

Marc Rigter

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EDUCATION

University of Oxford Oct. 2018 – Jan. 2023

Ph.D. in Machine Learning and Robotics

Thesis: “Risk-Sensitive and Robust Model-Based Reinforcement Learning and Planning”

Advisors: Prof. Nick Hawes and Dr. Bruno Lacerda

Examiners: Prof. Jakob Foerster and Prof. Aviv Tamar

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 Feb. 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.

Thomas Global Systems Apr. 2018 – Aug. 2018

Software Engineer

Sydney, Australia

- Developed prototypes for avionics software, including data-driven calibration of avionics displays.

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

Areas of expertise: deep learning; reinforcement learning; generative models; planning; robotics

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

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| 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

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| 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