Jacob Beck

University of Oxford
Department of Computer Science
+44 7412 011133
jakeABeck@gmail.com
jakebeck.com
github.com/jacooba
Google Scholar *Linkedin*

Education

Class of 2025 Expected — **University of Oxford**, *United Kingdom*, **DPhil**, Computer Science,
Meta-Reinforcement Learning, Multi-Agent Reinforcement Learning, Memory, Few-Shot Learning.
Advisor: Prof. Shimon Whiteson

Class of 2020 — **Brown University**, *United States*, **M.S.**, Computer Science, **4.0 GPA**,
Human Feedback, Game Theory, Autonomous Vehicles, Reinforcement Learning.
Advisor: Prof. Michael Littman, *Thesis*

Class of 2018 — **Brown University**, *United States*, **B.S.**, Computer Science, **3.8 GPA**.

Scholarships

2020–present — ***2020 Google DeepMind Doctoral Scholarship***

Experience

Extended Positions

2019 — **Microsoft Research**, ***Predoc***, Advisor: Katja Hofmann, *Brown's Blog*, *MSR's Blog*,
- Researched long-term memory in deep RL, with first author publication at ICLR 2020
- Showed the sensitivity of modern memory approaches to stochasticity in RL
- Implemented DNC and improved over it by 9%.

2017-2020 — **Brown University Self-Driving Car Lab**, ***Student Researcher***, Advisor: Michael Littman,
- Lead research on learning from human demonstration with human feedback (*New Scientist*)
- Used Stackelberg game trees for human interaction, with a publication at ICSR 2019
- Created DQN to plan actions for an autonomous car in a Unity.

Internships

Summer 2024 — **InstaDeep**, ***PhD Research Intern***,
- Conducting research on large language models (LLMs) for protein design.

Fall 2018 — **DeepScale**, ***R&D Intern***,
- Created state-of-the art methods for lane instance segmentation using PyTorch
- Developed heuristic, cluster-based, and end-to-end approaches based on shuffle net.

Summer 2018 — **Lyft**, ***Software Engineer Intern***,
- Worked on behavioral planning at the Level5 autonomous vehicle lab
- Simulated human agents at a stop intersection in C++
- Coded an MDP, and solver, to find a policy for AV at a stop intersection .

Summer 2017 — **Adobe**, ***Data Science Intern***,
- Improved forecasting for the Data Science Digital Marketing research team
- Set up the models to re-train online as new data comes in (concurrently)
- Improved team's prediction accuracy by 9%, with only 121 samples per model.

Summer 2015 — **Pied Piper Robotics LLC**, ***Engineering Intern***,
- Designed, 3D printed, programmed, and wired a robot head and neck, using ROS.

Journal Publications

2024 A Survey of Meta-Reinforcement Learning
Jacob Beck*, Risto Vuorio*, Evan Zheran Liu, Zheng Xiong, Luisa Zintgraf, Chelsea Finn, and Shimon Whiteson
Under Review at Foundations and Trends in Machine Learnining

Conference Publications

2024 SplAgger: Split Aggregation for In-Context Reinforcement Learning
Jacob Beck, Matthew Jackson, Risto Vuorio, Zheng Xiong, and Shimon Whiteson
Under Review at Reinforcement Learning Conference

2024 Distilling Morphology-Conditioned Hypernetworks for Efficient Universal Morphology Control
Zheng Xiong, Risto Vuorio, **Jacob Beck**, Matthieu Zimmer, Kun Shao, and Shimon Whiteson
Under Review at International Conference on Machine Learning

2023 Recurrent Hypernetworks are Surprisingly Strong in Meta-RL
Jacob Beck, Risto Vuorio, Zheng Xiong, and Shimon Whiteson
Neural Information Processing Systems

2023 Universal Morphology Control via Contextual Modulation
Zheng Xiong, **Jacob Beck**, and Shimon Whiteson
International Conference on Machine Learning

2023 Trust Region Bounds for Decentralized PPO Under Non-stationarity
Mingfei Sun, Sam Devlin, **Jacob Beck**, Katja Hofmann, and Shimon Whiteson
Autonomous Agents and Multiagent Systems (Best Paper Award)

2022 Hypernetworks in Meta-Reinforcement Learning
Jacob Beck, Matthew Jackson, Risto Vuorio, and Shimon Whiteson
Conference on Robot Learning

2021 On the Practical Consistency of Meta-Reinforcement Learning Algorithms
Zheng Xiong, Luisa Zintgraf, **Jacob Beck**, Risto Vuorio, and Shimon Whiteson
NeurIPS Meta-Learning Workshop

2021 No DICE: An Investigation of the Bias-Variance Trade off in Meta-Gradients
Risto Vuorio, **Jacob Beck**, Gregory Farquhar, Jakob Foerster, and Shimon Whiteson
NeurIPS Deep RL Workshop

2020 Stackelberg Punishment and Bully-Proofing Autonomous Vehicles
Matt Cooper, Jun Ki Lee, **Jacob Beck**, Joshua D. Fishman, Michael Gillett, Zoë Papakipos, Aaron Zhang, Jerome Ramos, Aansh Shah, and Michael L. Littman
International Conference on Social Robotics

2020 AMRL: Aggregated Memory For Reinforcement Learning
Jacob Beck, Kamil Ciosek, Sam Devlin, Sebastian Tschiatschek, Cheng Zhang, and Katja Hofmann
International Conference on Learning Representations

Academic Services

2024 **Meta-RL Tutorial**, *Presenter*,
Presented a *tutorial* on meta-reinforcement learning at AAAI 2024.

2023 **TalkRL Podcast**, *Interview*,
Interviewed on the *TalkRL Podcast* to explain meta-reinforcement learning.

2023 **Meta-RL Tutorial**, *Presenter*,
Presented a *tutorial* on meta-reinforcement learning at AutoML 2023.

*Contributed equally

2023 **Neural Information Processing Systems**, *Top Reviewer*.

2022 **NeurIPS Deep RL Workshop**, *Reviewer*.

2022 **International Conference on Machine Learning**, *Reviewer*.

2021 **ICLR Panel, Philosophy and AGI**, *Organizer*,
Organized two *panels* on the the technical and philosophical problems of AGI.

2020 **Nature Communications**, *Reviewer*.

Teaching and Supervision

Spring, 2022 **Supervisor**, *University of Oxford*,
Matthew Jackson, Hypernetworks in meta-reinforcement learning.

Fall, 2021 **Co-Supervisor**, *University of Oxford*,
Zheng Xiong, On the practical consistency of meta-reinforcement learning algorithms.

Fall, 2017 **Deep Learning Teaching Assistant**, *Brown University*,

- Designed, taught, graded material for the graduate deep learning course, CSCI 2470
- Gave a lecture on implementing sequence-to-sequence translation with attention
- Designed a lab on recurrent neural networks.

Computer Skills

Experienced Python, PyTorch, TensorFlow

Intermediate Java, C++, Unity