

# Alessandro Peca | Scientific CV

Yale University, Department Of Physics, 219 Prospect Street

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## Current position

### Eureka Scientific

*Post Doctoral Researcher*

**New Haven, CT, USA**

*May 2024 - Current*

Post-doctoral research position to work on supermassive black holes and their evolution.

Advisor: Dr. M. Koss

### Yale University, Department of Physics

*Visiting Scientist / Laboratory Associate*

**New Haven, CT, USA**

*June 2024 - Current*

Sponsor: Prof. M. Urry

## Education

### Ph.D. in Physics

*University of Miami, Department of Physics, Coral Gables, FL, USA*

**May 10th, 2024**

*2019–2024*

Thesis: *Unveiling the Dark Side of the Universe: Harnessing the Power of Big Data to Reveal a Hidden and Heavily Obscured AGN Population*; Advisor: N. Cappelluti.

### Visiting student

*University of Maryland (UMD), College Park, MD, USA*

*08/2023*

Research activity on the effects of UV/optical dust extinction in active galactic nuclei survey detection, with the supervision of Professor R. Mushotzky.

### Visiting student

*Yale University, New Haven, CT, USA*

*08/2022*

Research activity on X-ray spectral analysis of active galactic nuclei in the Stripe82X field, with the supervision of Professor M. Urry.

### Master's of Science

*University of Miami, Coral Gables, FL, USA*

*2019-2021*

Physics Major; Award of Academic Merit., Advisor: N. Cappelluti.

### Research fellowship

*INAF-OAS, Bologna, Italy*

*01/2019 - 07/2019*

Winner of the public competition "Measurement of spectral properties in the X-ray band and photometric redshift of a sample of X-ray selected AGN in SDSS field J1030+0524". Research activity with the supervision of Doctor R. Gilli.

### Master's of Astrophysics and Cosmology

*Alma Mater Studiorum, Bologna, Italy*

*2015–2018*

Thesis: *Obscured AGN in the field of J1030: the X-ray and optical/infrared perspective, 110/110 cum Laude*; Supervisors: Professor C. Vignali, Doctor R. Gilli, Doctor M. Mignoli.

### Bachelor of Physics

*Alma Mater Studiorum, Bologna, Italy*

*2010–2014*

Thesis: *Fundamentals and applications of plasmonics*, Supervisor: Professor L. Pasquini.

## Professional Experience

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### Early Career Editorial Member

*MDPI/Universe* 2025 - present

### GO Panelist/Peer Reviewer

*ALMA observatory* 2025 - present

### GO Panelist/Peer Reviewer

*NASA/NuSTAR observatory* 2025 - present

### GO Panelist/Peer Reviewer

*NASA/Swift observatory* 2024 - present

### GO Panelist/Peer Reviewer

*NASA/NICER observatory* 2024 - present

### Reviewer/referee for A&A journals

*Astronomy and Astrophysics* 2023 - present

### Reviewer/referee for AAS journals

*American Astronomical Society, The Astrophysical Journal.* 2023 - present

### NewAthena AGN science team member

*link: <https://www.the-athena-x-ray-observatory.eu/en>* 2025 - present

### LSST AGN science team member

*link: <https://agn.science.lsst.org/>* 2024 - present

### BASS survey team member

*link: <https://www.bass-survey.com/>* 2024 - present

### AXIS AGN science team member

*link: <https://axis.umd.edu/>* 2023 - present

### AGN-DataBase team member

*link: [agndb.physics.miami.edu](http://agndb.physics.miami.edu)* 2019 - present

### AHA (Accretion History of AGN) team member

*link: <https://project.ifa.hawaii.edu/aha/team/>* 2019 - present

### J1030 team member

*link: <http://j1030-field.oas.inaf.it/team.html>* 2018 - present

### Graduate students representative

*Department of Physics, University of Miami (UM), Coral Gables, FL, USA* 08/2023 - 05/2024

### K-12 Teacher Volunteer

*University of Florida (UF), Gainesville, FL, USA* 2022 - 2024

Scientist in Every Florida School Project

### Teaching Assistant

*Department of Physics, University of Miami (UM), Coral Gables, FL, USA* 2019 - 2022

Physics laboratory for undergraduate students.

