OANA VESA, PHD

Pronunciation: WAH-nah VEH-sa [language: Romanian]
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EDUCATION

Ph.D. in Astronomy, New Mexico State University (NMSU) Aug. 2024
Dissertation: *Dynamics of the Solar Atmosphere Observed with the Dunn Solar Telescope*
Committee Members: Juie Shetye, Jason Jackiewicz, Jon Holtzman, Laura Boucheron

B.A. in Physics & Mathematics (with Honors), Albion College May 2018
Honors Thesis: *Analysis of the Gaia RVS Region in ESPaDOnS Spectra of Asteroseismic Calibration Stars*
Faculty Advisor: Nicolle Zellner

RESEARCH INTERESTS

Dynamics of the solar interior and atmosphere using high-resolution, multi-height observations to probe wave interactions, magnetic coupling, and energy transport.

- Solar Seismology (Interior & Atmosphere): Identification and propagation of inertial modes (Rossby waves; high-latitude modes) and low-frequency waves (atmospheric gravity waves; p-modes).
- Wave-Magnetic Field Interactions: Magnetic modulation and diagnostic potential of waves in magnetized plasma across spatial and temporal scales.
- Small-Scale Vortex Flows (Chromospheric Swirls): Vortex dynamics and their role in energy and mass transport.

RESEARCH EXPERIENCE

Postdoctoral Researcher Sept. 2024 – Present
W.W. Hansen Experimental Physics Laboratory, Stanford University
Supervisor: J. Todd Hoeksema; Primary collaborator: Junwei Zhao

Co-PI, Nationwide Eclipse Ballooning Project (NEBP) Dec. 2022 – Apr. 2024
Atmospheric Science Research
Department of Astronomy, NMSU
Co-PI: Juie Shetye

Graduate Researcher Aug. 2018 – Aug. 2024
Department of Astronomy, NMSU
Advisor: Juie Shetye

PUBLICATIONS

Peer-Reviewed

Multiheight Observations of Atmospheric Gravity Waves at Solar Disk Center
Vesa, O., Jackiewicz, J., and Reardon, K., The Astrophysical Journal, Volume 952, Issue 1, article id. 58, 18 pp. (07/2023)

Characterization of Atmospheric Gravity Waves Observed During a Total Solar Eclipse in Granbury, Texas
Shetye, J., **Vesa, O.**, Houser, C., Martinez, M., Denney, A., Brealey-Road, A., Bundell, K., Oyewole, S., Olivas, R., and Angel, J., Bulletin of the AAS, Volume 56, Issue 9, article id. 2024n9i038. (02/2025)

Revealing the Dynamics of Atmospheric Gravity Waves: Insights from an Annular Solar Eclipse Event at Artesia Science Center, NM
Vesa, O., Shetye, J., Denney, A., Martinez, M., Houser, C., Brealey-Road, A., Silva, J. E., and Abotalebi, S., Bulletin of the AAS, Volume 56, Issue 9, article id. 2024n9i043. (03/2025)

Characterizing the Observational Properties of the Sun's High-latitude m = 1 Inertial Mode
Ding, B., Zhao, J., Chen, R., Waidele, M., Mahajan, S.S., and **Vesa, O.**, The Astrophysical Journal, Volume 989, Issue 1, article id. 26, 26 pp. (08/2025)

Atmospheric Gravity Waves Modulated by the Magnetic Field Configuration
Vesa, O., Morales, M., Jackiewicz, J., Vigeesh, G., and Reardon, K., The Astrophysical Journal, Volume 992, Issue 2, article id. 201, 14 pp. (10/2025)

First High-Resolution Observations of Chromospheric Swirls with the Dunn Solar Telescope
Vesa, O., Shetye, J., and Verwichte, E., Monthly Notices of the Royal Astronomical Society, Volume 543, Issue 4, 19 pp. (11/2025)

In Press

Structural Tilting and Depth-Dependent Behavior of Equatorial Rossby Waves
Vesa, O., Zhao, J., and Chen, R., arXiv:2601.05443

In Preparation

Exploring Upward-Propagating Acoustic Waves Through Spectral Line Dynamics using 3-D RHD Simulations of the Lower Solar Atmosphere
Hamilton, J., Sadykov, V., **Vesa, O.**, Kitiashvili, I., and Wray, A., *in preparation for The Astrophysical Journal* (2026)

