

Alessandro Peca | Scientific CV

Yale University, Department Of Physics, 219 Prospect Street
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Current position

Eureka Scientific

Post Doctoral Researcher

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

Advisor: Dr. M. Koss

New Haven, CT, USA

May 2024 - Current

Yale University, Department of Physics

Laboratory Associate / Visitor

Sponsor: Prof. M. Urry

New Haven, CT, USA

June 2024 - Current

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

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

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

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

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

08-2025 "*BASS. XLIX. Characterization of highly luminous and obscured AGNs: local X-ray and [NeV] λ 3426 emission in comparison with the high-redshift Universe*", The Astrophysical Journal, **Peca**, Koss, Oh et al., DOI: 10.3847/1538-4357/ade9a.

- 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 ~ 54.8 deg² and ~ 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 deg² 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

- 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] λ 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/ad68c9.
- 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/ad60bf.
- 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

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: \$TBD

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

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

Invited Talks.....

- 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, 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.....

- 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 deg² 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 deg² 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 deg² Stripe 82X"*, Super-massive 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 deg² 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

- *"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.

Skills

- 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).