### Science communicator

*SOFOS, Bologna, Italy* 2017 - 2019

Astronomical communication activities for schools (such as conferences, workshops, etc.); Guided visits and sky observations at the telescopes of the Bologna Astronomical Observatory in Loiano (BO).

### Mentoring experience

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Co-supervised summer students at the University of Miami and other institutions starting in summer 2021, providing guidance and mentorship in their research endeavours. In particular:

- Andrade, K., Northwestern University, Co-supervised with Meg Urry. The student will present the summer work "*A Spectroscopic Analysis of the Little Red Dots*" at the next 2026 American Astronomical Society Meeting.
- Schussheim, R., Yale University, main supervisor Meg Urry. The student presents the work "*Little Red Dots: The Search for AGN in  $z > 7$  Galaxies Imaged with the JADES Survey*" at the 245th American Astronomical Society Meeting, Abstract ID 3360.
- Aspegren, O., Yale University, main supervisor Meg Urry. The student presented the work "*The Relative Sensitivity of eROSITA and Chandra or XMM to Heavily Obscured AGN*" at the 241st American Astronomical Society Meeting, Poster ID 301.11.
- Cook, C., University of Kansas, main supervisor Allison Kirkpatrick. The student presented the work "*Fitting Cold Quasar Spectra in Xspec*" at the 237th American Astronomical Society Meeting, Poster ID 138.14.

### Research Interests

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I specialize in the study of Active Galactic Nuclei (AGN), with a focus on variability, feedback, surveys, and obscuration processes in both local and high-redshift AGN. My research combines X-ray and multiband data to investigate obscuration processes, the physical drivers of AGN variability, and the co-evolution of AGN with their host galaxies. I also study optical and infrared emission line diagnostics, such as [Ne V], a strong tracer of AGN activity, to characterize these systems and their evolution across cosmic time. In addition, I work extensively with Big Data, applying AI and machine-learning techniques to AGN catalogs for population and evolution studies, with the broader goal of advancing our understanding of AGN physics and cosmic evolution. Beyond research, I am deeply committed to mentoring students and early-career researchers, fostering their growth in both astrophysics and data-driven science.

### First Author Publications

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- 08-2025 "*BASS. XLIX. Characterization of highly luminous and obscured AGNs: local X-ray and [NeV] $\lambda 3426$  emission in comparison with the high-redshift Universe*", The Astrophysical Journal, **Peca**, Koss, Oh et al., DOI: 10.3847/1538-4357/adec9a.
- 07-2025 "*NuSTAR Detection of an Absorption Feature in ESP 39607: Evidence for an Ultrafast Inflow?*", The Astrophysical Journal, **Peca**, Koss, Serafinelli et al., DOI: 10.3847/1538-4357/adea4a.
- 2025 "*The AGN-DataBase (AGN-DB): A Comprehensive Multi-Band Database Unifying the Properties of Active Galactic Nuclei*", The Astrophysical Journal, **Peca**, Cappelluti, Urry et al., in prep. (close to submission and already presented at AAS High Energy Astrophysics Division meeting #20, id. 100.31. Bulletin of the American Astronomical Society, Vol. 55, No. 4 e-id 2023n4i100p31)

- 07/2024 "Stripe 82-XL: the  $\sim 54.8 \text{ deg}^2$  and  $\sim 18.8 \text{ Ms}$  Chandra and XMM-Newton point source catalog and number of counts", The Astrophysical Journal, **Peca**, Cappelluti, Urry et al., DOI: 10.3847/1538-4357/ad6df4.
- 11/2023 "X-ray Redshift for obscured AGN with AXIS deep and intermediate surveys", AXIS white paper, **Peca**, Cappelluti, Marchesi et al., DOI: 10.3390/universe10060245.
- 02/2023 "On the cosmic evolution of AGN obscuration and the X-ray luminosity function: XMM-Newton and Chandra spectral analysis of the 31.3 deg $^2$  Stripe 82X", The Astrophysical Journal, **Peca**, Cappelluti, Urry et al., DOI: 10.3847/1538-4357/acac28.
- 01/2021 "X-ray redshifts for obscured AGN: a study case in the J1030 deep field", The Astrophysical Journal, **Peca**, Vignali, Gilli et al., DOI: 10.3847/1538-4357/abc9c7.

