Jordan L. Eagle

NASA Postdoctoral Program (NPP) Fellow

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Introduction

I am a high energy astrophysicist with a specialized expertise in X- and γ-ray data reduction, analysis, and interpretation, primarily from the observations of the XMM–*Newton* and *Chandra* X-ray space observatories as well as the *Fermi*–Large Area γ-ray Space Telescope. My past and current research interests focus on where the most energetic massive particles, cosmic rays (CRs), are produced from in our Milky Way Galaxy, using broadband studies of the descendants of supernova explosions, pulsar wind nebulae (PWNe) and supernova remnants (SNRs) to understand the capability of these sources to generate CRs. I also prioritize meaningful outreach and community engagement. Successfully defended my Ph.D. dissertation (Class of 2022) at Clemson University and the Harvard & Smithsonian Center for Astrophysics as a predoctoral fellow.

Appointments

Post-doctoral

NASA Goddard Space Flight Center — *Greenbelt, MD*

Postdoctoral Fellow — *Fall 2022 – Present*

- Proposal: *Pulsar Wind Nebulae Studies in the Gamma-Ray Era*

Graduate

Harvard & Smithsonian Center for Astrophysics — *Cambridge, MA*

Chandra X-ray Center Predoctoral Fellow — *Spring 2020 – Summer 2022*

- Published two first-author, peer-reviewed articles to the Astrophysical Journal.

Physics & Astronomy Department, Clemson University — *Clemson, SC*

Graduate Research Assistant — *Spring 2019–Spring 2020*

- Published two first-author, peer-reviewed articles to the Astrophysical Journal.

Physics & Astronomy Department, Clemson University — *Clemson, SC*

Graduate Teaching Assistant — *Fall 2016–Fall 2018*

- Introductory Astronomy Labs. Lead instructor for each course.
- Taught a total of ten 11-week courses for Solar System Astronomy and Galactic Astronomy labs.

Education

Ph.D. in Physics — *Clemson University, Clemson, SC*

Received Summer 2022 — *Summer 2022*

- Thesis: *The Pursuit for γ-ray Emitting Pulsar Wind Nebulae with the Fermi-LAT*
- Advisors: D. Castro, M. Ajello
- Dissertation Defense & Approval: July 2022

M.S. in Physics — *Clemson University, Clemson, SC*

Received Fall 2019 — *Fall 2019*

- Thesis: *Investigation of a Candidate for Cosmic Ray Acceleration*
- Advisor: M. Ajello

B. S. in Physics — *Radford University, Radford, VA*

Received Spring 2016 — *Spring 2016*

- Minors: Astronomy and Spanish

Honors and Awards

Post-doctoral

NASA Goddard Space Flight Center — *Greenbelt, MD*

NASA Program Postdoctoral Fellow — *Fall 2022 – Present*

- Proposal: *Pulsar Wind Nebulae Studies in the Gamma-Ray Era*

Graduate

Clemson University, College of Science — *Clemson, SC*

Outstanding Graduate Student in Engagement Award — *Spring 2022*

- Recognized by the University's College of Science for commitment to community and outreach engagement.

Clemson University, Physics & Astronomy Department *Clemson, SC*

Graduate Research Assistant Award *Spring 2022*

- Recognized by the University's Physics and Astronomy Department as a successful graduate student researcher.

Chandra X-ray Center *Cambridge, MA*

Predoctoral Fellowship *Spring 2020 – Summer 2022*

- Completed PhD thesis while funded by the CXC.

Graduate Student Travel Grant *Clemson, SC*

$500.00 USD *Spring 2019*

- Awarded by Clemson University Physics and Astronomy department.

Grants and Awards as P.I.

Post-doctoral

NuSTAR Guest Observer Program, Cycle 9 *Greenbelt, MD*

$65,000.00 USD (current estimate) *Fall 2023*

- General Observer Program, Cycle 9. NASA Research Announcement NNH22ZDA001N. Proposal number 9035.

Fermi–LAT Guest Investigator Program, Cycle 15 *Greenbelt, MD*

$77,000.00 USD *Fall 2022*

- General Investigator Program, Cycle 15. NASA Research Announcement NNH21ZDA001N. Proposal number 151034.

Graduate

NuSTAR General Observer Program Cycle 6 *Clemson, SC*

$62,000.00 USD *Spring 2020*

- General Observer Program, Cycle 6. NASA Research Announcement NNH19ZDA001N. Proposal number 6053.

