Matthew Schlegel

Affiliation: modl.ai ● E-Mail: mkschleg@gmail.com ● Website: mkschleg.github.io

Education

University of Alberta – Edmonton, Alberta, CA — August 2023
PhD in Computing Science
Supervised by: Martha White and Adam White

Indiana University – Bloomington, IN — May 2017
Master of Science in Computer Science

Indiana University – Bloomington, IN — May 2015
Bachelor of Science in Physics with Distinction
Minors: Computer Science, Math, Music

Research Experience

Modl.AI – Member of Technical Staff: Research — November 2023 – Present

University of Alberta – Research Assistant — January 2019 – September 2023

BorealisAI – Research Intern — September 2021 – December 2021

Huawei – Research Intern — May 2018 – September 2018

University of Alberta – Research Assistant — August 2017 – May 2018

Indiana University – Research Assistant — May 2016 – July 2017

Publications

Pre-print

Human-like Bots for Tactical Shooters Using Compute-Efficient Sensors. Niels Justesen, Maria Kaselimi, Sam Snodgrass, Miruna Vozaru, **Matthew Schlegel**, Jonas Wingren, et. al. arXiv preprint arXiv:2501.00078. 2024.

Journal

In-sample Sparsemax for Offline Reinforcement Learning by Tsallis Regularization. Lingwei Zhu*, **Matthew Schlegel***, Han Wang, Martha White. Transactions on Machine Learning Research (TMLR). 2024.

Investigating Action Encodings in Recurrent Neural Networks in Reinforcement Learning. **Matthew Schlegel**, Volodymyr Tkachuk, Adam White, Martha White. Transactions on Machine Learning Research (TMLR). 2022.

General Value Function Networks. **Matthew Schlegel**, Andrew Jacobsen, Andrew Patterson, Zaheer Abbas, Adam White, Martha White. Journal of Artificial Intelligence Research (JAIR). 2021.

Conference

General Munchausen Reinforcement Learning with Tsallis Kullback-Leibler Divergence. Lingwei Zhu, Zheng Chen, **Matthew Schlegel**, Martha White. Neural Information Processing System Conference (NeurIPS). 2023.

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Continual Auxiliary Task Learning. Matthew K. McLeod, Chunlok Lo, **Matthew Schlegel**, Andrew Jacobsen, Raksha Kumaraswamy, Adam White, Martha White. Neural Information Processing System Conference (NeurIPS). 2021.

Structural Credit Assignment in Neural Networks using Reinforcement Learning. Dhawal Gupta, Gabor Mihucz, **Matthew Schlegel**, James E. Kostas, Philip S. Thomas, Martha White. Neural Information Processing System Conference (NeurIPS). 2021.

Importance Resampling for Off-Policy Prediction. **Matthew Schlegel**, Wesley Chung, Jian Qiang, Daniel Graves, Martha White. Neural Information Processing System Conference (NeurIPS). 2019.

Meta-descent for online, continual prediction. Andrew Jacobsen, **Matthew Schlegel**, Cameron Linke, Martha White, Adam White. AAAI Conference on Artificial Intelligence. 2019.

Context-dependent upper-confidence bounds for directed exploration. Raksha Kumaraswamy, **Matthew Schlegel**, Adam White, Martha White. Neural Information Processing System Conference (NeurIPS). 2018.

Adapting kernel representations online using submodular maximization. **Matthew Schlegel**, Yangchen Pan, Jiecao Chen, Martha White. International Conference on Machine Learning (ICML). 2017.

Workshop

Predictions predicting predictions. **Matthew Schlegel**, Martha White. The Multi-disciplinary Conference on Reinforcement Learning and Decision Making, 2022.

A Baseline of Discovery for General Value Function Networks under Partial Observability. **Matthew Schlegel**, Adam White, Martha White. Reinforcement Learning under Partial Observability Workshop at NeurIPS. 2018.

Stable predictive representations with general value functions for continual learning. **Matthew Schlegel**, Adam White, Martha White. Continual Learning and Deep Networks workshop at NeurIPS. 2016.

