

# Alessandro Peca | Scientific CV

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## Current position

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### Eureka Scientific

New Haven, CT, USA

*Post Doctoral Researcher*

May 2024 - Current

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

Adivsor: Dr. M. Koss

### Yale University, Department of Physics

New Haven, CT, USA

*Laboratory Associate*

June 2024 - Current

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

Sponsor: Prof. M. Urry

## Education

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### Ph.D. in Physics

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

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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### Reviewer/referee for A&A journals

*Astronomy and Astrophysics*

2023 - present

### Reviewer/referee for AAS journals

*American Astronomical Society, The Astrophysical Journal.*

2023 - present

### Graduate students representative

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

08/2023 - present

### K-12 Teacher Volunteer

*University of Florida (UF), Gainesville, FL, USA*

2022 - present

Scientist in Every Florida School Project

### AGN-DataBase team member & leading student

link: [agnodb.physics.miami.edu](http://agnodb.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

### 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.....

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

- Aspegren, O., Yale University, main supervisor Megan 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 "*The Relative Sensitivity of eROSITA and Chandra or XMM to Heavily Obscured AGN*" 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 multiband surveys, particularly exploring obscuration processes and high-redshift AGN. Additionally, I work extensively with Big Data, employing various machine-learning techniques on AGN catalogs to conduct population studies and advance our understanding of these cosmic objects.

## First Author Publications

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- 10/2024 *"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.
- 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: 10.48550/arXiv.2407.09617.
- 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  $31.3 \text{ deg}^2$  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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- 03/2024 *"Stripe 82X Data Release 3: Multiwavelength Catalog with New Spectroscopic Redshifts and Black Hole Masses "*, The Astrophysical Journal, LaMassa,**Peca**, Urry et al., DOI: 10.48550/arXiv.2403.20160.
- 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 FR II 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.

## Accepted proposals

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### 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

*The unknown giant: a backyard beacon of large-scale structure formation* 11/2022

Proposal ID 092132 XMM-Newton AO22, PI: Quirino D'Amato, **CO-I: Alessandro Peca**, Approved time: 17 ks.

### 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 Cappeluti, **CO-I: Alessandro Peca**, Approved budget: \$644,573

### Chandra Archival

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

Proposal ID 23700328, Bibcode:2021cxo..prop.6191P, **PI: Alessandro Peca**, Approved budget: \$85,000.

## Talks and Conferences

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### Invited Talks.....

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.....

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 *"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"*, Supermassive Black holes Environment & Evolution Conference, 21/06 Corfu, Greece.

### Poster exhibitions

- 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

- 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

- *"Asteroid Bennu may answer long sought questions, some South Florida researchers say"*, 09/25/2023 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++ (beginner),.