Fermi–LAT Guest Investigator Program, Cycle 11 *Clemson, SC*

$60,000.00 USD *Spring 2018*

- Fermi Guest Investigator Program, Cycle 11. NASA contract 80NSSC18K1716. Proposal number 111197.

Publications & Presentations

Journal Publications

1. *Fermi–LAT γ-ray Emission Discovered from Composite SNR B0453–685 in the Large Magellanic Cloud.* **Eagle, J.**, et. al., 2023. ApJ, 945, 13.

2. *MeV–GeV γ-ray Emission from SNR G327.1–1.1 Discovered by the Fermi–LAT.* **Eagle, J.**, et. al, 2022. ApJ, 940, 10.

3. *Gamma-ray Emission Revealed at the Western edge of SNR G344.7—0.1.* **Eagle, J.**, Marchesi S., Castro D., Ajello M., Vendraso A., 2020. ApJ, 904, 2.

4. *Discovery of a Possible Shock-Cloud Interaction on the Western Edge of the Vela SNR.* **Eagle, J.**, Marchesi S., Castro D., Ajello M., Duvidovich L., Tibaldo L., 2019. ApJ, 870, 1.

Co-Authored Journal Publications

1. *Discovery of GeV γ-Ray Emission from Pulsar Wind Nebula Kes 75 and PSR J1846-0258.* Straal, S., Gelfand, J., **Eagle, J.**, 2023. ApJ, 942, 103.

Journal Publications Close to Submission

1. *The Fermi–LAT Pulsar Wind Nebula Catalog.* **Eagle, J.**, et al., 2023. ApJ, in preparation.

2. *Optical Spectroscopy and Imaging using the Gemini–South Observatory to Investigate the Likely Shock-Cloud Site 2FHL J0826.1–4500 for Cosmic Ray Acceleration.* **Eagle, J.**, et al., 2023. ApJ, in preparation.

3. *Investigating the Multi-Wavelength Nature of MGRO J1908+06 as Observed by the Fermi–LAT, VERITAS, and HAWC High-Energy Observatories.* Shang, R. Y., **Eagle, J.**, Kumar, S., Coutiño, S., 2023. ApJ, in preparation.

4. *2FHL J1745.1–3035 A New, Efficient Very High Energy Galactic Accelerator.* Marchesi. S., **Eagle, J.**, Ajello, M., Castro, D., 2023. ApJ, in preparation.

Presentations

1. *Pulsar Wind Nebula Studies in the Gamma-ray Era with the Fermi-LAT.* Eagle, J., et. al., Mar. 28, 2023. AAS High Energy Astrophysics Division (HEAD) Meeting #20. Special Sessions: Recent Advances in PWNe, Waikoloa Village, HI.

2. *Pursuing Gamma-ray Emitting Pulsar Wind Nebulae with the Fermi-LAT.* Eagle, J., et. al., Oct. 10, 2022. Tenth International Fermi Symposium, Johannesburg, South Africa.

3. *Hunting Pulsar Wind Nebulae with the Fermi–LAT.* Eagle, J., Castro D., Mar. 13-17, 2022. AAS High Energy Astrophysics Division (HEAD) Meeting #19, Pittsburgh, PA.

4. *Hunting Pulsar Wind Nebulae with the Fermi–LAT.* Eagle, J., Castro D., Jan. 11-15, 2021. AAS 237th Meeting, iPoster Sessions.

5. *2FHL J0826.1-4500: Discovery of a New Galactic Accelerator.* Eagle, J., et al., Oct. 14-19, 2018. 8th International Fermi Symposium, Baltimore, MD.

Research Experience

Post-doctoral

NASA Goddard Space Flight Center — *Greenbelt, MD*

Postdoctoral Fellow — *Fall 2022 – Present*

- Advisor: Dr. Elizabeth Hays
- Objective: Continue high-energy studies of pulsar wind nebulae, focusing on the MeV bandpass for a future space mission such as the All-Sky Medium Gamma-ray Energy Observatory (AMEGO).

Graduate

Harvard & Smithsonian Center for Astrophysics — *Cambridge, MA*

Predoctoral Fellow — *Spring 2020 – Summer 2022*

- Advisor: Dr. Daniel Castro
- Objective: Searched for and characterized gamma-ray emitting pulsar wind nebulae (PWNe). Through this work, we provided a comprehensive pulsar wind nebula catalog of all gamma-ray emitting PWNe with no known Fermi–LAT pulsars and their properties using over 100 months of Fermi–LAT gamma-ray space telescope data.