Awards

Grants

IVADO PhD Excellence Scholarship ($100k)	2019-2023

Other Awards

Graduate Student Teaching Award	2020
Runner up for Early PhD Achievement Award	2018
University of Alberta Doctoral Recruitment Award ($10k)	2017-2018
CL&DNs Workshop NeurIPS student travel award	2017
Dean's List (9 Semesters)	2010-2015
Founders Scholar (4 Semesters)	2011, 2012

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Teaching Experience

CMPUT 397: Reinforcement Learning — Fall 2020
University of Alberta - Teaching Assistant

CMPUT 466/551: Machine Learning — Fall 2018, Fall 2019
University of Alberta - Teaching Assistant

CSCI B659: Reinforcement Learning — Spring 2017
Indiana University - Teaching Assistant

CSCI C335: Computer Structures — Spring 2016
Indiana University - Teaching Assistant

BIO L111: Foundations of Biology — Fall 2014
Indiana University - Teaching Assistant

Course Development

CMPUT 396: Machine Learning - Intermediate — Fall 2021, 2022
University of Alberta

CMPUT 267: Machine Learning - Basics — Fall 2021
University of Alberta

Presentations and Posters

Conferences (poster)

- COLLAs — 2023
- IJCAI — 2021
- NeurIPS — 2019, 2021
- AAAI — 2019

Invited Talk - INRIA Flowers Group — 2023

Barbados Workshop on Lifelong Reinforcement Learning (talk) — 2019, 2023

AI Seminar, University of Alberta Computing Science (talk) — 2022

Reinforcement Learning and Decision Making (poster) — 2022

Tea Time Talk — University of Alberta (RLAI) — 2018, 2019, 2020, 2021, 2022

Cognitive Neuroscience Seminar Series (talk) — 2019

Startup Edmonton (talk) — November 14, 2018

- Presented to a non-technical audience on the formulation and use of General Value Functions focusing on work done in the University of Alberta's RLAI and BLINC labs.

Deep Learning Reinforcement Learning Summer School (poster) — Summer 2018

- Presented a poster on General Value Function Networks.

Community

Lab Manager — 2022, 2023

- Organize various activities and resources for Martha White's lab including lab meetings, lab documents, and various other admin responsibilities to ensure a smooth lab experience.

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AI4Good Lab — Lecture 2021, 2022

- Lectured on several topics: Markov decision processes, dynamic programming, value functions, Monte Carlo methods, and temporal-difference learning.

ICLR Reviewer Mentorship Program 2021

- Participated as a mentor for the ICLR (2022) reviewer mentorship program. Provided advice and comments for new reviewers.

Making Minds Reading Group July 2018 - January 2021

- Organized and planned the University of Alberta's "Making Minds Reading Group" (MMRG).

Reinforcement Learning NeurIPS Social 2019

- On the organizing committee for the first reinforcement learning social hosted at the International Conference for Neural and Information Processing Systems.

Indiana University – Diversity and Inclusion Workshop Leader September 2015 – May 2017

- Create and present workshops, and other events to influence an inclusive environment within the School of Informatics and Computing.

Reviewing Experience

Journals

JMLR (2021, 2024)

JAIR (2022, 2023)

Neurons, Behavior, Data analysis, and Theory (2023)

TMLR (2022, 2023)

Conferences

AAAI (2019, 2020, 2021)

AISTATs (2022)

COLLAs (2022, 2023, 2024)

ICLR (2019, 2020, 2021, 2023)

ICML (2019, 2021)

NeurIPS (2019, 2020, 2021)

RLC (2024)

Workshops

Self-supervision for Reinforcement Learning, ICLR (2021)

Reproducibility Challenge, ICLR (2021, 2022, 2023)

Biological and Artificial Reinforcement Learning, NeurIPS (2019, 2020)

Optimization Foundations in Reinforcement Learning, NeurIPS (2019)

Technical Skills

- Proficient in developing and deploying machine learning models using several core technology stacks including Tensorflow/Keras, Flux (Julia), TFLite, ONNX, and Jax.

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- Hands on experience deploying training systems to AWS/Azure, using machine learning experiment platforms like Neptune, and developing pipelines for data processing, model training, and deployment.
- Demonstrated capabilities in writing and communication through published works, and several teaching and leadership experiences.