Properties of G-Band Bright Points Observed from the Dunn Solar Telescope
Oyewole, S., **Vesa, O.**, Shetye, J., Christian J. D., and Verwichte E., *in preparation for The Astrophysical Journal* (2026)

TEACHING & MENTORING EXPERIENCE

Graduate Research Mentor — Spring 2024 – Present
Department of Computer Science, NMSU

Undergraduate NEBP Research Mentor — Fall 2023 – Fall 2025
Department of Astronomy, NMSU

Co-Instructor/Guest Lecturer, ASTR 400: Undergraduate Research — Spring – Fall 2023; Spring 2024
Department of Astronomy, NMSU

Undergraduate Mentor, the FRIENDly mentoring in aStronomy program (FRIENDS) — Summer 2021 – 2022

Department of Astronomy, NMSU

Graduate Teaching Assistant, ASTR 110: Introduction to Astronomy Fall 2018 – Spring 2019
Department of Astronomy, NMSU

LEADERSHIP, SERVICE & OUTREACH

Service to the Scientific Community

Peer Reviewer (The Astrophysical Journal) ongoing

NASA Review Panel Executive Secretary March 2025; April 2025

Inclusive Astronomy Working Group Member, NMSU 2022 – 2024

Scientific Leadership and Program Organization

Workshop Organizing Committee & Instructor: *"Exploring Solar Data with SunPy & NASA's Solar Dynamics Observatory"*, Feb. 2026
Stanford's Love Data Week 2026

Session Co-Chair: *"Plasma $\beta \approx 1$ Regimes – Bridging the Photospheric Gap"*, June 2025
Solar, Heliospheric, and INterplanetary Environment (SHINE) Workshop

Session Co-Chair: *"From Creation to Emergence: Magnetic Fields of the Sun"*, Feb. 2025
SDO 2025 Science Workshop: A Gathering of the Helio-Hive

NASA DRIVE Science Center (COFFIES) Sept. 2024 – Present

Consequences Of Fields and Flows in the Interior and Exterior of the Sun

- Beans (Early-Career) Steering Committee Member
- Helioseismology Working Group Lead: Rossby Waves and Inertial Modes
- Quarterly Newsletter Editor, community-wide science communication
- COFFIES Effectiveness Team (CET) Member, contributing to center assessment and strategy
- Local & Science Organizing Committee Member, Virtual Workshop on Solar/Stellar Inertial Modes
- Local Organizing Committee Member, 3rd & 4th Annual COFFIES Meetings
- Workshop Organizing Committee, 2026 Professional Development Workshop (co-led with The Toolbox Dialogue Initiative)

Academic Leadership

Vice-President, Astronomy Graduate Student Organization, NMSU 2020 – 2023

Graduate Student Outreach Coordinator, Astronomy Department, NMSU 2020 – 2023

- Coordinated 40+ community service events, quadrupled volunteer participation, and expanded community engagement to 5,000+ community members post-COVID.

Outreach and Broader Impact

Webinar Panelist, HelioHub 2025
Topics: Navigating Your First Scientific Conference/Meeting; Career Opportunities in Heliophysics

Volunteer, Letters to a Pre-Scientist (LPS) 2020 – 2024

FELLOWSHIPS, AWARDS, & GRANTS

The Dr. Barry Neil Rappaport Endowed Memorial Scholarship 2024

- Departmental award for excellence in observational astronomy research and public outreach and service.

Zia Award 2023

- Departmental award recognizing outstanding graduate research.

Co-PI, Nationwide Eclipse Ballooning Project (NEBP) – Atmospheric Science Track 2022
NASA (subaward) and New Mexico Space Grant Consortium (NMSGC)
Total funding: $30,000 (NASA: $24,000; NMSGC: $6,000)
PI: Juie Shetye

A. Scott Murrell Memorial Endowed Scholarship Fund 2022

- Departmental award for research and professional accomplishments enhancing departmental visibility.

