NICHOLAS E. CORRADO

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EDUCATION

University of Wisconsin – Madison, Madison, WI   2019 – Present
Ph.D., Computer Sciences
Research Interests: reinforcement learning, data augmentation, robotics, representation learning
Advisor: Josiah Hanna

University of Pittsburgh, Pittsburgh, PA   2015 – 2019
B.S. in Physics, B.S in Mathematics, Minor in Computer Science
Thesis: A Search for W_{bJ} in Decays of $\Upsilon(5S)$: An Analysis Design Study
Advisor: Vladimir Savinov

EXPERIENCE

University of Wisconsin – Madison, *Graduate Research Assistant* ○ Madison, WI .... Jan. 2021 – Present
Advisor: Josiah Hanna

- ▸ Focus 1: Adaptive Action Sampling. Demonstrated that *on-policy* policy gradient algorithms are more data efficient with adaptive, *off-policy sampling* than *on-policy sampling* [M1].
- ▸ Focus 2: Data Augmentation. Identified aspects of data augmentation that improve the data efficiency of RL [C1] and successfully applied these insights to a *real-world robotics task* [M2].

Sandia National Laboratories, *Graduate Research Intern* ○ Albuquerque, NM (Remote) ....May 2021 – Nov. 2023
Advisor: Drew Levin

- ▸ Deep reinforcement learning for power systems management via distributed energy resource (DER) control [C2].
- ▸ From May 2022 - Nov 2023, I served as a consultant for reinforcement learning projects.

University of Wisconsin – Madison, *Graduate Research Assistant* ○ Madison, WI ....Sept. 2019 – Sept. 2020
Advisor: Jignesh Patel

- ▸ Built the query execution and storage engines of Hustle, a scalable data platform built on top of Apache Arrow.
- ▸ Designed a variant of the Lookahead Information Passing (LIP) query execution strategy with improved robustness in dynamic data environments and implemented it in Hustle.

University of Pittsburgh, *Undergraduate Research Assistant* ○ Pittsburgh, PA ....Oct. 2016 - Aug. 2019
Advisor: Vladimir Savinov

- ▸ Designed and optimized the first search for new hadronic W_{bJ} states in data collected by the Belle experiment. [thesis]
- ▸ Created tools to monitor TOP Level-1 trigger performance for the Belle-II experiment.

PAPERS

Manuscripts Under Review ....

[M1] **Nicholas E. Corrado** and Josiah P. Hanna. On-Policy Policy Gradient Reinforcement Learning Without On-Policy Sampling. Submitted. Feb. 2024. arXiv: 2311.08290. [paper]

[M2] **Nicholas E. Corrado**, Yuxiao Qu, John U. Balis, Adam Labiosa, and Josiah P. Hanna. Guided Data Augmentation for Offline Reinforcement Learning and Imitation Learning. Submitted. Mar. 2024. arXiv: 2310.18247. [paper] [video]

Conference Publications...

[C1] **Nicholas E. Corrado** and Josiah P. Hanna. Understanding when Dynamics-Invariant Data Augmentations Benefit Model-Free Reinforcement Learning Updates. In *Proceedings of the International Conference on Learning Representations (ICLR)*, May 2024. [paper]

[C2] **Nicholas E. Corrado**, Michael Livesay, Jay Johnson, and Drew Levin. Deep Reinforcement Learning for Distribution Power System Cyber-Resilience via Distributed Energy Resource Control. In *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (IEEE SmartGridComm)*, 2023. [paper]

[C3] **Nicholas E. Corrado**, Yuxiao Qu, and Josiah P. Hanna. Simulation-Acquired Latent Action Spaces for Dynamics Generalization. In *Proceedings of the 1st Conference on Lifelong Learning Agents (CoLLAs)*, 2022. [paper] [video] [website]

Technical Reports..