## Co-Author Relevant Publications

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- 08-2025 "A big red dot at cosmic noon", Astronomy & Astrophysics, Loiacono, Gilli, Mignoli, ..., **Peca** et al., Accepted, arXiv:2506.12141.
- 07-2025 "Insights for Early Massive Black Hole Growth from JWST Detection of the [Ne V] $\lambda 3427$  Emission Line", The Astrophysical Journal, Trakhtenbrot, Ricci, Treister, ..., **Peca** et al., DOI: 10.3847/2041-8213/ae0d8c.
- 06/2025 "Tracing High-z Galaxies in X-Rays with JWST and Chandra", The Astrophysical Journal, Kaminsky, Cappelluti, Hasinger, ..., **Peca**, et al., DOI: 10.3847/1538-4357/adcede.
- 01/2025 "BASS XLV: Quantifying AGN Selection Effects in the Chandra COSMOS-Legacy Survey with BASS", The Astrophysical Journal, Tokayer, ..., **Peca**, et al., DOI: 10.3847/1538-4357/adb8c9.
- 01/2025 "Estimating Black Hole Masses in Obscured AGN from X-ray and Optical Emission Line Luminosities", The Astrophysical Journal, LaMassa, ..., **Peca**, et al., DOI: 10.3847/1538-4357/adb0bf
- 10/2024 "Stripe 82X Data Release 3: Multiwavelength Catalog with New Spectroscopic Redshifts and Black Hole Masses", The Astrophysical Journal, LaMassa, **Peca**, Urry et al., DOI: 10.3847/1538-4357/ad6e7d.
- 08/2023 "X-ray properties and obscured fraction of AGN in the J1030 Chandra field", Astronomy & Astrophysics, Signorini, Marchesi, Gilli, ..., **Peca** et al., DOI: 10.1051/0004-6361/202346364.
- 12/2021 "Redshift identification of X-ray-selected active galactic nuclei in the J1030 field: searching for large-scale structures and high-redshift sources", Astronomy & Astrophysics, Marchesi, ..., **Peca** et al., DOI: 10.1051/0004-6361/202141416.
- 05/2020 "The deep Chandra survey in the SDSS J1030+0524 field", Astronomy & Astrophysics, Nanni, ..., **Peca** et al., DOI: 10.1051/0004-6361/202037914.
- 12/2019 "Discovery of a galaxy overdensity around a powerful, heavily obscured FRII radio galaxy at  $z = 1.7$ : star formation promoted by large-scale AGN feedback?", Astronomy & Astrophysics, Gilli, Mignoli, **Peca** et al., DOI: 10.1051/0004-6361/201936121.

**ADS Full publication list:** [clickable link]

## **Accepted proposals**

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### **XMM-Newton GO**

*A survey of the most X-ray luminous and obscured AGN at z=0.2-0.4* 12/2025  
Proposal ID 098307 XMM-Newton AO25, **PI:Alessandro Peca**, Approved Time: 159 ks.

### **NuSTAR DDT**

*Confirming an Ultra-Fast Inflow with XRISM and NuSTAR* 12/2025  
**PI:Alessandro Peca**, Approved Time: 25 ks.

### **NuSTAR DDT**

*Confirming an Ultra-Fast Outflow in SWIFT J2036* 11/2025  
**PI:Alessandro Peca**, Approved Time: 30 ks.

### **Palomar/NGPS**

*Black Hole Masses and Accretion in the Most Luminous Obscured Nearby AGN* 10/2025  
Semester 2026A, **PI:Alessandro Peca**, Approved Time: 2 full nights.

### **Palomar/NGPS**

*Tracing [NeV] Emission in Compton-thick AGN in BASS* 10/2025  
Semester 2026A, **PI:Alessandro Peca**, Approved Time: 3 full nights.

### **XRISM GO**

*Probing a sustained ultrafast inflow with XRISM* 10/2025  
Proposal ID 22171 XRISM Cycle 2, **PI:Alessandro Peca**, Approved Time: 90 ks.  
Approved budget: \$100,550

### **NuSTAR GO Large Program**

*Probing the structure of AGN tori with NuSTAR* 05/2025  
Proposal ID 11223 NuSTAR Cycle 11, **PI:Alessandro Peca**, Approved Time: 750 ks.  
Approved budget: \$128,955

### **Palomar/NGPS**

*Tracing [NeV] Emission in Compton-thick AGN and Galaxy Mergers with BASS* 04/2025  
Semester 2025B, **PI:Alessandro Peca**, Approved Time: 4 full nights.

