Jordan M. R. **Fox**

COMPUTATIONAL SCIENTIST

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Ph.D. with over 10 years of experience in cutting-edge research.
I specialize in simulations of complex systems, statistical models, and machine learning.

Education

Doctor of Philosophy in Computational Science
SAN DIEGO STATE UNIVERSITY & CLAREMONT GRADUATE UNIVERSITY

San Diego, CA, USA
Aug. 2016 - Sept. 2022

Bachelor of Science in Physics & Mathematics
SEATTLE UNIVERSITY

Seattle, WA, USA
Aug. 2013 - Mar. 2016

Papers

Restricted Boltzmann Machines Propagators for Auxiliary Field Diffusion Monte Carlo
JORDAN M. R. FOX, ALESSANDRO LOVATO, ALESSANDRO ROGGERO, ERMAL RRAPAJ

https://arxiv.org/abs/ 2407.14632
Preprint

Illuminating Systematic Trends in Reaction Cross Section Evaluations using Generative Deep Learning
JORDAN M. R. FOX, KYLE A. WENDT

https://arxiv.org/abs/ 2403.16389
Preprint

Uncertainty quantification of transition operators in the nuclear shell model
JORDAN M. R. FOX, CALVIN W. JOHNSON, AND RODRIGO NAVARRO PEREZ

Phys. Rev. C 108, 054310
Published 2023

Uncertainty quantification of an empirical shell-model interaction using principle component analysis
JORDAN M. R. FOX, CALVIN W. JOHNSON, AND RODRIGO NAVARRO PEREZ

Phys. Rev. C 101, 054308
Published 2020

Research & Experience

Postdoctoral fellow in neuroscience

Albert Einstein College of Medicine, Bronx, New York, USA

COMPUTATIONAL MODELS OF SOUND LOCALIZATION IN THE BARN OWL
Sept. 2024 - present
- Develop and implement high-resolution compartmental models of neurons
- Statistical modeling and machine learning for neuron models

Postdoctoral research associate in physics

Argonne National Laboratory, Lemont, IL, USA

MACHINE LEARNING SOLUTIONS FOR THE QUANTUM MANY-BODY PROBLEM.
Sept. 2022 - Sept. 2024
- Develop machine learning algorithms for improving large-scale quantum Monte Carlo code, run on supercomputers

Doctoral research

DATA-DRIVEN METHODS FOR LOW-ENERGY NUCLEAR PHYSICS: THEORY, UNCERTAINTY QUANTIFICATION, AND MACHINE LEARNING
- Supported in part by the DOE Office of Science Graduate Fellowship with Lawrence Livermore National Lab

Graduate summer internship #3

ILLUMINATING TRENDS IN REACTION EVALUATIONS WITH DEEP GENERATIVE MACHINE LEARNING
- Developed a generative adversarial network for learning complex correlations in nuclear data libraries
- Large scale training of neural networks on world-class heterogeneous architecture

Graduate summer internship #2

EXPLORING CORRELATIONS IN NUCLEAR DFT WITH DEEP GENERATIVE MACHINE LEARNING
- Developed a variational autoencoder for learning distributions of nuclear density functional theory observables

Graduate summer internship #1

QUANTUM MONTE CARLO WITH OPENMP 4.0+ FOR PERFORMANCE PORTABILITY
- Implemented OpenMP parallelization to Quantum Monte Carlo code

Undergraduate research #2

ANALYSIS OF $s\bar{s}$ ASYMMETRY IN THE PROTON SEA WITH A COMBINATION OF QUARK MODELS
- Analyzed strange quark/antiquark asymmetry in the proton sea using a hybrid Meson Cloud and statistical model

Undergraduate R.E.U. program

MOMENTUM SPECTRA OF BOTTOMONIUM IN HEAVY ION COLLISIONS
- Computed and compared transverse momentum spectra for bottomonium ($b\bar{b}$ mesons) in heavy-ion collisions via two models

Undergraduate research #1

NEURAL NETWORKS FOR AUDITORY LOCALIZATION IN THE BARN OWL *Tyto Alba*
- Used biophysics simulation codes to explore auditory localization in the Barn Owl with real neuron geometry

Talks

Invited talk

UNCERTAINTY QUANTIFICATION AND DEEP LEARNING FOR NUCLEAR THEORY AND DATA

Invited talk

LEARNING TRENDS IN REACTION CROSS DATA WITH GENERATIVE MACHINE LEARNING

Student poster session
San Diego State University

LEARNING TRENDS IN REACTION CROSS DATA WITH GENERATIVE MACHINE LEARNING

2021

Student poster session
Lawrence Livermore National Lab

LEARNING TRENDS IN REACTION CROSS DATA WITH GENERATIVE MACHINE LEARNING

2020

Conference Talk
APS April meeting

LEARNING TRENDS IN REACTION CROSS DATA WITH GENERATIVE MACHINE LEARNING

2021

Talk & Student poster session
TRIUMF, Canada

UNCERTAINTY QUANTIFICATION OF AN EMPIRICAL SHELL-MODEL INTERACTION USING PRINCIPLE COMPONENT ANALYSIS

2020

Student poster session
Lawrence Livermore National Lab

EXPLORING CORRELATIONS IN NUCLEAR DFT USING GENERATIVE MACHINE LEARNING

2019

Poster @ Student research symposium
San Diego State University

Ab initio CALCULATIONS OF GAMOW-TELLER TRANSITION STRENGTHS

2018

Student poster session
Los Alamos National Lab

QUANTUM MONTE CARLO WITH OPENMP 4.0+ FOR PERFORMANCE PORTABILITY

2017

Student poster session
Los Alamos National Lab

QUANTUM MONTE CARLO WITH OPENMP 4.0+ FOR PERFORMANCE PORTABILITY

2017

Student poster session
APS Division of Nuclear Physics meeting, Hawaii

ANALYSIS OF $s\bar{s}$ ASYMMETRY IN THE PROTON SEA WITH A COMBINATION OF QUARK MODELS

2014

Honors & Awards

2021	**Graduate Fellowship (SCGSR)**, US Department of Energy, Office of Science
2021	**Los Alamos National Laboratory prize at SDSU ACSESS event**, LANL
2016-18	**Graduate S-STEM Fellowship** , SDSU Computational Science Research Center
2016	**President's list** , Seattle University
2016	**National Physics Honor Society (SPS)**, Seattle University
2015	**Honorable Mention in the COMAP Mathematical Contest in Modeling**, Seattle University

Workshops

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2021	**ISNET 8: Information and Statistics in Nuclear Experiment and Theory**, Facility for Rare Isotope Beams (FRIB)	*Michigan State University*
2021	**TALENT school: Machine Learning applied to Nuclear Physics, experiment and theory**, ECT*	*Trento, Italy*
2019	**TALENT school: Bayesian Methods and Machine Learning**, University of York	*York, UK*
2018	**TALENT school: Fundamental Symmetries and Neutrinos**, Institute for Nuclear Theory, UW	*Seattle, USA*

Skills

Programming	Python, Tensorflow, Mathematica, MATLAB, FORTRAN
High-performance computing	OpenMP, MPI, GPU programming, supercomputer user