, and assessment.
- Supervision / Mentoring Summary:
  - Co-supervising 2 Ph.D. students at Monash University (Human-Robot Interaction / Shared Autonomy / Preference Learning focus); both successfully passed confirmation milestones (early 2025), with one having a paper accepted for oral presentation at HRI 2026 (premier HRI conference) and another conducting user studies with publication in preparation.
  - Co-supervised 1 final-year project team (5 students) at Monash University (robot learning infrastructure, preference learning, and interaction design) that passed with high marks and is being extended toward conference and journal publications.
  - Co-supervising a current final-year project team (3 students) at Monash University on deep reinforcement learning for robustness that successfully passed first-semester milestone.
  - Assisted in guiding 1 Master's student during my Ph.D. at University of Waterloo (development of RL experimentation procedures and analytical methodologies).
- Mentoring junior researchers in robotics labs (Monash Robotics, Waterloo Adaptive Systems, CSIRO) on experimental design, simulation development (Unity, Isaac Sim, NVIDIA Isaac Lab), DRL algorithm implementation, and reproducible evaluation.

- Introduced novel robot models into NVIDIA's Isaac Lab simulation framework and developed comprehensive tutorials for CSIRO Virga HPC reinforcement learning (environment setup, container/job submission, scaling policy training) now used across undergraduate, Master's, and Ph.D. student cohorts. A lecturer adopted the materials for formal course integration. Students report significantly reduced onboarding time (from weeks to days for RL environment setup) and increased confidence in conducting experiments.
- Guest instruction / session chairing supporting pedagogical dissemination (IROS 2021 Reinforcement Learning IV session chair).

School of Computer Science and Technology, China University of Mining and Technology

- Teaching Assistant, School of Computer Science and Technology May 2016 – Jul 2016
  - Course: Object Oriented Program Analysis and Design
  - Instructor: Prof. Lei Zhang
  - Responsibility: Leading laboratory and discussion sections, marking assignment and final.

SERVICE & LEADERSHIP

Academic Service

- Reviewer for Conferences:
  - Conference on Robot Learning (CoRL) 2025
  - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025, 2024
  - IEEE International Conference on Robotics and Automation (ICRA) 2026, 2024
  - International Conference on Pattern Recognition (ICPR) 2024
- Reviewer for Journals:
  - ACM Transactions on Human-Robot Interaction (ACM THRI)
  - IEEE Robotics and Automation Letters (RA-L)
  - Applied Soft Computing (Elsevier)
  - IEEE Transactions on Cognitive and Developmental Systems (IEEE TCDS)
- Technical Committee Member, Workshop on Human-aligned Reinforcement Learning for Autonomous Agents and Robots (ICRA 2024) May 2024
- Session Chair, Reinforcement Learning IV, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021) Sep 2021
- Volunteer, IEEE-RAS International Conference on Humanoid Robots (Humanoids 2019), Toronto Oct 2019 – Oct 2019
- Milestone Panel Examiner for Ph.D. and Master's students at Monash University (Electrical and Computer System Engineering / Mechanical and Aerospace Engineering)
- Research Reading Group Facilitator (Monash Robotics, topics: reinforcement learning, preference learning, human-robot interaction)

OUTREACH & IMPACT

- Public Engagement: Deployed deep reinforcement learning powered interactive installation at the Royal Ontario Museum (ROM) with 60,000+ public visitors documented in ACM Transactions on Human-Robot Interaction publication. Demonstrated real-world scalability of human-centered robot learning algorithms in high-traffic public environments.
- Industry Collaboration & Translation:
  - Partnered with Boeing Research on human-robot collaboration in manufacturing environments, translating DRL research to industrial applications
  - Collaborated with Suburban Connect (Australian urban planning consultancy) on road safety analytics, developing computer vision benchmarks for near-miss cycling event detection using real-world footage
  - Working with Amy's Foundation to translate road safety research to practical community safety improvements
- Cross-Disciplinary Collaboration: Worked with architects, artists, and designers through the Living Architecture Systems Group (LASG), demonstrating the application of robot learning to interactive architectural installations and adaptive built environments.
- Lab Tours & Demonstrations: Regularly conducted lab tours and robot demonstrations at CSIRO, Monash Robotics, and University of Waterloo, showcasing research to visiting academics, industry partners, government officials, and school students. Mentored high school students through university outreach programs on robotics and AI.
- Open Science: Released open-source code, datasets, and tutorials supporting reproducible research in deep reinforcement learning and human-robot interaction. Developed tutorial materials for NVIDIA's Isaac Lab (introducing novel robots and custom tasks) now used by multiple research groups globally.

AWARDS & SCHOLARSHIPS

- DAAD AI-Net Fellowship 11/2023 - Human Centered AI — Oct 2023
- University of Waterloo David Johnston International Experience Awards — Sep 2022
- University of Waterloo Doctoral Thesis Completion Award — Jan 2022
- University of Waterloo Graduate Studies Conference Assistantship — Aug 2021
- University of Waterloo S.P. Pasupalak Scholarship in Robotics and Artificial Intelligence — Aug 2021
- University of Waterloo Graduate Scholarship — Sep 2020, Jan 2021, May 2021
- University of Waterloo Graduate Research Studentship (GRS) — 2017 – 2022
- University of Waterloo International Doctoral Student Award (IDSA) — 2017 – 2021
- Excellent Innovative Master's Scholarship, Graduate School of CUMT — Jun 2017
- The Second Prize Academic Scholarship, Graduate School of CUMT — 2015 – 2016
- The Second Prize Academic Scholarship, Graduate School of CUMT — 2014 – 2015
- Outstanding Graduate Scholarship, CUMT — Jun 2014
- The First Prize Scholarship, CUMT — 2012 – 2013
- The First Prize Scholarship, CUMT — 2011 – 2012
- The Second Prize Scholarship, CUMT — 2010 – 2011

LANGUAGES

- Chinese: Native language.
- English: Fluent (listening, speaking, reading, writing).

SKILLS Python, Unity, MATLAB, C++, LaTeX

INTERESTS Sanshou, Muay Thai Boxing, Jogging, Watching Movies.

REFEREES Available upon request