

# Marc Rigter

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## EDUCATION

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**University of Oxford** Oct. 2018 – Jan. 2023

*Doctor of Philosophy in Information Engineering*

No corrections

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)

Honours thesis at NASA Jet Propulsion Laboratory supervised by Dr. Rob Reid and Dr. Benjamin Morrell

## EXPERIENCE

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**Microsoft Research** Feb. 2024 – present

*Machine Learning Researcher*

*Cambridge, United Kingdom*

- Developing foundation models for improved decision-making.

**Applied AI Lab, University of Oxford** Jan. 2023 – Jan. 2024

*Postdoctoral Researcher*

*Oxford, United Kingdom*

- Responsible for conducting research on model-based reinforcement learning and generative models, as well as co-supervising PhD students.

**JP Morgan AI Research** Apr. 2021 – Oct. 2021

*Research Scientist Intern*

*London, United Kingdom*

- Led project on the use of Markov decision processes for optimal monitoring of fraudulent transactions. Completed proof of concept on real transaction data and published novel method in AAAI.
- Improved schedule optimisation for the return to office following the Covid-19 pandemic.

**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*

*Los Angeles, USA*

- Developed machine-learning approach to automatically tune quadrotors for high speed flight.
- Approach demonstrated on real autonomous quadrotor system and published at IROS.

## PUBLICATIONS

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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

## SKILLS

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**Areas of expertise:** (deep) reinforcement learning; deep learning; generative models; planning

**Programming languages:** Python (proficient); MATLAB (proficient); C++ (intermediate)

**Other computer skills:** PyTorch; Tensorflow; NumPy; Git; Linux; ROS; Singularity; Slurm

## AWARDS

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- *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 covering all fees and living expenses, 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

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**University of Oxford**

Feb. 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). This involved writing example code for localisation, visualisation, 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 – present
Ana Deligny, PhD student (co-supervised)	2022 – present
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

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### Reviewing

AAAI Conference on Artificial Intelligence (AAAI)	2021*, 2023
Advances in Neural Information Processing Systems (NeurIPS)	2021*, 2022*, 2023
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

### Mentoring

*Pembroke College, University of Oxford*

- Academic representative on the college committee (2019 – 2020). Organised the student mentoring program for that academic year.