CURRICULUM VITAE

Anna Trindade Falcão

NASA Postdoctoral Program Fellow · Multiwavelength observational astrophysicist

NASA Goddard Space Flight Center

Greenbelt, Maryland, USA

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RESEARCH PROFILE

I study how accreting supermassive black holes launch multiphase outflows and investigate how those outflows interact with, and potentially transfer energy to, gas in their host galaxies. My research combines spatially resolved X-ray imaging and spectroscopy with multiwavelength observations to test connections between nuclear winds and feedback on galactic scales.

- Black-hole accretion and AGN feedback
- Compton-thick and low-luminosity active nuclei
- High-resolution X-ray astronomy and NewAthena science
- Highly ionized X-ray-emitting gas and multiphase outflows
- AGN-host-galaxy interaction

APPOINTMENTS

NASA Postdoctoral Program Fellow
NASA Goddard Space Flight Center, High Energy Astrophysics Division
July 2025 - present
Greenbelt, Maryland

Postdoctoral Researcher
Center for Astrophysics | Harvard & Smithsonian
June 2022 - May 2025
Cambridge, Massachusetts

University Research Assistant
The Catholic University of America
January 2018 - May 2022
Washington, DC

EDUCATION

Ph.D. in Physics, cum laude
The Catholic University of America
Dissertation: Spatially-Resolved Mass Outflows in QSOs: Implications for AGN Feedback
2022
Washington, DC

M.S. in Physics, cum laude
The Catholic University of America
2019
Washington, DC

B.S. in Physics
Universidade Federal de Minas Gerais
2017
Belo Horizonte, Brazil

RESEARCH METHODS AND SOFTWARE

Methods

- Spatially resolved X-ray imaging and spectroscopy of active nuclei and host-galaxy gas
- Broadband X-ray spectral modeling of obscured and unobscured accretion
- Optical and infrared emission-line diagnostics and kinematic analysis
- Photoionization and plasma modeling of multiphase outflows
- Multiwavelength image registration and comparison across X-ray, optical, infrared, millimeter, and radio bands
- Radio and millimeter interferometric imaging of compact nuclear structure

Software

- Chandra analysis: CIAO, Sherpa, SAOImage DS9
- XMM-Newton and NuSTAR analysis: SAS, HEASoft, NuSTARDAS
- X-ray spectral fitting: XSPEC
- Photoionization modeling: Cloudy
- Radio interferometry: CASA
- Optical and infrared data reduction: IRAF
- Scientific Python: Astropy, NumPy, Pandas, Matplotlib

Languages

- Portuguese (native)
- English (fluent)

