

# Nicholas E. Corrado

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## Education

Present **University of Wisconsin – Madison**, Madison, WI

**Doctoral Student**, Advisor: *Josiah Hanna*

*Interests*: reinforcement learning, robotics, data augmentation, representation learning

2019 **University of Pittsburgh**, Pittsburgh, PA

**BPhil in Physics, BS in Mathematics**, Advisor: *Vladimir Savinov*

*Thesis*: A Search for  $W_{bJ}$  in Decays of  $\Upsilon(5S)$ : An Analysis Design Study ([link](#))

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## Experience

Jan 2021 – **University of Wisconsin – Madison**, *Research Assistant*, Madison, WI.

Present 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.
- Demonstrated that on-policy policy gradient algorithms are more data efficient with **adaptive, off-policy sampling** than on-policy sampling.
- Identified aspects of data augmentation that improve the data efficiency of RL and successfully applied these insights to a **real-world robotics task**.

May 2021 – **Sandia National Laboratories**, *Research Intern*, Albuquerque, NM.

Nov 2023 Advisor: Drew Levin

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

Sept 2019 – **University of Wisconsin – Madison**, *Research Assistant*, Madison, WI.

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 for Hustle ([github](#)).

Oct 2016 – **University of Pittsburgh**, *Research Assistant*, Pittsburgh, PA.

Aug 2019 Advisor: Vladimir Savinov

- Designed and optimized the first search for new hadronic  $W_{bJ}$  states in data collected by the Belle experiment ([link](#)).
- 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, 2023.

**Nicholas E. Corrado** & Josiah P. Hanna. Understanding when dynamics-invariant data augmentations benefit model-free reinforcement learning updates. Under Review, 2023.

**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, 2023.

**Nicholas E. Corrado**, Michael Livesay, Tyson Bailey, & Drew Levin. Reinforcement learning for automatic generation control using a Kuramoto-like model. Under Review, 2023.

## Publications

IEEE Smart-GridComm 2023 **Nicholas E. Corrado**, Michael Livesay, Jay Johnson, & Drew Levin. Deep reinforcement learning for distribution power system cyber-resilience via distributed energy resource control. To appear in IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (IEEE SmartGridComm), 2023.

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](#))

## 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. (Poster)

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. (Poster)

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

## Technical Reports

Belle Collaboration **Nicholas Corrado** & Vladimir Savinov. Search for  $\Upsilon(5S) \rightarrow \gamma W_{bJ}$ . Belle Collaboration. Belle Note 1522, 2019. Local copy of version 1.9 can be found [here](#).

## 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

Yuxiao Qu (Undergraduate, University of Wisconsin-Madison, 2021-2023); **Currently at 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 Completed 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

Reviewer 2024: ICML, NeurIPS, AAAI

Program 2024: ICRA  
Committee

Workshops 2022: Sandia Machine Learning and Deep Learning (MLDL) Workshop. Designed and organized a reinforcement learning competition.

## Technical Skills

Languages Python, C++, familiar with Matlab, Java, Verilog

Other PyTorch, Apache Arrow, ROOT