

NICOLAS MARTIN GUERRA

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EDUCATION

Cornell University Ithaca, NY

Ph.D. in Applied Mathematics

Expected May 2028

M.S. in Applied Mathematics

May 2026

Northwestern University Evanston, IL

M.S. and B.S. in Applied Mathematics; B.M. in Viola Performance GPA: 3.93/4.00 Cum Laude

June 2023

RESEARCH & PROFESSIONAL EXPERIENCE

Applied Research Science Intern | Shure Incorporated Niles, IL

May 2026 – Present

- Developed a computer vision pipeline to reconstruct conference rooms in 3D using Gaussian splatting from video, captured under variable lighting conditions.
- Enabled room geometry estimation from built-in cameras to support acoustic simulation and future room-aware Shure products.

Graduate Researcher | Yang Research, Cornell University

Dec. 2023 – Present

- Developed an adjoint-based bilevel optimization algorithm to learn sample weights that suppress harmful training data; experiments with 80% label corruption improve MLP accuracy from 62% to 80% on Fashion-MNIST.
- Derived and implemented adjoint methods for optimizing particle-based training distributions in radiative transport, using PyTorch and AWS to conduct scientific machine learning experiments.
- Developed methods to optimize training data distributions for improved out-of-distribution generalization, including parametric optimization of distribution moments and particle-based optimization of individual training samples.
- Developed AMINO, a multi-input extension of Neural Inverse Operators (NIO); OOD experiments reduce relative L1 error from ~ 0.20 to ~ 0.08 while maintaining comparable in-distribution performance.

Teaching Assistant | INFO 2950: Intro to Data Science, Cornell University

Aug. 2024 – Dec. 2024

- Led weekly discussion sections and office hours covering Python, SQL, GitHub, and statistical modeling.
- Designed and graded assessments for 250+ students while reinforcing core data science concepts.

Research Assistant | Ulmer Research, Northwestern University

Jan. 2020 – June 2023

- Developed MATLAB tools for quantitative analysis of telescopic mirror surface roughness.
- Applied machine learning and image-processing techniques in Python in an effort to detect exoplanet 51 Eridani b.
- Managed and optimized access to 100+ GB of space-imaging data.

Undergraduate Researcher | Vlahovska Research, Northwestern University

Jan. 2022 – June 2022

- Performed eigenvalue stability analysis of nonlinear ODE systems to characterize chaotic dynamics in Quincke rotors with time-dependent electric fields.
- Developed MATLAB simulations to study and visualize system dynamics using bifurcation diagrams.

TECHNICAL SKILLS

Programming & Data: Python (PyTorch, NumPy, pandas), MATLAB, R, SQL, Java, C

Computing & Tools: CUDA, Docker, Git/GitHub, AWS, Amazon SageMaker, high-performance computing

Languages: Spanish (Native), Vietnamese (Conversational)

PUBLICATIONS

Nicolas Guerra, Nicholas H. Nelsen, and Yunan Yang. "Learning Where to Learn: Training Data Distribution Optimization for Scientific Machine Learning." *arXiv preprint arXiv:2505.21626* (2025).

FELLOWSHIPS & AWARDS

• DoD NDSEG Fellowship

Sept. 2025 – May 2028

• Cornell Fellowship

Aug. 2023 – May 2024

• Cornell Graduate School Dean's Scholar

Aug. 2023

• Co-Winner, Northwestern Applied Mathematics Outstanding Graduate Award

June 2022

• Illinois Space Grant Consortium Scholarship

June 2020 – June 2022