Nathan Lambert

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I research **data-driven decision making**, including progressing **reinforcmement learning** algorithms, applying them to real-world problems such as **large language models** and **robotics**, and planning for the **societal implications** therein.

Education

Ph.D. in Electrical Engineering and Computer Science, University of California, Berkeley (4.0/4.0)   2017 – 2022
Synergy of Prediction and Control in Model-based Reinforcement Learning
Advisors: Kristofer S.J. Pister, Roberto Calandra
Committee: Sergey Levine, Claire Tomlin

B.S. in Electrical and Computer Engineering, Cornell University (4.0/4.0)   2013 – 2017

Industry Experience

HuggingFace, Remote — Research Scientist and RLHF Team Lead   2022 – cont.
DeepMind, London (*Virtual*) — Research Intern (Host: Martin Riedmiller)   2021
Facebook AI, Menlo Park — Research Intern and Student Researcher (Host: Roberto Calandra)   2019 – 2020
Tesla, Palo Alto Test Engineering Intern   2015

Honors & Awards

Reward Reports - Auditing AI Mozilla Technology Fund Cohort   2023
Best Oral Presentation; Berkeley Sensor and Actuator Sensor Spring Review   2022
Best Student Paper Finalist; IEEE Symposium on Multi-Robot and Multi-Agent Systems   2021
Berkeley EECS Demetri Angelakos Memorial Achievement Award   2021
Heart to Humanity Eternal (H2H8) Pioneer   2021
NDSEG Graduate Research Fellowship Program Top 200   2018
NSF Graduate Research Fellowship Program Honorable Mention   2017, 2018
Berkeley EECS Department Fellowship   2017
Eight undergraduate scholarships   2013 – 2017
Cornell Rowing Charles E. Courtney Award, Tau Beta Pi Scholarship, Southeastern New England Defense Industry Alliance STEM Scholarship 2016, 2017, Cornell Athletics 400 Club Induction, Beta Pi Induction, Eta Kappu Nu Induction, American Society of Engineering Education SMART Scholar Award

Publications [Google Scholar, Semantic Scholar]

Representative publications that I am a primary author on are highlighted.

2022

1. *Measuring Data*
   Margaret Mitchell, Alexandra Sasha Luccioni, **Nathan Lambert**, Marissa Gerchick, Angelina McMillan-Major, Ezinwanne Ozoani, Nazneen Rajani, Tristan Thrush, Yacine Jernite, and Douwe Kiela
   arXiv Preprint 2022

2. *Reward Reports for Reinforcement Learning* [code]
   Thomas Gilbert, Sarah Dean, **Nathan Lambert**, Tom Zick, and Aaron Snoswell
   arXiv Preprint 2022

3. *Choices, Risks, and Reward Reports: Charting Public Policy for Reinforcement Learning Systems*
   Thomas Gilbert, Sarah Dean, Tom Zick, and **Nathan Lambert**
   Center for Long-Term Cybersecurity Whitepaper Series 2022

4. *Investigating Compounding Prediction Errors in One-step Dynamics Models* [code]
   Nathan Lambert, Roberto Calandra, and Kristofer Pister
   arXiv Preprint 2022

5. *Understanding the Challenges of Exploration for Offline Reinforcement Learning*
Nathan Lambert, Markus Wulfmeier, Arunkumar Byravan, Michael Bloesch, William Whitney, Vibhavari Dasagi, Tim Hertweck, and Martin Riedmiller
arXiv Preprint 2022

6. *BLISS: Interplanetary Exploration with Swarms of Low-Cost Spacecraft*
Alexander Alvara*, **Nathan Lambert***, Emmanuel Sin*, Lydia Lee*, Beau Kuhn, Andrew Westphal, and Kristofer Pister
Under Review 2022 (*co-lead authors)

2021

7. *MBRL-Lib: A Modular Library for Model-based Reinforcement Learning* [code]
Luis Pineda, Brandon Amos, Amy Zhang, **Nathan Lambert**, and Roberto Calandra
arXiv Preprint 2021

8. *BotNet: A Simulator for Studying the Effects of Accurate Communication Models on High-agent-count Multi-agent Control* [code]
Mark Selden, Felipe Campos, Jason Zhou, **Nathan Lambert**, Daniel Drew, and Kristofer Pister
Symposium on Multi-Agent and Multi-Robot Systems 2021 (Best Student Paper Finalist)