FIRST-AUTHOR REFEREED PUBLICATIONS

REFEREED ARTICLES

1. **Trindade Falcão, A., et al.** (2026). “Hot, Photoionized X-Ray Gas in Two Luminous Type 2 Quasars: Chandra-HST Evidence for a Wind-driven Sequence.” *The Astrophysical Journal, 1000, 242*. doi:10.3847/1538-4357/ae4aa3
2. **Trindade Falcão, A., et al.** (2025). “The X-Ray Emission of NGC 5005: An Unobscured Low-luminosity Active Galactic Nucleus with a Weakly Accreting Broad-line Region.” *The Astrophysical Journal, 993, 247*. doi:10.3847/1538-4357/ae07d0
3. **Trindade Falcão, A., et al.** (2025). “Mapping the Excitation Mechanisms in the LINER I Active Galactic Nucleus NGC 5005: Positive Feedback and a Thin LINER Cocoon.” *The Astrophysical Journal, 986, 175*. doi:10.3847/1538-4357/addc64
4. **Trindade Falcão, A., et al.** (2024). “Deep Chandra Observations of NGC 5728. III. Probing the High-resolution X-Ray Morphology and Multiphase Interstellar Medium Interactions in the Circumnuclear Region.” *The Astrophysical Journal, 977, 275*. doi:10.3847/1538-4357/ad8de3
5. **Trindade Falcão, A., et al.** (2024). “Hubble Space Telescope observations of nearby type 1 quasars. I. Characterization of the extended [O III] 5007 Å emission.” *Monthly Notices of the Royal Astronomical Society, 535, 621-633*. doi:10.1093/mnras/stae2412
6. **Trindade Falcão, A., et al.** (2024). “Resolving a Candidate Dual Active Galactic Nucleus with ~100 pc Separation in MCG-03-34-64.” *The Astrophysical Journal, 972, 185*. doi:10.3847/1538-4357/ad6b91
7. **Trindade Falcão, A., et al.** (2024). “Discovery of Kiloparsec-scale Semirelativistic Fe Kα Complex Emission in NGC 5728.” *The Astrophysical Journal, 963, 6*. doi:10.3847/1538-4357/ad18b3
8. **Trindade Falcão, A., et al.** (2023). “Deep Chandra Observations of NGC 5728: Morphology and Spectral Properties of the Extended X-Ray Emission.” *The Astrophysical Journal, 950, 143*. doi:10.3847/1538-4357/acd052
9. **Trindade Falcão, A., et al.** (2022). “Tracking X-ray outflows with optical/infrared footprint lines.” *Monthly Notices of the Royal Astronomical Society, 511, 1420-1430*. doi:10.1093/mnras/stac173
10. **Trindade Falcão, A., et al.** (2021). “Hubble Space Telescope [O III] emission-line kinematics in two nearby QSO2s: A case for X-ray feedback.” *Monthly Notices of the Royal Astronomical Society, 505, 3054-3069*. doi:10.1093/mnras/stab1549
11. **Trindade Falcão, A., et al.** (2021). “Hubble Space Telescope observations of [O III] emission in nearby QSO2s: Physical properties of the ionized outflows.” *Monthly Notices of the Royal Astronomical Society, 500, 1491-1504*. doi:10.1093/mnras/staa3239

CONFERENCE PROCEEDINGS AND ABSTRACTS

1. **Trindade Falcão, A., et al.** (2024). “Discovery of kpc-scale Semirelativistic Fe K Emission in NGC 5728.” *AAS High Energy Astrophysics Division Meeting 21, Bulletin of the American Astronomical Society, 56, 202.06*.
2. **Trindade Falcão, A., et al.** (2023). “Deep Chandra Observations of NGC 5728: A Study of Morphology and Spectral Properties of the Extended X-Ray Emission.” *241st American Astronomical Society Meeting, Bulletin of the American Astronomical Society, 55, 360.22*.
3. **Trindade Falcão, A., et al.** (2022). “Tracking X-Ray Outflows with Optical and IR Footprint Lines.” *Multiphase AGN Feeding & Feedback II Conference Proceedings*.
4. **Trindade Falcão, A., et al.** (2021). “HST Observations of [O III] Emission in Nearby QSO2s: Physical Properties of the Outflows.” *Proceedings of the International Astronomical Union, 15, Symposium S359, 269-271*. doi:10.1017/S1743921320004196
5. **Trindade Falcão, A., et al.** (2019). “Hubble Space Telescope Observations of [O III] Emission in Nearby QSO2s: Physical Properties of the Ionized Outflows.” *233rd American Astronomical Society Meeting, Bulletin of the American Astronomical Society, 51, 242.19*.

