Marc Rigter

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EDUCATION

University of Oxford   Oct. 2018 – Jan. 2023
Ph.D. in Machine Learning and Robotics
Advisors: Prof. Nick Hawes and Dr. Bruno Lacerda

University of Sydney   Feb. 2014 – Jan. 2018
Bachelor of Engineering (Aerospace and Control)
First Class Honours and University Medal (1st in cohort)

EXPERIENCE

Microsoft Research   Jan. 2024 – present
Machine Learning Researcher   *Cambridge, United Kingdom*
- Developing foundation models for decision-making and embodied AI.

Applied AI Lab, University of Oxford   Jan. 2023 – Jan. 2024
Postdoctoral Researcher, supervised by Prof. Ingmar Posner   *Oxford, United Kingdom*
- Led research on generative models and reinforcement learning in addition to co-supervising PhD students.

JP Morgan AI Research   Apr. 2021 – Oct. 2021
Research Scientist Intern   *London, United Kingdom*
- Led project on optimal control for monitoring fraudulent transactions. Completed proof of concept on real transaction data and published novel method.

NASA Jet Propulsion Laboratory   Jul. 2017 – Dec. 2017
Visiting Researcher, supervised by Dr. Rob Reid and Dr. Benjamin Morrell   *Pasadena, USA*
- Developed and published machine-learning method for tuning high-speed autonomous quadrotors.

SKILLS

Research areas: deep learning; generative models; reinforcement learning; computer vision; robotics; foundation models
Programming languages: Python (expert); C++ (intermediate)
Other computer skills: PyTorch; Tensorflow; NumPy; Git; Linux; ROS; Docker; Slurm

PUBLICATIONS

18. *Reward-Free Curricula for Training Robust World Models.*
    International Conference on Learning Representations (**ICLR**), 2024.
    M. Rigter, M. Jiang, I. Posner

17. *World Models via Policy-Guided Trajectory Diffusion.*
    Transactions on Machine Learning Research (**TMLR**), 2024.
    M. Rigter, J. Yamada, I. Posner

16. *TWIST: Teacher-Student World Model Distillation for Efficient Sim-to-Real Transfer.*
    International Conference on Robotics and Automation (**ICRA**), 2024.
    J. Yamada, **M. Rigter**, J. Collins, I. Posner

15. *Risk-sensitive and robust model-based reinforcement learning and planning.*
    PhD thesis, University of Oxford, 2023.
    M. Rigter

14. *One risk to rule them all: A risk-sensitive perspective on model-based offline reinforcement learning.*
    Advances in Neural Information Processing Systems (**NeurIPS**), 2023.
    M. Rigter, B. Lacerda, N. Hawes

13. *Risk-constrained planning for multi-agent systems with shared resources.*
    International Conference on Autonomous Agents and Multiagent Systems (**AAMAS**), 2023.
    Anna Gautier, **Marc Rigter**, Bruno Lacerda, Nick Hawes, and Michael Wooldridge

12. *Planning with hidden parameter polynomial MDPs.*
    AAAI Conference on Artificial Intelligence (**AAAI**), 2023.
    C. Costen, **M. Rigter**, B. Lacerda, N. Hawes

11. *RAMBO-RL: Robust adversarial model-based offline reinforcement learning.*
    Advances in Neural Information Processing Systems (**NeurIPS**), 2022.
    M. Rigter, B. Lacerda, N. Hawes

10. *Planning for risk-aversion and expected value in MDPs.*
    International Conference on Automated Planning and Scheduling (**ICAPS**), 2022.
    Best paper award runner-up.
    M. Rigter, P. Duckworth, B. Lacerda, N. Hawes

9. *Shared autonomy systems with stochastic operator models.*
   International Joint Conference on Artificial Intelligence (**IJCAI**), 2022.
   C. Costen, **M. Rigter**, B. Lacerda, N. Hawes

8. *Optimal admission control for multiclass queues with time-varying arrival rates via state abstraction.*
   AAAI Conference on Artificial Intelligence (**AAAI**), 2022.
   M. Rigter, D. Dervovic, P. Hassanzadeh, J. Long, P. Zehtabi, D. Maggazeni