Clemson University — *Clemson University, Clemson, SC*

Graduate Research Assistant — *Spring 2017 – Spring 2020*

- Advisor: Dr. Marco Ajello
- Objective: Identify and characterize 12 newly detected sources by the Fermi-LAT in the 2FHL catalog reported in 2016 (see Eagle et al., 2019, 2020).

Professional Training & Skills

Professional Training

Fermi Summer School — *Lewes, DE*

Student Participant — *Summer 2019*

- Held annually by the Fermi-LAT Collaboration
- Description: Two-week intensive workshop involving processing and interpreting Fermi data ranging from basic point-source analysis to more advanced work like extension analyses.

Computer Skills

Data & Spectral Analysis Software (Level)

- FermiPy Python Package (Advanced)
- FermiTools (Advanced)
- HEASOFT tools including Xspec, fv, nh (Advanced)
- *Chandra* Interactive Analysis of Observations or CIAO (Advanced)
- XMM–*Newton* Science Analysis System or SAS (Advanced)
- NAIMA Python Package (Advanced)
- Sherpa (Moderate)
- Pyraf/IRAF (Basic)

Programming Software (Level)

- Python (Advanced)
- C++ (Basic)
- Fortran (Basic)

Telescopes

- Fermi–LAT (MeV–GeV γ-ray)
- Nuclear Spectroscopic Telescope Array or NuSTAR (hard X-ray)
- XMM–*Newton* and *Chandra* (soft X-ray)
- Gemini (optical imaging and spectroscopy)

Professional Affiliations & Service

Professional Affiliations

Smithsonian Astrophysical Observatory *Cambridge, MA*

Research Collaborator *Summer 2022 – Present*

Fermi–LAT Collaboration

Postdoctoral Member *2020–Present*

Professional Service

Astrophysical Journal

Peer Reviewer *2019–Present*

Graduate

Clemson University, Physics & Astronomy Graduate Student Organization *Clemson, SC*

Public Outreach Secretary *Spring 2019 – Spring 2020*

- Helped prepare and execute departmental outreach events as public outreach secretary.

Clemson University, Symposium in Research for Physics and Astronomy (SIRPA) *Clemson, SC*

Event Organizer *August 2019*

- Planned and hosted the annual Clemson University SIRPA conference on behalf of the department.

Mentorship & Advising

Post-doctoral

Minds Matter Boston Chapter *Boston, MA*

Co-mentor *2020–Present*

- Co-mentorship duties include assisting assigned mentee during weekly academic workshops concentrated on ACT exam preparation, professional development, and ultimately college preparation.

Graduate

Clemson University *Clemson, SC*

Co-Advisor *2018–2020*

- Co-advised an undergraduate physics student beside PhD advisor Dr. Marco Ajello and colleague Dr. Lea Marcotulli.
- Under our supervision, the student analyzed archival XMM-Newton X-ray data for a supernova remnant which was later published in a peer-reviewed article (Eagle et al., 2020).

Teaching Experience

Graduate

Physics & Astronomy Department, Clemson University *Clemson, SC*

Graduate Teaching Assistant *Fall 2016 – Fall 2018*

- Introductory Astronomy Lab. Lead instructor for each course.

Outreach & Community Engagement

On Planet Nine YouTube Channel *OnPlanetNine.com*

Volunteer Outreach Scientist *2020–Present*

- Four female colleagues and I started up a brand new YouTube channel called *On Planet Nine* that is rooted in science education as well as sharing our enthusiasm and expertise.
- YouTube channel: https://www.youtube.com/channel/UCIBFLQP4_40eHEMa-1gmFLg

Minds Matter Boston Chapter *Boston, MA*

Volunteer *2020–Present*

- Volunteer co-mentorship of a junior high school student in inner Boston City to help them prepare and achieve higher education goals.

Oconee Humane Society *Clemson, SC*

Volunteer *Spring 2019 – Summer 2019*

- Fostered homeless pets.

Clemson University Planetarium *Clemson, SC*

Volunteer Operator *Fall 2016 – Spring 2020*

- Volunteer operation of the planetarium on campus for any interested groups free of charge including families, student groups, prospective students, special events, and more.