[T1] **Nicholas E. Corrado**, Michael Livesay, Tyson Bailey, and Drew Levin. <u>Reinforcement Learning for Automatic Generation Control using a Kuramoto-like Model</u>. 2023.

[T2] **Nicholas E. Corrado** and Vladimir Savinov. <u>Search for Decay $\Upsilon(5S) \to \gamma W_{bJ}$</u>. *Belle Collaboration*, Belle Note 1522, 2019. [paper]

[T3] **Nicholas Corrado** & Vladimir Savinov. <u>Search for $\Upsilon(5S) \to \gamma W_{bJ}$</u>. In *American Physical Society (APS) Meeting*, 2018. [abstract & slides]

HONORS & AWARDS

▸ **Sandia Employee Recognition Award.** Awarded to < 10% of the Sandia workforce	2023
▸ **UW-Madison CS Department Scholarship ($3000).** Awarded to top graduate applicants.	2019
▸ **John O. Blumberg Memorial Scholarship ($1000).** Awarded to the top math major.	2019
▸ Pennsylvania Space Grant Consortium Scholarship (third time, $1500). Research funding.	2019
▸ Emil Sanielevici Scholarship ($4000). Research funding.	2018
▸ Pennsylvania Space Grant Consortium Scholarship (second time, $1500). Research funding.	2018
▸ J&M Bigos Memorial Scholarship ($10,000). Awarded for academic excellence.	2018
▸ Sigma Pi Sigma Physics Honor Society	2018
▸ American Physical Society DPF Travel Award ($200)	2017
▸ **Peter F.M. Koehler Award ($500).** Awarded to the top physics major.	2017
▸ Brackenridge Summer Research Fellowship ($3500). Research funding.	2017.
▸ Rebecca Dytman Scholarship ($10,000). Awarded for academic excellence in physics and astronomy.	2017
▸ Pennsylvania Space Grant Consortium Scholarship (first time, $1500). Research funding.	2017

TALKS

▸ **On-Policy Policy Gradient Reinforcement Learning Without On-Policy Sampling** University of Edinburgh RL Reading Group	2023

ADVISING

▸ Nora Tseng (Undergraduate, University of Wisconsin-Madison)	2024 – Present
▸ Yuxiao Qu (Undergraduate, University of Wisconsin-Madison) **Current Position: PhD @ Carnegie Mellon University.**	2021-2023

TEACHING EXPERIENCE

University of Wisconsin–Madison ....

▸ Research Mentor Program (Part of the Delta Program)	Fall 2023
▸ Teaching Assistant for *Mathematical Foundations of Machine Learning (CS 761)*	Fall 2021
▸ Head Teaching Assistant for *Intro to Computer Systems (CS 354)*	Fall 2021
▸ Teaching Assistant for *Problem Solving for Engineers (CS 310)*	Spring 2021
▸ Teaching Assistant for *Discrete Mathematics (CS 240)*	Fall 2020

University of Pittsburgh ....

▸ Teaching Assistant for *Quantum Mechanics (PHYS 1370)*	Fall 2018

SERVICE

▸ Graduate Student Mentor, Wisconsin Science and Computing Emerging Research Stars (WISCERS)	2024
▸ Invited Panelist, Demystifying Graduate School (University of Wisconsin-Madison)	2024
▸ Sandia Machine Learning and Deep Learning (MLDL) Workshop. Designed a reinforcement learning competition.	2022

Reviewing ....

▸ Senior Reviewer, RLC (Reinforcement Learning Conference)	2024
▸ Reviewer, ICML	2024
▸ Reviewer, ICLR	2024
▸ Reviewer, AAAI	2024
▸ Reviewer, ICRA	2024
▸ Reviewer, NeurIPS	2023

Machine Learning & Data Science: Python ∘ PyTorch ∘ NumPy ∘ Pandas ∘ Matplotlib ∘ Jupyter ∘ Anaconda
Software Engineering: C++ ∘ C ∘ Git ∘ Bash