CO-AUTHORED PUBLICATIONS

REFEREED ARTICLES

1. **Król, D. Ł., et al.** (2026). “High Resolution (<100 pc) Ionization Structures in the ISM of AGN ESO 137-G34.” *The Astrophysical Journal, 1005, 230*. doi:10.3847/1538-4357/ae78d2
2. **Lamperti, I., et al.** (2026). “Fast, dust-poor outflows in the local candidate dual AGN MCG-03-34-64 observed with VLT/ERIS.” *Astronomy & Astrophysics, 710, A193*. doi:10.1051/0004-6361/202659161
3. **Middei, R., et al.** (2026). “Ultra-thick warm absorbers: Enlarging the parameter space of AGN ionised outflows.” *Astronomy & Astrophysics, 710, A118*. doi:10.1051/0004-6361/202659321
4. **Middei, R., et al.** (2026). “Directly Tracking the Rebrightening of a Supermassive Black Hole Accretion Disk.” *The Astrophysical Journal, 1004, 200*. doi:10.3847/1538-4357/ae6f0e
5. **Middei, R., et al.** (2026). “Tracking Down the Broadband Polarimetric Properties of PG 1553+113.” *The Astrophysical Journal, 1004, 130*. doi:10.3847/1538-4357/ae6cf0
6. **Reeves, J. N., et al.** (2026). “Winds of Change: XRISM Resolve X-Ray Spectroscopy of NGC 4051.” *The Astrophysical Journal, 1001, 137*. doi:10.3847/1538-4357/ae5527
7. **Król, D. Ł., et al.** (2026). “Active Galactic Nuclei-driven Metallicity Enrichment in the Interstellar Medium of Mrk 573.” *The Astrophysical Journal Letters, 1000, L43*. doi:10.3847/2041-8213/ae4de1
8. **Król, D. Ł., et al.** (2026). “Probing Active Galactic Nuclei-Interstellar Medium Feedback through Extended X-Ray Emission in ESO 137-G034.” *The Astrophysical Journal, 998, 135*. doi:10.3847/1538-4357/ae3143
9. **Feuillet, L. M., et al.** (2026). “Footprints in the Wind: Probing X-Ray Outflows in NGC 7469 Using Near-infrared Emission Lines.” *The Astrophysical Journal, 997, 287*. doi:10.3847/1538-4357/ae2bfb
10. **Liodakis, I., et al.** (2025). “Detection of Compton Scattering in the Jet of 3C 84.” *The Astrophysical Journal Letters, 994, L9*. doi:10.3847/2041-8213/ae157d
11. **Revalski, M., et al.** (2025). “Quantifying Feedback from Narrow Line Region Outflows in Nearby Active Galaxies. V. The Expanded Sample.” *The Astrophysical Journal, 984, 32*. doi:10.3847/1538-4357/adc131
12. **Feuillet, L. M., et al.** (2025). “Core Revelations: The Star Formation and Active Galactic Nucleus Connection at the Heart of NGC 7469.” *The Astrophysical Journal, 983, 49*. doi:10.3847/1538-4357/adb155
13. **Russell, H. R., et al.** (2024). “The Evolution of Galaxies and Clusters at High Spatial Resolution with Advanced X-Ray Imaging Satellite (AXIS).” *Universe, 10, 273*. doi:10.3390/universe10070273
14. **Maksym, W. P., et al.** (2023). “A UFO Seen Edge-on? Resolving Ultrafast Outflow Emission on ~200 pc Scales with Chandra in the Active Nucleus of Mrk 34.” *The Astrophysical Journal, 951, 146*. doi:10.3847/1538-4357/acd7f1
15. **Revalski, M., et al.** (2022). “Quantifying Feedback from Narrow Line Region Outflows in Nearby Active Galaxies. IV. The Effects of Different Density Estimates on the Ionized Gas Masses and Outflow Rates.” *The Astrophysical Journal, 930, 14*. doi:10.3847/1538-4357/ac5f3d

COMMUNITY REPORTS AND MISSION STUDIES

1. **Koss, M., et al.** (2025). “The Advanced X-ray Imaging Satellite Community Science Book.” *Community science report*.

