Nicholas E. Corrado

ncorrado@wisc.edu (412) 417-1383
https://nicholascorrado.github.io https://github.com/NicholasCorrado

Education

Present **University of Wisconsin – Madison**, Madison, WI
Doctoral Student, Advisor: *Josiah Hanna*, GPA: *3.8/4.0*
Interests: reinforcement learning, robotics, data augmentation, representation learning

04/19 **University of Pittsburgh**, Pittsburgh, PA
BPhil in Physics, BS in Mathematics, Advisor: *Vladimir Savinov*, GPA: *3.9/4.0*
Thesis: A Search for W_{bJ} in Decays of $\Upsilon(5S)$: An Analysis Design Study [thesis]

Experience

01/21 – Present **University of Wisconsin – Madison**, *Research Assistant*, Madison, WI.
Advisor: Josiah P. Hanna

- My research focuses on improving the data efficiency of reinforcement learning (RL) by controlling the distribution of data from which an RL agent learns.
- Identified aspects of data augmentation that improve the data efficiency of RL and successfully applied these insights to a **real-world robotics task.**
- Demonstrated that on-policy policy gradient algorithms are more data efficient with **adaptive, off-policy sampling** than on-policy sampling.

05/21 – 11/23 **Sandia National Laboratories**, *Research Intern*, Albuquerque, NM.
Advisor: Drew Levin

- Deep reinforcement learning for power systems management.
- From May 2022 - Nov 2023, I served as a consultant for reinforcement learning projects.

09/19 – 09/20 **University of Wisconsin – Madison**, *Research Assistant*, Madison, WI.
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 for Hustle. [github]

10/16 – 08/19 **University of Pittsburgh**, *Research Assistant*, Pittsburgh, PA.
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.

Submitted Manuscripts

Nicholas E. Corrado & Josiah P. Hanna. On-policy policy gradient learning without on-policy sampling. Under Review. [arxiv]

Nicholas E. Corrado, Yuxiao Qu, John U. Balis, Adam Labiosa, & Josiah P. Hanna. Guided data augmentation for offline reinforcement learning and imitation learning. Under Review. [arxiv] [video]

Nicholas E. Corrado, Michael Livesay, Tyson Bailey, & Drew Levin. Reinforcement learning for automatic generation control using a Kuramoto-like model. Under Review.

Publications

ICLR 2024 **Nicholas E. Corrado** & 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), 2024. [arxiv]

IEEE SmartGridComm 2023 **Nicholas E. Corrado**, Michael Livesay, Jay Johnson, & 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]

CoLLAs 2022 **Nicholas Corrado**, Yuxiao Qu, Josiah P. Hanna. Simulation-acquired latent action spaces for dynamics generalization. In Proceedings of the 1st Conference on Lifelong Learning Agents (CoLLAs), 2022. [paper] [website] [video]

Abstracts

MMLS 2023 **Nicholas E. Corrado** & Josiah P. Hanna. On-policy policy gradient learning without on-policy sampling. In Midwest Machine Learning Symposium (MMLS), 2023.

MMLS 2023 **Nicholas E. Corrado**, Yuxiao Qu, John U. Balis, Adam Labiosa, & Josiah P. Hanna. Guided data augmentation for offline reinforcement learning and imitation learning. In Midwest Machine Learning Symposium (MMLS), 2023.

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

Technical Reports

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

Honors & Awards

2023 **Sandia Employee Recognition Award. Awarded to $<$ 10% of the Sandia workforce**

2019 **UW-Madison CS Department Scholarship ($3000). Awarded to top graduate applicants.**

John O. Blumberg Memorial Scholarship ($1000). Awarded to the top math major.

Pennsylvania Space Grant Consortium Scholarship (third time, $1500). Research funding.

2018 Emil Sanielevici Scholarship ($4000). Research funding.

Pennsylvania Space Grant Consortium Scholarship (second time, $1500). Research funding.

APS DPF Travel Award ($200)

J&M Bigos Memorial Scholarship ($10,000). Awarded for academic excellence.

Sigma Pi Sigma Physics Honor Society

2017 **Peter F.M. Koehler Award ($500). Awarded to the top physics major.**

Brackenridge Summer Research Fellowship ($3500). Research funding.

Rebecca Dytman Scholarship ($10,000). Awarded for academic excellence in physics and astronomy.

Pennsylvania Space Grant Consortium Scholarship (first time, $1500). Research funding.

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.**

Talks

2023 On-Policy Policy Gradient Reinforcement Learning Without On-Policy Sampling (University of Edinburgh RL Reading Group)

Teaching Experience

Fall 2023 Research Mentor Program
(University of Wisconsin – Madison, Delta Program)

Fall 2021 Teaching Assistant for *Mathematical Foundations of Machine Learning*
(University of Wisconsin – Madison, CS 761)

Fall 2021 Head Teaching Assistant for *Intro to Computer Systems*
(University of Wisconsin – Madison, CS 354)

Spring 2021	Teaching Assistant for *Problem Solving for Engineers* (University of Wisconsin – Madison, CS 310)
Fall 2020	Teaching Assistant for *Discrete Mathematics* (University of Wisconsin – Madison, CS 240)
Fall 2018	Teaching Assistant for *Quantum Mechanics* (University of Pittsburgh, PHYS 1370)

Service

Academic Service	Graduate Student Mentor, Wisconsin Science and Computing Emerging Research Stars (WISCERS) (2024)
Workshops	Sandia Machine Learning and Deep Learning (MLDL) Workshop. Designed and organized 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

Technical Skills

Languages	Python, C++, C, familiar with Matlab, Java, Verilog
Other	PyTorch, Apache Arrow, ROOT