New Mexico Space Grant Consortium Graduate Research Fellowship ($10,000) 2021, 2022
Topic: *"Harnessing the Untapped Potential of Solar Tornadoes"*

IN THE NEWS

NMSU Press Release: NMSU research group brings science and community together during solar eclipses June 2025

NMSU Press Release: NMSU and the Dunn Solar Telescope Dec. 2023

Santa Fe New Mexican: NMSU Researchers Shine Light on Solar Tornadoes June 2023

NMSU Press Release: NMSU Researchers Study Solar Tornadoes' Impact, News Conference in Albuquerque June 5 June 2023

Las Cruces Sun News: NMSU Team to Use Hot-air Balloons to Study Solar Effects Amid Eclipses Dec. 2022

INVITED TALKS & LECTURES

COFFIES 2025 Annual Meeting Jan. 2025
Title: *"Multi-Height Observations of Atmospheric Gravity Waves"*

Monterey Institute for Research in Astronomy (MIRA) Astronomy Club Quarterly Meeting Nov. 2024
Title: *"Characterization of Small-scale Tornadoes on the Sun"*

KIPAC Public Seminar: "Heliophysics & Solar Maximum" Nov. 2024
Title: *"Sunspots, Solar Storms, and Aurorae: Exploring Solar Maximum"*

COFFIES Public Webinar for NASA's Heliophysics Big Year: Oct. 2024
"The Temperamental Sun: Understanding Solar Cycles"
Topic: *"Helioseismology"*

NSO Focus Meeting: "Things That Wiggle - Oscillations in the Solar Atmosphere" May 2024
Title: *"Multi-Height Observations of Atmospheric Gravity Waves (AGWs) in the Lower Solar Atmosphere"*

Press Talk for the 242nd American Astronomical Society Meeting — June 2023
Title: *Characterizing Tornadoes on the Sun*

Albion College Mathematics & Computer Science Department Colloquium Series — Apr. 2021
Title: *"Atmospheric Gravity Waves in the Magnetized Solar Atmosphere"*

Preparing for DKIST: Image Processing and Time Series Workshop at California State University, Northridge — Jan. 2020
Title: *"Gravity Waves in the Photosphere"*

SELECTED CONFERENCE PRESENTATIONS

Contributed Talks

Solar/Stellar Inertial Modes and Their Implications — Sept. 2025
Title: *"Tilted Radial Structure of Rossby Waves with the Solar Cycle"*

Waves and Instabilities in the Solar Atmosphere (WISA) — Sept. 2025
Title: *"Atmospheric Gravity Waves in the Magnetized Lower Solar Atmosphere"*

54th Solar Physics Division Meeting — Aug. 2023
Title: *"Unlocking the Secrets of Atmospheric Gravity Waves on the Quiet Sun: Observational Insights"*

[Virtual] 36th Annual New Mexico Symposium — Nov. 2020
Title: *"The Propagation of Atmospheric Gravity Waves in the Magnetic Solar Atmosphere"*

29th Annual Elkin R. Isaac Student Research Symposium — Apr. 2018
Title: *"Analysis of the Gaia RVS Region in ESPaDOnS Spectra of Asteroseismic Calibration Stars"*

Poster Presentations

Solar, Heliospheric, and INterplanetary Environment — June 2025
Title: *"Morphological Analysis of Chromospheric Swirls Observed with the Dunn Solar Telescope"*

The American Geophysical Union Fall Meeting 2023 — Dec. 2023
Title: *"Multi-Height Observations of Propagating Atmospheric Gravity Waves"*

54th Solar Physics Division Meeting — Aug. 2023
Title: *"Characterization of Chromospheric Swirls on the Quiet Sun"*

[IPoster] 51st Solar Physics Division Meeting — Aug. 2020
Title: *"Atmospheric Gravity Waves in the Magnetized Solar Atmosphere"*

231st American Astronomical Society Meeting — Jan. 2018
Title: *"Analysis of the Gaia RVS Region in ESPaDOnS Spectra of Asteroseismic Calibration Stars"*

229th American Astronomical Society Meeting — Jan. 2017
Title: *"The Evolution of Starspots on LO Pegasi"*

PROFESSIONAL DEVELOPMENT

Intent to Impact (I2I) Mentorship Course, Movement Consulting	2025
AAS Peer Review Training Workshop	June 2023
Statistics for Astronomers XVI, Pennsylvania State University's Center for Astrostatistics	July 2021

OBSERVING EXPERIENCE

Dunn Solar Telescope (ROSA, ZYLA, FIRS)	2022
Dunn Solar Telescope (IBIS, ROSA)	2019

RELEVANT SKILLS

Programming	Proficient in Python and IDL; Some experience in Fortran, MATLAB, and R
Data Reduction	Substantial experience in narrowband and broadband data reduction for ground-based instruments
Other Software	Git, Jupyter Notebook, Markdown