SELECTED TALKS AND PRESENTATIONS

Watching a Black Hole Wind Grow — August 13, 2026
From the Nucleus to Galaxy-Scale Outflows
NRL Astronomy & Astrophysics Seminar
Invited seminar

A Wind-Driven Feedback Sequence in Luminous Type 2 Quasars — July 2026, ESO Garching, Germany
AGN FAAST: The Final Decade of the VLT
Contributed talk

Watching a Black Hole Wind Grow: Chandra and Hubble Reveal the Early Stages of Galaxy Feedback — June 2026, Pasadena, California
248th American Astronomical Society Meeting
Press briefing

Probing the Role of X-ray Winds in Driving Large-scale Outflows in Nearby Type 2 Quasars — 2025, Vasto, Italy
Vasto Accretion Meeting: AGN
Poster

Discovery of kpc-scale Semi-relativistic Fe K Emission in NGC 5728: Implications for AGN Feedback — 2024, Boston, Massachusetts
25 Years of Science with Chandra
Poster

A Chandra Study of the AGN-host Interaction in NGC 5728 — 2024
The Catholic University of America Physics Colloquium
Invited seminar

Discovery of kpc-scale Semi-relativistic Fe K Emission in NGC 5728 — 2024
NASA Goddard AGN Seminar
Invited seminar

Recent Discovery of Semi-relativistic Fe K Emission in NGC 5728: Why Do We Care? — 2024, New Orleans, Louisiana
243rd American Astronomical Society Meeting
Public contributed talk

Discovery of kpc-scale Semi-relativistic Fe K Emission in NGC 5728 — 2023, Easton, Maryland
AGN Winds on the Chesapeake
Invited talk

Tracking X-ray Outflows with Optical and IR Footprint Lines — 2022, Sexten, Italy
Multiphase AGN Feeding & Feedback II
Contributed talk

Tracking X-ray Outflows with Optical and IR Footprint Lines — 2021
Space Telescope Science Institute Colloquium
Invited seminar

SELECTED SCIENCE COMMUNICATION

Commentary on a Close Black-Hole Pair in the Early Universe ↗ — August 13, 2026
Live Science
Independent perspective on the JWST and ALMA evidence for an obscured dual-AGN candidate

NASA's Hubble, Chandra Find Supermassive Black Hole Duo — September 2024
NASA Science and the Chandra X-ray Center
Lead author and science contact

HONORS AND AWARDS

NASA Postdoctoral Program Fellowship — July 2025 - present
NASA Goddard Space Flight Center
Probing the Role of X-ray Gas in Effective AGN-Galaxy Feedback in the Local Universe

SELECTED SUCCESSFUL OBSERVING PROPOSALS

PRINCIPAL INVESTIGATOR

Resolving the Closest-separation Supermassive Black Hole Pair with VLA-A
Very Large Array, Cycle 2026A
Principal Investigator

CO-INVESTIGATOR

Dual Fe Kα Peaks in MCG-03-34-64
Chandra X-ray Observatory, Cycle 27
Co-Investigator

The Spatially Extended Ultra-fast Outflow of NGC 5728
Chandra X-ray Observatory, Cycle 26
Co-Investigator

Mass Outflow in the QSO2 Mrk 34
XMM-Newton, Cycle 24
Co-Investigator

Probing the AGN-host Relationship in NGC 4102
Hubble Space Telescope, Cycle 31
Co-Investigator

MENTORING

Research Mentor
October 2024 - May 2026

Amity Regional High School Science Research Program

Mentoring independent projects on narrow-line-region extent and AGN outflow efficiency.

PROFESSIONAL SERVICE

Referee
2022 - present

- The Astrophysical Journal
- Monthly Notices of the Royal Astronomical Society
- Astronomy & Astrophysics
- Nature

Seminar Organizer
2022 - 2025

- Center for Astrophysics High Energy Astrophysics Division Seminar

Scientific Organizing Committees
2023

- AGN Winds on the Chesapeake

Panel and Time Allocation Review

- National Science Foundation Astronomy & Astrophysics Grants (2025)
- Hubble Space Telescope Cycle 33 (2025)
- XRISM Cycle 1 (2024)
- James Webb Space Telescope Cycle 3 (2023)

Professional Membership
2024 - present

- HEASARC Users Group