

# 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

May 10th, 2024

*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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### **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

### **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

### **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  
Scientist in Every Florida School Project

2022 - 2024

## Teaching Assistant

Department of Physics, University of Miami (UM), Coral Gables, FL, USA  
Physics laboratory for undergraduate students.

2019 - 2022

## 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:

- Schussheim, R., Yale University, main supervisor Megan 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 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

I specialize in the study of Active Galactic Nuclei (AGN), focusing on variability, multiband surveys, and obscuration processes in both local and high-redshift AGN. I use X-ray and multiband data to investigate these processes, combining observations across different wavelengths. Additionally, I work extensively with Big Data, applying machine-learning techniques to AGN catalogs for population and evolution studies, with the goal of advancing our understanding of AGN physics and evolution.

## First Author Publications

- 07/2025 "*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., (accepted for publication).
- 06/2025 "*NuSTAR Detection of an Absorption Feature in ESP 39607: Evidence for an Ultra-Fast Inflow?*", The Astrophysical Journal, **Peca**, Koss, Serafinelli et al., (accepted for publication) DOI: 10.3847/1538-4357/adea4a.

- 07/2024 *"Stripe 82-XL: the  $\sim 54.8$  deg<sup>2</sup> and  $\sim 18.8$  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<sup>2</sup> 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.
- 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)

## Co-Author Relevant Publications

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- 01/2025 *"BASS XLV: Quantifying AGN Selection Effects in the Chandra COSMOS-Legacy Survey with BASS"*, The Astrophysical Journal, Tokayer, ..., **Peca**, et al., DOI: 10.48550/arXiv.2501.16708.
- 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: 10.48550/arXiv.2501.14072
- 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 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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### NuSTAR GO Large-Program

*Probing the Struscture of AGN Tori with NuSTAR* 05/2025

Proposal ID 11223 NuSTAR Cycle 11, **PI:Alessandro Peca**, Approved Time: 750 ks.

Approved budget: \$128,955

### 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

*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

11/2024 *"X-ray Redshifts for Obscured Active Galactic Nuclei with AXIS Deep and Intermediate Surveys"*, AXIS seminar series, 10/30 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.....

- 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 *"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.....

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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○ *"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++ (intermediate).