7. *Risk-averse Bayes-adaptive reinforcement learning.*
   Advances in Neural Information Processing Systems (**NeurIPS**), 2021.
   M. Rigter, B. Lacerda, N. Hawes

6. *Minimax regret optimisation for robust planning in uncertain Markov decision processes.*
   AAAI Conference on Artificial Intelligence (**AAAI**), 2021.
   M. Rigter, B. Lacerda, N. Hawes

5. *A framework for learning from demonstration with minimal human effort.*
   Robotics and Automation Letters (**RAL**), 2020.
   M. Rigter, B. Lacerda, N. Hawes

4. *Robot path planning for multiple target regions.*
   European Conference on Mobile Robots (**ECMR**), 2019.
   S. Ishida, **M. Rigter**, N. Hawes

3. *An autonomous quadrotor system for robust high-speed flight through cluttered environments without GPS.*
   International Conference on Intelligent Robots and Systems (**IROS**), 2019.
   M. Rigter, B. Morrell, R. Reid, G. Merewether, T. Tzanetos, V. Rajur, K. Wong, L. Matthies

2. *Comparison of trajectory optimization algorithms for high-speed quadrotor flight near obstacles.*
   IEEE Robotics and Automation Letters (**RAL**), 2018.
   B. Morrell, R. Thakker, G. Merewether, R. Reid, **M. Rigter**, T. Tzanetos, G. Chamitoff

1. *Differential flatness transforms for aggressive quadrotor flight.*
   International Conference on Robotics and Automation (**ICRA**), 2018.
   B. Morrell, **M. Rigter**, G. Merewether, R. Reid, R. Thakker, T. Tzanetos, V. Rajur, G. Chamitoff

Preprints

1. *The Essential Role of Causality in Foundation World Models for Embodied AI.*
   arXiv preprint, 2024.
   T. Gupta, W. Gong, C. Ma, N. Pawlowski, A. Hilmkil, M. Scetbon, **M. Rigter**, A. Famoti, A. Juan Llorens, J. Gao, S. Bauer, D. Kragic, B. Schölkopf, C. Zhang

Awards

- *Runner-up for the best paper award*, International Conference on Automated Planning and Scheduling (ICAPS), 2022.
- *Clarendon Scholarship*, flagship postgraduate scholarship at the University of Oxford, 2018.
- *University Medal*, awarded by the University of Sydney to the top student in each degree program, 2018.
- *University of Sydney Outstanding Achievement Scholarship*, for achieving the highest possible university entrance percentile (99.95th percentile), 2014.

Teaching

University of Oxford   Jan. 2020 – Mar. 2020
Lead Teaching Assistant, Autonomous Intelligent Machines and Systems CDT
- Created the curriculum for a hands-on robotics course for first-year PhD students (~ 30 contact hours) covering localisation, planning, and control of a mobile robot.
- Presented the course in 2020. The course materials have been reused for subsequent years.

University of Sydney   Feb. 2015 – May 2017
Tutor, MATLAB programming course
- Delivered MATLAB tutorials to classes of approximately 20 students.

Supervision

Jun Yamada, PhD student (co-supervised)	2022 – 2023
Clarissa Costen, PhD student (co-supervised)	2021 – 2022
Ivan Belostotskiy, Master's student (co-supervised)	2019 – 2020
Shu Ishida, Master's student (co-supervised)	2018 – 2019

Professional Service

Reviewing

AAAI Conference on Artificial Intelligence (AAAI)	2021*, 2023
Advances in Neural Information Processing Systems (NeurIPS)	2021*, 2022*, 2023, 2024
Artificial Intelligence	2022, 2023
Automatica	2021, 2022
IEEE International Conference on Robotics and Automation (ICRA)	2020, 2022
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	2020, 2021
International Conference on Automated Planning and Scheduling (ICAPS)	2021*
International Conference on Autonomous Agents and Multiagent Systems (AAMAS)	2021*

* indicates sub-reviewer