John D. Martin

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https://jdmartin86.github.io

RESEARCH INTERESTS

Artificial Intelligence and Reinforcement Learning, including topics such as model-based RL, meta learning, continual learning, representations, agency and embodiment.

EDUCATION

Stevens Institute of Technology **2015 – 2021**
Ph.D. in Mechanical Engineering

Columbia University **2013 – 2015**
Graduate coursework in Computer Science

University of Maryland **2009 – 2012**
B.S. in Physics and B.S in Aerospace Engineering

PUBLICATIONS

Settling the Reward Hypothesis,
John D. Martin*, Michael Bowling*, David Abel, Will Dabney
In Preperation, (2022)

Should Models Be Accurate?,
Esra'a Saleh, **John D. Martin**, Anna Koop, Arash Pourzarabi, Michael Bowling
The Multi-disciplinary Conference on Reinforcement Learning and Decision Making, (2022)

Adapting the Function Approximation Architecture in Online Reinforcement Learning,
John D. Martin*, Joesph Modayil*
ArXiv 2106.09776, (2021)

On Catastrophic Interference in Atari 2600 Games,
William Fedus*, Dibya. Ghosh*, **John D. Martin**, Marc G. Bellemare, Yoshua Bengio, Hugo Larochelle
ArXiv 2002.12499, (2020)

Stochastically Dominant Distributional Reinforcement Learning,
John D. Martin, Michal Lyskawinski, Xiaohu Li, Brendan Englot,
37th International Conference on Machine Learning (ICML), (2020).

Variational Filtering with Copula Models for SLAM,
John D. Martin*, Kevin Doherty*, Caralyn Cyr, Brendan Englot, John Leonard,
International Conference on Intelligent Robots and Systems (IROS), (2020).

Autonomous Exploration Under Uncertainty via Deep Reinforcement Learning on Graphs,
Fanfei Chen, **John D. Martin**, Yewei Huang, Jinkun Wang, Brendan Englot
International Conference on Intelligent Robots and Systems (IROS), (2020).

Fusing Orthogonal Wide-aperture Sonar Images for Dense Underwater 3D Reconstruction,
John McConnell, **John D. Martin**, Brendan Englot
International Conference on Intelligent Robots and Systems (IROS), (2020).

Sparse Gaussian Process Temporal Difference Learning for Marine Robot Navigation,
John D. Martin, Jinkun Wang, Brendan Englot,
2nd Annual Conference on Robot Learning (CoRL), (2018).

Extending Model-based Policy Gradients for Robots in Heteroscedastic Environments,
John D. Martin, Brendan Englot,
1st Annual Conference on Robot Learning (CoRL), (2017).

WORKSHOP PUBLICATIONS

Learning to Prioritize Planning Updates in Model-based Reinforcement Learning,
Brad Burega, **John D. Martin**, Michael Bowling
NeurIPS Workshop on Meta Learning, (2022)

The Stochastic Road Network Environment for Robust Reinforcement Learning,
John D. Martin, Paul Szenher, Xi Lin, Brendan Englot
ICRA Workshop on Releasing Robots into the Wild, (2022)

Adapting the Function Approximation Architecture in Online Reinforcement Learning,
John D. Martin*, Joesph Modayil*, Fatima Davelouis Gallardo, Michael Bowling
The Multi-disciplinary Conference on Reinforcement Learning and Decision Making, (2022)

Stochastically Dominant Distributional Reinforcement Learning,
John D. Martin, Michal Lyskawinski, Xiaohu Li, Brendan Englot,
New York Academy of Sciences, Machine Learning Symposium, (2020)

MEMENTO: Further Progress Through Forgetting,
William Fedus*, Dibya. Ghosh*, **John D. Martin**, Marc G. Bellemare, Yoshua Bengio, Hugo Larochelle
NeurIPS Workshop on Biological and Artificial RL (2019). (Best Poster Award)

Stochastically Dominant Distributional Reinforcement Learning,
John D. Martin, Michal Lyskawinski, Xiaohu Li, Brendan Englot,
NeurIPS Workshop on Safety and Robust Decision Making (2019).

Distributed Gaussian Process Temporal Differences for Actor-critic Learning,
John D. Martin, Zheng Xing, Zhiyuan Yao, Ionut Florescu, Brendan Englot,
New York Academy of Sciences, Machine Learning Symposium, (2018)

APPOINTMENTS

Intel AI Labs. **2022 – Present**
Research Scientist

I perform fundamental and applied research in reinforcement learning.