9. *Axes for Sociotechnical Inquiry in AI Research*
Sarah Dean, Thomas Krendl Gilbert, **Nathan Lambert**, and Tom Zick
Transactions on Technology and Society (TTS) 2021 (Authors arranged alphabetically)

10. *On the Importance of Hyperparameter Optimization for Model-based Reinforcement Learning*
Baohe Zhang, Raghu Rajan, Luis Pineda, **Nathan Lambert**, André Biedenkapp, Kurtland Chua, Frank Hutter, and Roberto Calandra
International Conference on Artificial Intelligence and Statistics (AISTATS) 2021

11. *Learning Accurate Long-term Dynamics for Model-based Reinforcement Learning* [code]
Nathan Lambert, Albert Wilcox, Howard Zhang, Kristofer SJ Pister, and Roberto Calandra
International Conference on Decision and Control (CDC) 2021

12. *Nonholonomic Yaw Control of an Underactuated Flying Robot With Model-Based Reinforcement Learning*
Nathan Lambert, Craig Schindler, Daniel Drew, and Kristofer Pister
Robotics and Automation Letters (RAL) 2021

2020

13. *Objective Mismatch in Model-based Reinforcement Learning*
Nathan Lambert, Brandon Amos, Omry Yadan, and Roberto Calandra
Conference on Learning for Decision and Control (L4DC) 2020

14. *AI Development for the Public Interest: From Abstraction Traps to Sociotechnical Risks*
McKane Andrus, Sarah Dean, Thomas Gilbert, **Nathan Lambert**, and Tom Zick
International Symposium on Technology and Society (ISTATS) 2020 (Authors arranged alphabetically)

15. *Learning for Microrobot Exploration: Model-based Locomotion, Robust Navigation, and Low-Power Deep Classification*
Nathan Lambert, Fahran Toddywala, Brian Liao, Eric Zhu, Lydia Lee, and Kristofer Pister
International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS) 2020

16. *Learning Generalizable Locomotion Skills with HierarchicalReinforcement Learning*
Tianyu Li, **Nathan Lambert**, Roberto Calandra, Akshara Rai, and Franziska Meier
International Conference on Robotics and Automation (ICRA) 2020

2019

17. *Low-Level Control of a Quadrotor With Deep Model-Based Reinforcement Learning* [code]
Nathan Lambert, Daniel Drew, Joseph Yaconelli, Sergey Levine, Roberto Calandra, and Kristofer Pister
Robotics and Automation Letters (RAL) 2019

2018

18. *Toward Controlled Flight of the Ionocraft: A Flying Microrobot Using Electrohydrodynamic Thrust With Onboard Sensing and No Moving Parts*
Daniel S Drew, **Nathan Lambert**, Craig B Schindler, and Kristofer Pister
Robotics and Automation Letters (RAL) 2018

2017

19. *Enhanced lithium niobate pyroelectric ionizer for chip-scale ion mobility-based gas sensing*
K. B. Vinayakumar, V. Gund, **Nathan Lambert**, S. Lodha, and A. Lal
Sensors 2017

Repositories

lvwerra/trl — ★3.9k — *Lean library for RLHF*	2023
huggingface/simulate — ★177 — *Tool for building embodied AI environments*	2022
huggingface/diffusers — ★16.2k — *Diffusion models library*	2022
facebookresearch/mbrl-lib — ★816 — *Model-based reinforcement learning library*	2021
natolambert/dynamicslearn — ★51 — *Model-based RL for mixed sim. and real*	2020

Machine Learning Artifacts

HuggingFaceH4/starchat-alpha — ★209— *Coding assistant language model* (*model*)	2023
HuggingFaceH4/open-llm-leaderboard — ★3098— *Leaderboard for open instruction-tuned LLMs* (*space*)	2023
HuggingFaceH4/stack-exchange-preferences — ★52— *Preference dataset for RLHF from StackExchange* (*dataset*)	2023

Invited Talks

ACM Conference on Fairness, Accountability, and Transparency   (Slides Available)   Jun 2023
(Tutorial) Steering language models with reinforcement learning from human feedback and constitutional AI

