NICOLAS MAZZIOTTI

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Education

University of Arizona Tucson, AZ

Bachelor of Science in Astronomy and Physics, Minor in Italian 08/2021 - 05/2025 (expected)

- Cumulative GPA: 4.0
- Student of W.A. Franke Honors College

Publications

- S. Dey, M. G. Jones. D. Sand, **N. Mazziotti**, S. Janowiecki, G. Zeimnan, P. Bennet, **2024**, "Citizen Science Identification of Isolated Blue Stellar Systems in the Virgo cluster", submitted to ApJ Nov. 2024 (arXiv:2411.14526)
- M. G. Jones , S. Janowiecki, S. Dey, D. Sand, P. Bennet, D. Crnojevic, C. Fielder, A. Karunakaran, B. Kent, **N. Mazziotti**, B. Mutlu-Pakdil, K. Spekkens, **2024**, "Dark no more: The low luminosity stellar counterpart of a dark cloud in the Virgo cluster", ApJL 966 15.
- (In prep.) **Mazziotti** et al., *"Citizen Science Catalog of Diffuse Galaxies in the Fornax Cluster"*

Research Experience

Senior Honors Thesis (PHYS 498H) Tucson, AZ

Advisors: Prof. David Sand, Dr. Michael Jones (UofA Department of Astronomy) 08/2024 - Present

- Worked with UofA grad student Donghyeon Khim to optimize `GALFIT` fitting algorithm for the Fornax Deep Survey
- Set up pipeline to fit structural parameters of diffuse galaxies (effective radius, magnitude, Sérsic index, PSF) with `GALFIT`

Maria Mitchell Observatory NSF-REU Nantucket, MA

Advisor: Prof. Lindsay King (UT Dallas Department of Physics) 05/2024 - 08/2024

- Developed algorithm to identify over 1000 systems of merging galaxy clusters above $10^{13} M_{\odot}$ since z=1 in the TNG300 and TNG-Cluster simulations
- Discovered one potential simulated analog to the system Abell 2146 above $10^{14} M_{\odot}$ with a prominent cosmic bow shock and bullet-feature in projected gas temperature maps
- Created public code resource on GitHub called `tng_tools` to assist with analyses of merging galaxy clusters in IllustrisTNG

University of Arizona NASA Space Grant Program Tucson, AZ

Advisors: Prof. David Sand, Dr. Michael Jones (UofA Department of Astronomy) 08/2022 - 05/2024

- Built citizen science project on Zooniverse titled *Blobs and Blurs: Extreme Galaxies in Clusters* to visually identify diffuse dwarf galaxies and "blue blobs" in nearby galaxy clusters
- Processed volunteer classifications (∼150,000) into catalog of over 600 diffuse galaxies in Fornax via cross-matching and manual vetting
- Identified over 50 diffuse galaxies in Fornax not found by automated searches and 3 previously unknown candidates

University of Florida NSF-REU Gainesville, FL

Advisor: Prof. Jaehan Bae (UF Department of Astronomy) 05/2023 - 08/2023

- Generated synthetic 12CO data cubes with `RADMC-3D` radiative transfer code, sourced from `FARGO3D` planet-disk simulations
- Analyzed gas perturbations from a 0.1-3M_{Jup} planet in 2D kinematic maps with `discminer` MCMC modeling
- Constrained radius and azimuth of a simulated planet in the observed system HD 163296 disk within 20 AU and 10°, respectively, using line width moment maps

Presentations

- **Maria Mitchell Association Science Speaker Series** (talk): *When Giants Collide: Merging Galaxy Clusters in Computer Simulations*—August 2024
- **NOIRLab Rare Gems in Big Data Conference** (poster and lightning talk): *Identifying Diffuse Galaxies through Citizen Science*—May 2024
- **33rd Arizona NASA Space Grant Consortium Statewide Symposium** (talk): *Utilizing Citizen Science to Identify Diffuse Galaxies*—April 2024
- **243rd Meeting of the American Astronomical Society** (iPoster): *Developing a planet-searching tool with kinematic detection methods*—January 2024
- **UofA College of Science Galileo Circle Scholars Celebration** (poster): *Identifying Extreme Galaxies through Citizen Science*—October 2023
- **University of Florida REU Final Presentation** (talk and YouTube video): *Developing a planet-searching tool with Machine Learning*—August 2023
- **32nd Arizona NASA Space Grant Consortium Statewide Symposium** (talk): *Identifying Diffuse Galaxies through Citizen Science*—April 2023

Science Communication and Outreach

Astronomy Outreach Liaison Nantucket, MA

Loines Observatory, Maria Mitchell Assocation 06/2024 - 08/2024

- Helped run the MMA's public observing nights twice a week as part of REU
- Operated an 8" antique refracting telescope and a 24" modern research telescope
- Educated guests about Maria Mitchell, constellations, and popular objects in the night sky

Intern Advisor Tucson, AZ

University of Arizona NASA Space Grant Program 08/2023 - 05/2024

- One of 3 intern advisors selected for a second year with Space Grant
- Oversaw monthly progress of 10 Space Grant interns majoring in STEM as they completed their year-long research projects
- Collaborated with fellow intern advisors to hold networking events and REU application workshops for first-year interns

Zooniverse Moderator Remote

Blobs and Blurs: Extreme Galaxies in Clusters 06/2023 - 03/2024

- Assisted volunteers from the general public with classifying objects on *Blobs and Blurs* by responding to inquiries on the project's talk forum
- Created segment on the project's "Results" page to inform volunteers of their exciting discoveries after the project concluded

Research Panelist Tucson, AZ

UofA College of Engineering's Honors Undergraduate Research Workshop 10/2023

- Discussed experience as an astronomy student in Space Grant with audience of honors engineering undergraduates looking for research opportunities

Popular Science Radio

- **Star Report with Nick Mazziotti: Hidden Water on Mars**, The Nature of Nantucket Podcast—*August 2024*
- **Star Report with Nick Mazziotti: Strawberry Moon**, The Nature of Nantucket Podcast—*June 2024*

Awards

- **Evelyn O. Bychinsky Promising Astronomer Award**, UofA Department of Astronomy—*August 2024*
- **Galileo Circle Scholarship**, UofA College of Science—*October 2023*
- **Academic Year Highest Academic Distinction**, UofA—*2022, 2023, 2024*
- **Dean's List with Distinction**, UofA—*Fall 2021, Spring 2022, Fall 2023, Spring 2024*
- **Arizona Distinction Tuition Scholarship**, UofA—*2021-2025*

Technical Skills

- **Programming languages:** Python, Java, JavaScript, LaTeX
- **Software:** SAOImageDS9, TOPCAT, CARTA, Legacy Survey Sky Browser