Nicholas T. Marston

Astronomy and Physics Researcher

Website | GitHub | LinkedIn

Position: Post-Bacc Reseracher at the University of Wisconsin-Madison
Research Interests: Dynamics, Exoplanets, Compact Objects, Computational Astrophysics, Stellar Astrophysics
Methods: Computational & Numerical Astrophysics, Periodic Analysis, Semi-Analytical Analysis
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Statement

I'm a recent graduate of the University of Wisconsin-Madison, where I studied Astronomy, Physics, and Scandinavian Studies. I am currently a post-baccalaureate researcher at my alma mater, where I work with Professors Juliette Becker, Nicholas Stone, and Melinda Soares-Furtado. My projects are focused on modeling the interior structures and thermal histories of observed exoplanets, and modeling the dynamics of compact objects embedded in AGN disks. My previous work includes variable star analysis using Kepler mission data for the open cluster NGC 6819 and developing relevant data processing tools and pipelines. I graduated in 2025 with my B.S. in Physics, Astronomy-Physics, and Scandinavian Studies, with Certificates in Italian and European Studies.

Experience

Post-Baccalaureate Researcher
Prof. Nicholas Stone, University of Wisconsin-Madison — Summer 2025 - present

· Modeling the dynamics of compact objects embedded in AGN disks with N-body integration

Post-Baccalaureate Researcher
Prof. Juliette Becker, University of Wisconsin-Madison — Spring 2025 - Present

· Investigating and evaluate potential explanations for anomalously low density exoplanets
· Computationally modeling interior structures and thermal evolution of low density exoplanets

Undergraduate/Post-Baccalaureate Researcher
Prof. Melinda Soares-Furtado, University of Wisconsin-Madison — Spring 2023 - present

· Analyzing Kepler mission data in combination with Gaia DR3 data to characterize periodicity and other properties of stars in the open cluster NGC 6819.

Education

B.S. in Astronomy-Physics, Physics, Scandinavian Studies
University of Wisconsin-Madison — 2022-2025

· Certificates in European Studies, Italian

A.A.S in Cyber Security
Saint Paul College — 2018 - 2021

· Graduated with High Distinction

Publications

The TEMPO Survey II: Science Cases Leveraged from a Proposed 30-Day Time Domain Survey of the Orion Nebula with the Nancy Grace Roman Space Telescope.
Soares-Furtado, M., Limbach, M. A., Vanderburg, A., Bally, J., Becker, J., Rosen, A. L., Bouma, L. G., Vos, J. M., Howell, S. B., Beatty, T. G., Best, W. M. J., Cody, A. M., Distler, A., D'Onghia, E., Heller, R., Hensley, B. S., Hinkel, N. R., Jackson, B., Kounkel, M., Kraus, A., Mann, A. W., **Marston, N.**, Robberto, M., Rodriguez, J. E., Steffen, J. H., Teske, J. K., Townsend, R., Yarza, R., Youngblood, A. 2024 *Space Science Reviews* (Submitted) https://doi.org/10.48550/arXiv.2406.01492

Kepler Image-Subtracted Light Curves and Variable Star Catalog of NGC 68191
Soares-Furtado, M., Kuenzi, R., McClure, R. L., **Marston, N. T.**, Linck, E., Mathiew, R. M., Vanderburg, A., Hartman, J. D., Cudworth, K., Gagliano, R., Jacobs, T., Kristiansen, M. H., Omohundro, M., Schwengeler, H. M. 2025 (In-Prep)

Other Scholarly Activities

Penn State Summer School in Statistics for Astronomers	Summer 2025
Code/Astro Software Engineering Workshop for Astronomy (CIERA/Northwestern University)	Summer 2025
2025 Sagan Summer Workshop: Exoplanet Demographics (NExScI)	Summer 2025
Intro to Deep Learning with Keras (UW-Madison Data Science Hub)	Spring 2025
Intensive Italian Language Summer Program (Umbra Institute, Perugia, Italy)	Summer 2024
Intensive Norwegian Language Level III - Oslo International Summer School (Universitetet i Oslo)	Summer 2024

Awards & Achievements

Foreign Language & Area Studies (FLAS) Fellowship - U.S. Dept. of Education — Summer 2023/2024

The Foreign Language and Area Studies Fellowship is a competitive grant awarded to undergraduate and graduate students funded by the U.S. Department of Education. The grant provides a total of $8,500 to assist students in acquiring foreign language and either area or international studies competencies. I received this grant to participate in the University of Oslo-International Summer School's high-level intensive Norwegian language course, through which I reached CEFR-B2/C1 (Upper Intermediate/Advanced) fluency. *In 2024, I was awarded the fellowship for a second consecutive year* to take an advanced Italian language course through the Umbra Institute in Perugia, Italy. Through this course I reached a CEFR-B2 (Upper-intermediate) fluency level