UCL Dark Lab   (Recording Available, Slides)   Mar 2023
(Invited Seminar) Reinforcement Learning from Human Feedback; Open and Academic Progress

Microsoft Data Science Gems   Feb 2023
(Invited Seminar) Reinforcement Learning from Human Feedback; Pathways to Open Reproduction of ChatGPT

ICML Workshop on Responsible Decision Making in Dynamic Environments   (Recording Available, Slides)   July 2022
(Contributed Talk) Reward Reports for Reinforcement Learning

Lead The Future   July 2022
(Invited Seminar) Synthesizing Robotic Controllers with Model-based Reinforcement Learning

University of Pennsylvania – Perception, Action, and Learning Group   (Recording Available, Slides)   April 2022
(Invited Seminar) Planning through Exploration and Exploitation in Model-based Reinforcement Learning

Microsoft Research   (Slides)   March 2022
(Job Talk) Legible Reinforcement Learning via Dynamics Models

DeepMind Robotics All Hands   February 2022
(Invited Seminar) The Challenges of Exploration for Offline Reinforcement Learning

Amazon Robotics & AI   (Slides)   February 2022
(Job Talk) Synergy of Prediction and Control in Model-based Reinforcement Learning

Cruise AI   December 2021
(Job Talk) Control-oriented Predictions in Model-based Reinforcement Learning

Cornell Robotics Seminar   (Recording Available, Slides)   March 2021
(Invited Seminar) Improving Model Predictive Control in Model-based Reinforcement Learning

UC Berkeley Semiautonomous Seminar   (Recording Available, Slides)   April 2020
(Invited Seminar) Model Learning for Low-level Control in Robotics

Mentorship

Mark Selden (UC Berkeley BS '22)	2020
Albert Wilcox (UC Berkeley BS '22)	2019
Jason Zhou (UC Berkeley BS, MS '21 to Matician)	2019
Felipe Campos (UC Berkeley BS '20 to Armstrong Robotics)	2018
Howard Zhang (UC Berkeley BS, MS'21 to UCLA PhD)	2018

Peer Review

Conference on Machine Learning (ICML) (count is 1 unless labelled)	2020, 2022 (3)
Conference on Neural Information Processing Systems (NeurIPs)	2022 (2)
Conference on Learning Representations (ICLR) (*Outstanding Reviewer)	2021* (3), 2022 (3)
Conference on Robot Learning (CORL)	2020
Conference on Robotics and Automation (ICRA)	2020, 2021, 2022 (2)
Conference on Intelligent Robots and Systems (IROS)	2021, 2022 (2)
Robotics - Science and Systems (RSS)	2022
Conference on Decision and Control (CDC)	2021
Robotics and Automation Letters (RA-L)	2019, 2020, 2022
Transactions on Cybernetics	2019, 2020

Professional Activities

Associate Editor (AE), Conference on Intelligent Robots and Systems (IROS)	2023
Farama Foundation Board of Technical Advisors	2022 – cont.
NeurIPs Workshop on Robot Learning Organizor	2021, 2022
Member of Well-Being in Machine Learning	2021 – cont.
RLDM Workshop on Building Accountable and Transparent RL Organizer	2022
Berkeley AI Research Audio & Video Team	2021 – 2022
Machine Learning Collective Office Hours	2021 – cont.
Tapia Panel on Student Mental Health Organizor	2021
Founder of UC Berkeley EECS Equal Access to Application Assistance (EAAA) Program	2020 – 2022
Wellness Coordinator for UC Berkeley Electrical Engineering Graduate Student Assembly (EEGSA)	2020 – 2022
Bay Area Teachers in Schools	2017

Teaching

Introduction to Artificial Intelligence (UCB CS188), TA	Su2020, Fa2020
Introduction to Artificial Intelligence (UCB CS188), Instructor lectured to 800+ students	Sp2020
Designing Information Devices and Systems II (UCB EE16B), TA	Fa2019
Integrated Micro Sensors and Actuators (Cornell ECE4320), Grader	Sp2017
Mathematics of Signal and System Analysis (Cornell ECE 3250), TA	Fa2016

Extracurriculars

Cornell Varsity Lightweight Rowing	2013 – 2017
Novice Rowing Coach	2017 – 2018
Graduates for Engaged and Extended Scholarship in Computing and Engineering President	2021 – 2022