Dana K. Baylis-Aguirre

Curriculum Vitae

Physics Department
New Mexico Institute of Mining and Technology
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Education

2021 **PhD, Physics**, *Dissertation in Astrophysics*, New Mexico Tech
Dissertation: A Mid-Infrared Study of Mira Variable Atmospheres: Phase Dependent Analysis Of Spectral Lines Observed With The Spitzer IRS, Advisor: Michelle J. Creech-Eakman.

Research Description: Analyzing mid-infrared spectra of Mira variable atmospheres taken with the Spitzer Infrared Spectrograph (IRS). This analysis includes line identification and modeling with the radiative transfer code, RADEX to determine conditions in the atmosphere such as temperature and density.

2007–2013 **B.S.**, *Physics & Applied Mathematics*, California State University Chico, *GPA – 3.388*.

Research Experience

Dec. 2022 **Postdoctoral Scholar**, *New Mexico Tech*,
This project will establish a new *Reference Set of Mira Variables* that can be utilized across the astronomical community for a variety of applications. Questions we will directly address include the physical processes that govern Mira variables and their circumstellar environments, as well the modes of pulsation, and how these pulsations affect the surrounding photospheric environment. (NSF Award Number: 2206803).

June 2021-Dec.2022 **Part-time Research Scientist**, *New Mexico Tech*,
Analyzing mid-infrared spectral data of evolved stars observed with the Stratospheric Observatory for Infrared Astronomy (SOFIA). Analysis includes data reduction, subtracting the telluric atmospheric, and models of stellar spectral features..

Teaching Experience

2021-Present **Part-Time Instructor**, *Math, Science, and Engineering (MSE) Department*, Central New Mexico Community College,
Instructor for both introductory physics and astronomy courses. Physics experience includes both algebra and calculus based courses..

2021 **Lab Infrastructure**, *Physics Department*, New Mexico Tech,
Develop contingency labs that can be performed virtually when students cannot be physically present in the lab.

2021 **TA Training Working Group**, *Center for Graduate Studies*, New Mexico Tech,
Working group of both faculty and TAs to combine expertise and come up with a training workshop for new TAs for the Fall semester.

2013–2020 **Teaching Assistant**, *Physics Department, New Mexico Tech*,
Instructor for both freshman mechanics and freshman electricity and magnetism labs. Assisted with developing new labs and updating manuals.

2016-2019, 2022 **Core Class Instructor**, *American Association of University Women (AAUW) New Mexico Tech Trek*, "A Tour of the Stellar Life Cycle", This week-long class introduces 8th grade girls to astrophysics. Topics include spectroscopy, nucleosynthesis, and stellar evolution.

2010 **Undergraduate Research Intern**, *University of California Davis*,
Undergraduate research working on the Large Underground Xenon (LUX) experiment.

2007-2013 **Tutor**, *Society of Physics Students*, California State University,Chico,
Tutoring for calculus and algebra based freshman physics and calculus I,II, & III.

Computer Skills

Proficient with: Python, FORTRAN, RADEX, IRAF, MATHEMATICA, LaTeX,
Linux, Microsoft Office, Open Office, Adobe Creative Suite

Competitive Observing Time Awards

2019 SOFIA award of 5.5 hours as science-PI for Mira variable atmospheres program.

Publications

- Baylis-Aguirre, D.K., *A Mid-Infrared Study of Mira Variable Atmospheres: Phase Dependent Analysis Of Spectral Lines Observed With The Spitzer IRS*, New Mexico Tech, Doctoral Dissertation, 2021
- Baylis-Aguirre, D. K., Creech-Eakman, M. J., & Güth, T. *Mid-IR Spectra of M-Type Mira Variable R Tri Observed with the Spitzer IRS*, 2020, MNRAS, 493, 807, doi: 10.1093/mnras/staa322
- Baylis-Aguirre, D. K., Creech-Eakman, M. J., Luttermoser, D. G, et al. 2016, 19th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (CS19), 26, doi: 10.5281/zenodo.158001

Conference Presentations

- Cool Stars 20.5 Poster: "CO_2 in M-type Mira Atmospheres Observed With Spitzer", Cool Stars 20.5, "Virtually Cool"
- New Mexico Symposium Poster: "Line Dancing of CO_2 in Mira Atmospheres", 35^{th} New Mexico Symposium, Socorro, New Mexico, February 21, 2020
- AAS Winter Meeting Poster: "The Lines They Are A'Changing: A Spitzer Study of Mid-Infrared Spectral Lines in Mira Variables", AAS 233 Meeting, Seattle, WA, January 6-10, 2019
- Cool Stars 19 Poster: "Blinded by the Lines: Mid-IR Spectra of Mira Variables Taken with Spitzer", Cool Stars 19, Uppsala, Sweden, June 6-10, 2016

Talks

- Physics Department Colloquium: "The Lines They Are A-Changin': A Study of Mid-Infrared Spectral Lines in Mira Variable Atmospheres", Dissertation Defense, New Mexico Tech, December 9, 2020
- Physics Department Colloquium: "A Study of Mid-IR Spectral Lines in Mira Variable Atmospheres Observed with the Spitzer Space Telescope", New Mexico Tech, November 2018
- Physics Department Colloquium: "The ABC's of AGB's: An Introduction to Asymptotic Giant Branch Stars", California State University Chico, February 2016
- Physics Department Colloquium: "The Physics of Core Collapse Supernovae", California State University Chico, May 2013

Awards

2018 Leslie Fallon Award: For Distinguished Teaching of Physics Laboratories

Societies and Memberships

2015-Present American Astronomical Society (AAS) Member
2013 Sigma Pi Sigma, ($\Sigma\ \Pi\ \Sigma$): Physics Honor Society
2013 Pi Mu Epsilon, ($\Pi\ \mathrm{M}\ \mathrm{E}$): Mathematics Honor Society

Volunteering and Leadership Activities

- 2016-2020: Graduate Student Representative to the Physics Department Faculty
- 2019: New Mexico Science Olympiad: Event Supervisor, Thermodynamics Division B

- 2014-2019: Physics Department Graduate Student Representative to the Graduate Student Association (GSA)
- 2016 & 2017: Sarracino Middle School Math and Science Night ("Galaxy Sorting" 2016), ("What Goes Bump in the Light" Spring 2017), ("Pocket Solar System" Fall 2017); Sarracino Middle School, Socorro, New Mexico
- 2014-2018: New Mexico Science Olympiad: Event Volunteer, Physics Divisions B & C
- 2014 & 2015: Judge: New Mexico Science and Engineering Fair