Noah L. Donald, Ph.D.

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Professional Summary

Researcher with extensive experience developing and computationally implementing theoretical models to solve complex problems. Experience with Python, C++, Mathematica, and Excel for data analysis, algorithm development, and modeling. Strong track record in applying numerical methods, statistical analysis, and optimization techniques. Proven ability to learn new topics and work independently. Adept at collaborating with cross-functional teams, managing multiple priorities, and communicating results.

Education

William and Mary, Williamsburg, VA
Ph.D., Physics (Theoretical Focus) | 2020 – 2025
M.S., Physics | 2020 – 2022
GPA 3.92/4.00

Ohio State University, Columbus, OH
B.S., Physics (Honors, Magna Cum Laude) | 2016 – 2020
B.S., Mathematics (Honors, Magna Cum Laude) | 2016 – 2020
GPA 3.74/4.00

Skills

Programming: Python, Jupyter Notebook, C++, Mathematica, Excel, LaTeX

Analytical: Statistical Analysis, Optimization, Numerical Modeling, Probability Theory, Quantum Field Theory, General Relativity, Model Building, Differential Geometry, Abstract Algebra, Graph Theory

Technical: Basic laboratory experience (including in a research setting)

Soft Skills: Collaboration, Communication, Time Management, Organization, Scientific Writing

Language: English (Native), German (Intermediate)

Relevant Experience

William and Mary, Williamsburg, VA
Graduate Researcher | 2020 – 2025

- Applied a tuning paradigm to an extension of the standard model with a dark sector that led to a large separation between a heavy electroweak scale and a light dark scale. Conducted a numerical dark matter analysis using Mathematica. (2024 – 2025)

- Constructed several models for nonlocal spacetime defects in discrete spacetime. Calculated the effect of these defects on the Feynman propagator in a free scalar field theory numerically using Mathematica/Python and analyzed their impact on the low-energy effective theory. (2023)

- Constructed a viable extension of the standard model of particle physics which is asymptotically safe. Calculated renormalization group equations using PyR@TE3 software in C++ and analyzed several fixed-point scenarios using Mathematica/Python. Conducted a dark matter analysis for a dark matter candidate in the model. (2021 – 2022)

- Teaching: Prepared weekly short lectures on introductory physics topics, oversaw the lab work of students, and graded assignments. (2020 – 2022, 2024 – 2025)

- Courses: Quantum Field Theory, Standard Model, General Relativity, Quantum/Nonlinear Optics

Ohio State University, Columbus, OH
Undergraduate Researcher | 2016 – 2020

- Utilized C++ and constructed Mathematica/Python code to calculate topological entanglement entropy and study phase transitions in quantum spin liquids for a Kitaev honeycomb model in Prof. Nandini Trivedi's condensed matter theory group. (2019 – 2020)
- Researched the combinatorial features of voltage graphs using symmetric chromatic polynomials in Prof. Sergei Chmutov's knots and graph theory group. (2019)
- Courses: Probability Theory, Combinatorics, Abstract Algebra, Computational Physics, C++, Linear Algebra & Differential Equations, Differential Geometry, Advanced Physics Lab

Journal Publications

- C.D. Carone and N.L. Donald, "Tuning towards the edge of a dark abyss: Implications of a tuning paradigm on the hierarchy between the weak and dark scales", Phys. Rev. D 111, no. 3, 035021 (2025).
- C.D. Carone and N.L. Donald, "Towards a quantum field theory description of nonlocal spacetime defects", Class. Quantum Grav. 41, 095003 (2024).
- J. Boos, C.D. Carone, N.L. Donald, and M.R. Musser, "Asymptotically safe dark matter with gauged baryon number," Phys. Rev. D 107, no. 3, 035018 (2023).
- J. Boos, C.D. Carone, N.L. Donald, and M.R. Musser, "Asymptotic safety and gauged baryon number," Phys. Rev. D 106, no. 3, 035015 (2022).

Awards & Accomplishments

Roy L. Champion Award | 2024

- Awarded to a physics graduate student who has demonstrated outstanding research achievement.

DAAD RISE Fellowship | 2018

- Worked on an ultra-high vacuum chamber to collect atomic level data regarding the surface structure and composition of various crystallin substrates in Prof. Michael Farle's group at the University of Duisburg-Essen.

Germany for STEM Students | 2015

- Engineered a water filtration device with applications in third-world countries. I was awarded a weeklong experience exploring scientific institutions in Germany.

Professional Presentations

- *"Towards a Quantum Field Theory Description of Nonlocal Spacetime Defects"*. Graduate & Honors Research Symposium, College of William & Mary, Williamsburg VA, March 2024.
- *"Asymptotically Safe Dark Matter with Gauged Baryon Number"*. Phenomenology 2023 Symposium, University of Pittsburgh, Pittsburgh PA, May 2023.
- *"A Symmetric Chromatic Function for Voltage Graphs*". The 62nd Midwest Graph Theory Conference, Marion OH, October 2019.

Activities

- Sports: Soccer, Weightlifting, Running, Climbing