### **XMM-Newton GO**

*Confirming a Potential Ultra-Fast Inflow with XMM-Newton* 11/2024  
Proposal ID 096085 XMM-Newton AO24, **PI:Alessandro Peca**, Approved Time: 46 ks.  
Approved budget: \$50,000

### **Joint NuSTAR-XMM-Newton GO**

*Decoding Luminous, High-Redshift, and Obscured eROSITA AGN* 04/2023  
Proposal ID 9160 NuSTAR cycle 9, **PI:Alessandro Peca**, Approved Time: 220 ks NuSTAR, 48 ks XMM-Newton.  
Approved budget: \$83,600

### **XMM-Newton GO**

*Decoding Luminous, High-Redshift, and Obscured eROSITA AGN* 11/2022  
Proposal ID 092080 XMM-Newton AO22, **PI:Alessandro Peca**, Approved time: 112 ks.

### **Astrophysics Data Analysis Program (ADAP)**

*A multiwavelength study of AGN evolution from z=7 to z=0* 10/2022  
Proposal ID 22-ADAP22-0083, PI: Nico Cappelluti, **CO-I:Alessandro Peca**, Approved budget: \$644,573

### **Chandra Archival**

*The Large STRIPE-82 X-Ray (S82XL) Survey* 09/2021

## Talks and Conferences

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### Invited Talks

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- 11/2025 "Probing the structure of AGN tori with X-ray variability", UMBRELA Dialogue, 18/11 Cambridge, Ma, USA.
- 11/2024 "X-ray Redshifts for Obscured Active Galactic Nuclei with AXIS Deep and Intermediate Surveys", AXIS seminar series, 01/11 Online seminar, USA.
- 03/2023 "Estimating Obscured Chandra Source Catalog AGN Redshifts using the XZ Method and Machine Learning", 20th HEAD Conference, 26-30/03 Waikoloa, HI, USA.

### Contributed Talks

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- 12/2025 "Evidence for ultrafast inflows and outflows in high Eddington ratio AGN", AHA IV Conference, 15-17/12, Miami, FL, USA.
- 10/2025 "X-ray and optical/UV insights into highly luminous, obscured, variable AGN: feedback, enhanced [NeV] emission missing in JWST X-ray weak sources, and a rare ultra-fast inflow from the BASS survey", HEAD 22nd Conference, 12-16/10, St. Louis, MO, USA.
- 05/2025 "The AXIS View of Highly Obscured AGN Across Cosmic Time", AXIS Community Science Conference, 14-16/05, Annapolis, MD, USA.
- 02/2025 "Compton-thick fraction evolution from local to high redshift (and maybe little red dots!)", AXIS SWG seminar series, 03/02, Online.
- 04/2024 "Unveiling the Dark Side of the Universe: Harnessing the Power of Big Data to Reveal a Hidden and Heavily Obscured AGN Population", 21th HEAD Conference, 7-12/04 Horseshoe Bay, TX, USA.
- 01/2024 "Unveiling the Dark Side of the Universe: Harnessing the Power of Big Data to Reveal a Hidden and Heavily Obscured AGN Population", Dissertation talk, 243rd AAS Conference, 11/01 New Orleans, LA, USA.
- 12/2023 "On the evolution of high luminosity and obscured AGN in the Stripe 82X field", The HEAD Frontier Seminar Series, 08/12 Online.
- 11/2023 "Harnessing the power of big data: using large surveys and multi-wavelength catalogs to unveil the obscured AGN Universe", Seminar series in Europe: 26/11 National Observatory of Athens, Athens, Greece; 21/11 Tor Vergata University, Rome, Italy, 29/11 INAF - Osservatorio Astrofisico di Arcetri, Florence, Italy; 05/12 University of Bologna, Bologna, Italy.
- 11/2023 "Harnessing the power of big data: using large surveys and multi-wavelength catalogs to unveil the obscured AGN Universe", NASA-GSFC AGN Seminar, 09/11, NASA Goddard space flight center, Greenbelt, MD, USA.
- 11/2023 "The 55 deg<sup>2</sup> release of the Stripe 82 X-Ray Large (S82XL) Survey: The Point Source Catalog", High Energy Seminar at Center for Astrophysics | Harvard & Smithsonian, 01/11 Cambridge, MA, USA.