Named to Dean's List	2025
Presidential Scholarship Recipient - St. Olaf College	2021-2022
Began Studies at St. Olaf College with 101 previously earned credit hours	2021
Named to President's List - Saint Paul College	2019, 2020, 2021
Member of Mu Alpha Theta Mathematics Honor Society - Saint Paul College	2020-2021
AP Scholar Award Recipient	2020
Named to President's List - Saint Paul College	2019
Presidential Scholarship Recipient - St. Olaf College	2021-2022

Leadership & Community Involvement

University Physical Society (Physics Club) - UW-Madison
President — Fall 2023 - Spring 2025

· Organization of STEM outreach events, networking events with up to 100 in attendance, GRE preparation seminars, peer-tutoring, collaboration events with the UW-Madison Physics Department, and coordination/facilitation of a group tour/visit to Fermilab's SQMS and Muon g-2

· Organization/Hosting of a faculty lecture series, including contacting and coordinating with guest lecturers.

Dept. of Astronomy Curriculum Committee - UW-Madison
Undergraduate Representative — Fall 2024 - Spring 2025

· Assisted in restructuring the University of Wisconsin's Astronomy-Physics undergraduate program

· Acted as a liaison between department administration and the undergraduate student body

Triangle Science & Engineering Fraternity
Information Systems Officer, Health & Wellness Officer — Fall 2022 - Spring 2025

· Maintained and implemented upgrades to a website using HTML and Next.js, managed communications between over 100 active members & alumni

· Collaborated with the End Overdose Organization to host overdose prevention & Naloxone administration training

UW-Madison Men's Club Ultimate Frisbee
Member — Fall 2022 - Spring 2025

· Consistent high-level play and mentorship

Saint Olaf Berzerker's Men's Ultimate Frisbee
Member — Fall 2021 - Spring 2022

· 2021 National championship runners-up

Saint Paul College Math Club
Vice President — Fall 2020 - Spring 2021

· Regional Finalist/National Competitor in the American Mathematical Association of Two-Year Colleges (AMATYC) Student Research League

· Participated in and helped to facilitate tutoring, outreach, and club participation in Mu Alpha Theta's Rocket City Math League

Skills & Courses

Relevant Coursework

PHYS 772 High Energy Astrophysics	Fall 2025
ASTRON 620 Exoplanets	Spring 2025
PHILOS 562 Philosophy of Quantum Mechanics	Spring 2025
PHYS 406 Special Topics: General Relativity	Fall 2024
ASTRON 335 Cosmology	Fall 2024
MATH 561 Differential Geometry	Spring 2024
PHYS 448/449 Atomic & Quantum Physics (Two Semester Sequence)	2023-2034
ASTRON 465 Observational Astronomy Lab	Fall 2023
Abstract Algebra, Number Theory, Real Analysis (Taken at St. Olaf College)	2021-2022

Technical Skills

Programming

Python	Expert - 8+ years

· Extensive experience with relevant libraries/tools including Astropy, Astroquery, LightKurve, Pandas, Numpy, Scipy, Multiprocessing, GSpread, Matplotlib, and Seaborn

Java	Expert - 6+ years
C++/C#	3+ years
Linux & Bash Scripting	3+ years
Git/Version Control	3+ years
ADQL/SQL Query Automation	2+ years

Selected Research Techniques

· Hands on experience with frequency-space and power spectral analysis
· Lomb-Scargle, Box Least Squares, and other periodogram analysis techniques
· Optical & Radio data processing pipeline development
· Illustris & TNG-50
· Deep Learning & Machine Learning
· Experience working with/contributing to computational modeling codes in C++
Optimizing simulation codes to significantly decrease time-to-run and resource usage
· Scientific Writing & In-depth literature review

Languages

English	Native
Norwegian	CEFR-B2/C1 (Fluent)
Italian	CEFR-B2 (Proficient)
Danish	Reading Proficiency
Swedish	Conversational Competence

Research Advisors / References

Dr. Melinda Soares-Furtado
Assistant Professor
University of Wisconsin-Madison
Depts. of Astronomy, Physics
mmsoares@wisc.edu

Dr. Juliette Becker
Assistant Professor
University of Wisconsin-Madison
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juliette.becker@wisc.edu

Dr. Nicholas Stone
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