# Nicolas Martin Guerra

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## Education

PhD, Applied Mathematics — Expected: May 2028
Cornell University | Ithaca, NY, USA

BS/MS, Applied Mathematics with specialization in Industrial Engineering — June 2023
Northwestern University | Evanston, IL, USA
GPA: 3.93/4.00, *Cum Laude*

*Relevant Courses*: Partial Differential Equations, Linear Algebra, Probability, Stochastic Processes, Machine Learning, Optimization Methods in Data Science, Statistical Learning for Data Analysis, Financial Engineering, Service Engineering and Management

## Publications and Written Works

Ulmer, M.P., Dugard, J.H., Quispe, D., Buchholz, D.B., Stagon, S.P., Chung, Y.W., Cao, J., Kritikos, K., **Guerra, N.**, Stahl, M.T. and Shiri, R., 2022, August. A concept for a deployable normal incidence EUV mirror based on shape memory alloy sheets. In *Space Telescopes and Instrumentation 2022: Ultraviolet to Gamma Ray* (Vol. 12181, pp. 776-784). SPIE.

Ulmer, M.P., Jalilvand, M., Marks, N.A., Buchholz, D.B., Fujishima, B., **Guerra, N.**, Cao, J., Chung, Y.W., Baturalp, T.B., Coverstone, V.L. and Stagon, S.P., 2020, December. The prospects for applying magnetic smart materials combined with shape memory alloys to produce correctable and deployable space telescopes. In *Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation IV* (Vol. 11451, pp. 393-404). SPIE.

## Relevant Experience

**Research Assistant** — January 2020 – June 2023
Ulmer Research Group | Evanston, IL

- Engineered a program in MATLAB to quantify roughness of telescopic mirrors by reading in experimental data and using Fourier transform
- Employed image filtering and machine learning programs in Python to detect exoplanets 163 light-years away using principal component analysis
- Managed over 100 GB of space-imaging data ensuring efficient data-accessing measures and organization

**Tutor Aide** — September 2022 – June 2023
America Reads @ McGaw YMCA | Evanston, IL

- Assisted elementary school children in reading, writing, and math to help them excel in school
- Facilitated students in completing and thoroughly understanding their homework assignments

**Engineering Analysis IV Grader** September 2022 – December 2022
Northwestern University | Evanston, IL

- Evaluated assignments and exams for a foundational differential equations course with over 100 students
- Provided constructive feedback on every assignment and addressed any uncertainties students had

**Undergraduate Researcher** January 2022 – June 2022
Petia M. Vlahovska Research Group | Evanston, IL

- Examined Quincke rotor dynamics with a time-dependent electric field to further the research of fluid dynamic
- Unraveled a complicated physical system of differential equations, similar to the Lorenz equations, using eigenvalue stability analysis to understand its chaotic dynamics
- Modeled a simulation of the system's behavior using MATLAB in order to gain a deeper understanding of its dynamics

**Instructor** June 2019 – August 2019
iD Tech | Miami, FL

- Educated elementary and middle school students on programming fundamentals in Java and Lua
- Tailored my curriculum to align with each student's preferred learning style

## Grants and Scholarships Received

**Illinois Space Grant Consortium (ISGC) Scholarship** September 2021 – June 2022
Consortium is part of NASA's National Space Grant College and Fellowship Program

**ISGC Summer Research Program** June 2021 – September 2021

- Utilized image subtraction programs to detect transient phenomena such as supernovae and gamma-ray bursts in Python
- Enhanced the speed and accuracy of image processing procedures by 40%

**Summer Undergraduate Research Grant** June 2021 – July 2021
Northwestern University

- Automated image subtraction and filtering techniques and programs to detect variable stellar sources in Python
- Explored and implemented approaches to efficiently handle and analyze large remote Hubble datasets within the codebase

**ISGC Summer Research Program** June 2020 – September 2020

- Developed a program in MATLAB to model ray trace of light hitting imperfect mirrors using vector calculus
- Facilitated weekly meetings to review progress, address any challenges that arose, and brainstorm potential solutions

**ISGC Scholarship** September 2020 – June 2021
Consortium is part of NASA's National Space Grant College and Fellowship Program

## Recognitions

Cornell Graduate School Dean's Scholar August 2023

*Scholars who have demonstrated a strong commitment to academic excellence and advancing aspects of diversity, access, equity, inclusion, and belonging in the academy and other communities*

Co-Winner of Northwestern's Applied Mathematics Outstanding Graduate Award June 2022

*Attained the highest academic performance among peers in my cohort in Northwestern's applied mathematics curriculum, earning recognition for outstanding achievement*

## Presentations

*Oral Presentations*

**Guerra, N.**, Eberlin, S., Ulmer, M.P. (2021, August). *Search for Transient Phenomena.* Annual ISGC Summer Research Presentations. Zoom

**Guerra, N.**, Ulmer, M.P. (2020, August). *Power Spectral Density.* Annual ISGC Summer Research Presentations. Zoom

**Guerra, N.***, Kanda, T.*, Wang, V.*, Brunner, K.* (2020, June). *The Wishy Washy.* Design, Thinking, and Communication (DTC) Spring Quarter Presentations. Zoom

*Poster Presentations*

**Guerra, N.***, Anderson, M.*, Bhatti, V.*, Timmins, B.* (2019, November). *Walk this Way.* Shirley Ryan AbilityLab & DTC Fall Quarter Presentations. Ford Motor Company Engineering Design Center, Evanston, IL

*Equal Contribution

## Skills

*Professional*

- Expertise in MATLAB, Python, R/RStudio, and SQL
- Familiarity with Java and C
- Proficient with Microsoft Excel and PowerPoint
- Knowledgeable in mathematical physics, machine learning, data regression and statistical analysis, data management, high performance and parallel computing, computer programming

*Language*

- Spanish: Native fluency
- Vietnamese: Basic proficiency