NICHOLAS E. CORRADO

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EDUCATION

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

University of Pittsburgh, Pittsburgh, PA — 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 [C2] and successfully applied these insights to a *real-world robotics task* [C1].

Amazon, *Applied Scientist Intern* ∘ Palo Alto, CA .....June 2024 – Sept. 2024

- RL for LLMs.

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 [C3].
- 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]

Conference Publications

[C1] **Nicholas E. Corrado**, Yuxiao Qu, John U. Balis, Adam Labiosa, and Josiah P. Hanna. Guided Data Augmentation for Offline Reinforcement Learning and Imitation Learning.[paper] [video]

[C2] **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]

[C3] **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]

[C4] **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. Reinforcement Learning for Automatic Generation Control using a Kuramoto-like Model. 2023.

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

[T3] **Nicholas Corrado** & Vladimir Savinov. Search for $\Upsilon(5S) \to \gamma W_{bJ}$. 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** 2023
  University of Edinburgh RL Reading Group

ADVISING

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

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

- Reviewer, RA-L (Robotics and Automation Letters) 2024
- Senior Reviewer, RLC (Reinforcement Learning Conference) 2024
- Reviewer, ICML 2024
- Reviewer, ICLR 2024
- Reviewer, AAAI 2024
- Reviewer, ICRA 2024
- Reviewer, NeurIPS 2023

MEDIA

- Training a dog and training a robot aren't so different 2023

TECHNICAL SKILLS

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