- 10/2023 "Is the black hole accretion density tracing a missing heavily obscured AGN population?", Galaxy lunch Seminar at Yale University, 11/10 New Haven, CT, USA.
- 06/2023 "Uncovering the dark side of the universe: are we missing a hidden and heavily Compton-thick AGN population?", The X-ray Universe 2023 Conference, 16/06 Athens, Greece.
- 01/2023 "On the cosmic evolution of AGN obscuration and the X-ray luminosity function: XMM-Newton and Chandra spectral analysis of the 31.3 deg<sup>2</sup> Stripe 82X", 241st AAS Conference, 11/01 Seattle, WA, USA.
- 01/2021 "Spectral analysis in S82X: XMM-Newton and Chandra", Accretion History of AGN III Conference, 21/01 Online.
- 10/2019 "Spectral analysis in S82X: Chandra data", Accretion History of AGN II Conference, 18/10 Miami FL, USA.
- 06/2019 "X-ray redshifts for obscured AGN in the Chandra J1030 field", Supermassive Black holes Environment & Evolution Conference, 21/06 Corfu, Greece.

### **Poster exhibitions**

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- 01/2025 "A NuSTAR and XMM-Newton View of Highly Obscured, Luminous, and Variable AGN in the BASS survey", 245th AAS meeting, 12-16/01 National Harbor, MD, USA.
- 03/2023 "On the cosmic evolution of AGN obscuration and the X-ray luminosity function: XMM-Newton and Chandra spectral analysis of the 31.3 deg<sup>2</sup> Stripe 82X", 20th HEAD Conference, 26-30/03 Waikoloa, HI, USA.
- 03/2023 "AGN-DB: A Spectro-Photometric and Morphological Database of AGN", 20th HEAD Conference, 26-30/03 Waikoloa, HI, USA.
- 09/2019 "X-ray redshifts for obscured AGN: a study case in the J1030 deep field", X-ray Astronomy 19 Conference, 08-13/09 Bologna, Italy.
- 10/2018 "Obscured AGN in the field of J1030", AGN 13 Conference, 09-12/10, Milan, Italy.

### **Prizes**

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- 04/2023 Outstanding Graduate Research or Scholarship Award 2023-2024, University of Miami.
- 11/2023 Rodger Doxsey Travel Prize honorable mention for the AAS's 243rd meeting.

### **Press**

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- "Origins of mental illness, fast gas for a black hole", 11/2025 Press Release on Yale News, link: <https://news.yale.edu/2025/09/09/origins-mental-illness-fast-gas-black-hole>.
- "Asteroid Bennu may answer long sought questions, some South Florida researchers say", Sept 25th, 2023 TV Interview for CBS News Miami, link: <https://www.cbsnews.com/miami/news/asteroid-bennu-may-answer-long-sought-questions-some-south-florida-researchers-say/>.
- "The quasar that survives the banquet of the black hole", 09/2020 Press Release for Media INAF, link: <https://www.media.inaf.it/2020/11/30/quasar-sopravvive-banchetto-buco-nero/>.

- *"The astrophysics rookie's big discovery"*, 12/2019 Interview for University of Miami News, link: <https://news.miami.edu/as/stories/2019/12/peca-black-hole-research.html>.
- *"Black Hole Nurtures Baby Stars a Million Light Years Away"*, 09/2019 NASA Press Release, link: [https://chandra.cfa.harvard.edu/press/19\\_releases/press\\_112619.html](https://chandra.cfa.harvard.edu/press/19_releases/press_112619.html).

## **Skills**

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- Languages: English (fluent), Italian (mother tongue), Spanish (beginner)
- Programming: Python (advanced), SQL/ADQL (advanced), Perl (intermediate), Fortran (intermediate), R (intermediate), HTML (intermediate), C/C++ (intermediate).