

JENNIE PAINE

jennie.paine@colorado.edu \diamond jenniepaine.github.io

EDUCATION

University of Colorado, Boulder, CO

M.S., Astrophysics

Dec. 2018

Ph.D. Candidate, Astrophysics

2018 - present

Expected graduation: May 2023

Virginia Tech, Blacksburg, VA

B.S., *summa cum laude*, Physics

May 2016

Minors: Astronomy and Mathematics

AWARDS AND HONORS

- NSF Graduate Research Fellowship 2018 - present
- Ben C. Parmenter Graduate Fellowship, CU Boulder Oct. 2021
- High Pass distinction on Master's Exam, CU Boulder Sept. 2018
- Chambliss Astronomy Achievement honorable mention, AAS June 2018
- Ray Mace Smith Graduate Fellowship, CU Boulder May 2018
- Sigma Xi Honor Society May 2018
- Sigma Pi Sigma Physics Honor Society April 2015
- Robert C. Richardson, Virginia Tech Physics April 2015
- Wan-Zia Scholarship, Virginia Tech Physics April 2014
- Frank Leigh Robeson Scholarship, Virginia Tech Physics April 2013

RESEARCH EXPERIENCE

Graduate Research, University of Colorado

Jan. 2017 - Present

Advisor: Prof. Jeremy Darling

- Studying astrophysical motions as probes of gravity and cosmology. Current focus is measuring the kinematics of stellar SiO masers in the Galactic Center using the Very Large Array (VLA) and the Atacama Large Millimeter/submillimeter Array (ALMA).
- Co-advised two undergraduate students on research projects related to this work.

NSF REU, Harvard-Smithsonian Center for Astrophysics

June - Aug. 2015

Advisors: Dr. Georgiana Ogrean, Dr. Paul Nulsen

- Thermodynamic properties of galaxy clusters and X-ray measurement techniques.

Undergraduate Research, Virginia Tech
Advisors: Prof. Duncan Farrah, Dr. Sara Petty,

Jan. 2014 - May 2016

- Infrared photometry of high redshift Hyperluminous Infrared Galaxies.

AWARDED OBSERVING TIME

Gravity in the Galactic Center: Precise Stellar Kinematics in the Inner Parsec, Paine, J. & Darling, J., VLA, Priority grade A, 2.15 hours, **Principal Investigator**

3D Positions, Velocities, and Accelerations of SiO Masers in the Inner Parsec, Paine, J. & Darling, J., ALMA, Priority grade A, 0.9 hours, **Principal Investigator**

Co-Investigator on one other successful ALMA proposal, one VLA proposal, and one GBT proposal.

TEACHING EXPERIENCE

Instructor of Record, University of Colorado Summer 2020
Taught ASTR 1000, The Solar System. Developed class materials for remote instruction and designed a unit on scientific literacy for non-STEM majors.

ISEE Professional Development Program Mar. - July 2019
Several month-long program on inclusive education and professional development training. Co-designed and taught an inquiry activity on buoyancy in nature for incoming freshmen at CU Boulder.

Teaching Assistant, University of Colorado Boulder Fall 2016
Instructed labs for ASTR 1000, The Solar System.

Undergraduate Teaching Assistant, Virginia Tech Fall 2013 - Spring 2015
Instructed recitations for PHYS 1055 & 1056, Introduction to Astronomy.

MENTORING, SERVICE, AND OUTREACH

Research Mentoring:

Co-advised CU Boulder undergraduate student Anna Nica Spring 2021 - Spring 2022
Co-advised CU Boulder undergraduate student Gus Santaella Fall 2019

Service:

NRAO/GBO Users Committee April. 2022 - present
Graduate Peer Mentor, CU Boulder 2017 - 2018, 2020 - 2021
Graduate Admissions Committee, CU Boulder Dec. 2019 - Feb. 2020
Graduate Curriculum and Concerns Committee, CU Boulder Aug. 2017 - Aug. 2019
Faculty Hiring Committee, CU Boulder Jan. - Mar. 2019
Comprehensive Exam Committee, CU Boulder Aug. 2018 - May 2019
CU-STARs Administrator and mentor to undergraduates Aug. 2017 - May 2018

Outreach:

Taught unit on ancient astronomy to Gifted and Talented elementary students	April 2019
Astronomy Day at Sommers-Bauch Observatory volunteer	April 2019
Public Observing Host at Sommers-Bausch Observatory	2016 - 2018
Organized “sidewalk astronomy” observing events at Virginia Tech	2012 - 2015

TALKS AND PRESENTATIONS

Kinematics in the Galactic Center with SiO masers. Seminar talk, NRAO Charlottesville, Jan. 2023

Kinematics in the Galactic Center with SiO masers. Dissertation talk, AAS, Jan. 2023

Kinematics in the Galactic Center with SiO masers. Virtual talk, UCLA Galactic Center Group meeting, Sept. 2022

3D Kinematics of SiO Masers in the Central Parsec of the Galactic Center. iPoster, AAS, Jan. 2021

Proper Motion Cosmology: Secular Extragalactic Parallax and Large Scale Structure. Talk, CU Boulder Black Holes Group seminar, Feb. 2020

Secular Extragalactic Parallax: Measurement Methods and Predictions for Gaia. Poster, AAS, Jan. 2020

Applications of Gaia Extragalactic Proper Motions: Secular Parallax, Galactocentric Acceleration, and the Isotropy of Cosmic Expansion. Comprehensive Exam talk, CU Boulder, Sept. 2018

Secular Extragalactic Parallax and Geometric Distances with Gaia Proper Motions. Poster, AAS, June 2018

Systematic Uncertainties in Characterizing Cluster Outskirts: The Case of Abell 133. Poster, AAS, Jan. 2016

PUBLICATIONS

REFEREED PUBLICATIONS**First Author:**

- [1] *3D Kinematics of Stellar SiO Masers in the Galactic Center.* **Paine, J.** & Darling, J. 2022, ApJ, 927, 181
- [2] *Secular Extragalactic Parallax: Measurement Methods and Predictions for Gaia.* **Paine, J.**, Darling, J., Graziani, R., & Courtois, H. 2020, ApJ, 890, 146
- [3] *The Gaia-WISE Extragalactic Astrometric Catalog.* **Paine, J.**, Darling, J., & Truebenbach, A. 2018, ApJS, 236, 2

Co-Author:

- [1] *Astrometric Limits on the Stochastic Gravitational Wave Background.* Darling, J., Truebenbach, A., & **Paine, J.** 2018, ApJS, 861, 113
- [2] *Extragalactic Proper Motions: Gravitational Waves and Cosmology.* Darling, J. Truebenbach, A., & **Paine, J.** 2018, refereed ngVLA Science Book chapter
- [3] *The Geometry of the Infrared and X-Ray Obscurer in a Dusty Hyperluminous Quasar.* Farrah, D. et al. [including **Paine, J.**] 2016, ApJ, 831, 76

NON-REFEREED PUBLICATIONS

- [1] *Extragalactic Proper Motions: Gravitational Waves and Cosmology.* Darling, J. Truebenbach, A., & **Paine, J.** 2019, Astro2020 Decadal Survey