Reinforcement Learning and AI Lab - University of Alberta. **2021 – 2022**
Postdoctoral Fellow – Advisor: Michael Bowling

I performed fundamental research in reinforcement learning and artificial intelligence while co-supervising two graduate students whose research focused on model-based RL and representation learning in RL.

DeepMind - Edmonton **June 2020 – Nov. 2020**
Research Scientist Intern – Host: Joseph Modayil

I studied how RL systems can continually adapt neural network topologies in the incremental online learning setting. This remains a central topic of my current research.

Google Brain - Montréal **May 2019 – Feb. 2020**
Research Scientist Intern / Student Researcher – Host: Marc G. Bellemare

I studied algorithms for efficient exploration in RL. Additionally, I studied catastrophic interference in deep neural networks—received best poster at a NeurIPS 2019 workshop.

Piasecki Aircraft Corporation **2017 – 2019**
Part-time Analytical Consultant

I wrote proposals for new autonomy research initiatives, one of which was awarded $500,000.

Sikorsky Aircraft **2012 – 2015**
Robotics and Flight Controls Engineer

I was part of a small development team that took two experimental helicopters to first flight.

TEACHING EXPERIENCE

Nepal Applied Mathematics and Informatics Institute **December 2021**
Program Chair.
I was the principle organizer of an introductory lecture series on reinforcement learning. This consisted of four ninety-minute lectures, two of which I gave. In addition, I helped find speakers for other introductory machine learning topics.

Stevens Institute of Technology, Advanced Robotics (ME-654) Spring 2020, 2021
Guest Lecture: Seeking Certainty in An Uncertain World
I gave a guest lecture centered on uncertainty-sensitive decision making in RL.

Stevens Institute of Technology, Advanced Robotics (ME-654) **Spring 2017**
Guest Lecture: Reinforcement Learning Basics
I co-taught a lecture with other instructors, introducing students to the basics of RL.

INVITED TALKS

University of Massachusetts Amherst, **October 2022**
Learning to Prioritize Updates in Model-based Reinforcement Learning

Google Brain, Sparsity Reading Group, **August 2021**
Adapting the Function Approximation Architecture in Online Reinforcement Learning.

University of California Berkeley, **November 2020**
Uncertainty, Perception, and Their Lessons for Creating General-purpose Robots.

Massachusetts Institute of Technology, **November 2019**
From Tasks to Timescales: A path to generalization in reinforcement learning.

Deepmind, Edmonton **October 2019**
From Tasks to Timescales: A path to generalization in reinforcement learning.

Google Robotics, New York **August 2019**
Exploiting Transition Invariance for Multi-stage Reinforcement Learning Tasks.

Stevens Institute of Technology **August 2014**
Sikorsky R&D: Motion Planning for Autonomous Rotorcraft.

AWARDS

Robert Crooks Stanley Fellow **2019, 2020**
Two-time recipient. Provided one year of research funding.

Department of Homeland Security Doctoral Fellow **2015**
Provided four years of academic and research funding.

American Helicopter Society Howard Hughes Award **2015**
Accepted on behalf of the Sikorsky Autonomous Research Aircraft team, for achieving completely autonomous flight with an S-76 helicopter, including takeoff, path planning, navigation to an objective, and landing zone selection.

ACADEMIC SERVICE

Masters Thesis Advising
Co-advising with Michael Bowling at the University of Alberta
Bradley Burega, University of Alberta, *2021–*
Fatima Davelouis, University of Alberta, *2021–*

Workflow Chair
AAAI 2023

Program Chair

NAAMII Winter AI School, 2021
ICML Reinforcement Learning Social, 2020

Program Committee

ICLR, 2021
NeurIPS, 2022, 2021, 2020
ICML, 2021, 2020
ICML, Robust RL Workshop, 2021
AAAI, 2019
CoRL, 2020
WAFR, 2019
RAL, 2019
ICRA, 2020, 2019, 2018
IROS, 2017
JOE, 2020

Mentor

Neuromatch Academy, 2022
NeurIPS New in ML Workshop, 2020

LANGUAGES

Computer

Python, C/C++, R, OCaml, Matlab

Natural

English, Nepalese