

## CURRICULUM VITAE

CV date 09-06-2026

### Part A. PERSONAL INFORMATION

|                                            |                         |                     |                                   |           |           |
|--------------------------------------------|-------------------------|---------------------|-----------------------------------|-----------|-----------|
| First name                                 | MICHELE                 |                     |                                   |           |           |
| Family name                                | PERNA                   |                     |                                   |           |           |
| Gender                                     | M                       | Birth date          | 07/04/1987                        |           |           |
| Social Security                            | 28-1518191800           | Passport            | YB1096129                         | ID number | Y7102651N |
| e-mail                                     | mperna@cab.inta-csic.es | URL Web             | jwst-agn-cab.github.io/perna.html |           |           |
| Open Researcher and Contributor ID (ORCID) |                         | 0000-0002-0362-5941 |                                   |           |           |

#### A.1. Current position

|                   |                                                                                                                                            |              |               |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
| Position          | Ramón y Cajal Fellow                                                                                                                       |              |               |
| Initial date      | 01/01/2025                                                                                                                                 |              |               |
| Institution       | Centro de Astrobiología (CAB) CSIC - INTA                                                                                                  |              |               |
| Department/Centre | Astrofísica                                                                                                                                |              |               |
| Country           | Spain                                                                                                                                      | Phone number | +393472319720 |
| Keywords          | Galaxy evolution, Space Astronomical Instrumentation, Active Galactic Nuclei, Ultraluminous Infrared Galaxies, Integral field spectroscopy |              |               |

#### A.2. Previous positions

| Period            | Position/Institution/Country                                                |
|-------------------|-----------------------------------------------------------------------------|
| 07/2019 - 12/2024 | Postdoctoral Researcher, CAB, Madrid, ES                                    |
| 05/2019 - 05/2023 | Atracción de Talento Fellow, Postdoctoral Researcher, CAB, Madrid, ES       |
| 01/2019 - 04/2019 | Visiting scientist at the European Southern Observatory (ESO), Garching, DE |
| 01/2017 - 01/2019 | Postdoctoral Researcher at the Arcetri Astrophysical Observatory (AAO), IT  |

#### A.3. Education

| PhD, Graduate Degree                          | University/Country                     | Year    |
|-----------------------------------------------|----------------------------------------|---------|
| PhD in Astrophysics                           | Università di Bologna, IT              | 11/2016 |
| Visiting PhD student                          | (3-months at) University of Sussex, UK | 2016    |
| Laurea Magistrale in Astronomia e Astrofisica | Università di Roma La Sapienza, IT     | 01/2012 |
| Laurea Triennale in Fisica e Astrofisica      | Università di Roma La Sapienza, IT     | 12/2009 |

### Part B. CV SUMMARY (links to external pages in [blue](#))

My research career is framed in the field of observational Astronomy. The main goal is to understand how galaxies form and evolve, with a particular interest in the role of Active Galactic Nuclei (AGN) and starbursts. In a nutshell, my activities led to

- Refereed publications (see [NASA ADS](#))
  - 147 papers, with 12000+ citations, H-index=58
  - 36 papers as 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> author
  - 16 as 1<sup>st</sup> author, with 780+ citations
- Dissemination activities
  - 50+ talks in international conferences
  - 20+ invited lectures and talks
  - SOC & LOC for *JWST data reduction workshop NOVA* (2022), *Achieve your JWST data: getting ready for Cycle 4* (2024), and *GA-NIFS workshops* (2023-2026)
  - LOC for the conferences *Crossing the Rubicon. The fate of gas flows in galaxies* (2016) and *Galaxy origins in the JWST era* (2025), and the workshop *JWST Cy1 proposal preparation* (2020)
  - Outreach: several press releases and collaboration with media (see [here](#))
- Leadership in major projects
  - Science: JWST [GA-NIFS](#) collaboration (*Galaxy Assembly with NIRSpec IFS*, 330h of JWST time) and PUMA (*Physics of ULIRGs with MUSE (70h) and ALMA (50h)*) survey
  - Data treatment: JWST GTO & GO IFS extragalactic programs, and [SUPER](#) survey

- Participation in other major projects: [JADES](#) (JWST survey), ELT/[HARMONI](#) (science team), and [SUBWAYS](#) (XMM-Newton large program), among others
- Awarded grants: ~1M€ for 5 projects (170k€ as PI of a AEI project)
- Awarded fellowships: Ramón y Cajal (2025-29) and Atracción de Talento (2019-23)
- Other awarded post-doc positions (*accepted & declined*) at KIAA-PKU (2016), AAO (2017-19; 2023; 2024), CAB (2023-24), and Scuola Normale Superiore (2023)
- Awarded observing time: >4000h in major facilities as co-I (>120h as PI on optical, near-infrared, sub-mm, and X-ray telescopes); observing experience at LBT (18 nights)
- Awarded travel grants: 4months at ESO (DE); 3months at University of Sussex (UK); 3weeks at MIAPP (DE); workshops at the Lorentz Center (NL), STScI (US), and IFPU (IT)
- Training and mentoring: supervision of 2 PhD students (started in 2023) and a post-doc (since 2025); contribution to the training of 2 additional students
- Reviewing activities for A&A, ApJ, MNRAS, Science, Nature Astronomy; peer review for GTC, JWST and ALMA; ALMA Science Assessor (2026)

### Career highlights

During my PhD and my two-year post-doc at AAO, I established my research profile in galaxy evolution, with a particular focus on AGN roles, combining multi-wavelength observations from world-leading facilities. It follows a selection of my main contributions during this period

- I reported the first detailed characterization of outflow properties - and their feedback effects - in AGN host galaxies at  $z \sim 2$  (e.g. [MP+15a,b](#)). Among these sources, XID2028 can be now considered one of the best galaxies to perform feedback studies in the distant Universe
- By analysing a sample of ~650 AGN ([MP+17a,b](#)), I constrained fundamental outflow properties, and I discovered a significant correlation between outflow and AGN power. The latter is now implemented in many cosmological simulations (e.g. [Davé+19](#))
- I presented the first statistically-sound investigation of AGN feedback effects at  $z > 1$  ([MP+18b](#)).
- I reported the first scientific demonstration of adaptive optics spectroscopy with *curved slits*, studying the gas metallicity and kinematics in  $z \sim 2$  lensed galaxies ([MP+18a](#))
- I measured the black hole mass of the most luminous AGN at  $z \sim 2$  (e.g. [MP+14](#), *COSPAR paper award for young scientists*), analysing spectro-photometric data collected over 11 years

At CAB (2019-present) I have expanded my expertise to nearby starbursts and established a leading role in JWST, as part of the NIRSpec GTO team; I also participate in HARMONI projects as a member of its science team. This work led to a Ramón y Cajal tenure-track position, the co-supervision of 2 PhD students (since 2023) and a postdoctoral researcher (since 2025), and funding (as PI) to recruit an additional postdoctoral researcher and PhD student in late 2026. My contributions include

- I have a leading role in PUMA, a survey aimed to study 25 nearby ULIRGs with VLT/MUSE and ALMA. This work led to 5 papers: for instance, [MP+20](#) shows the most detailed characterization of feedback effects in Arp220, the archetypical ULIRG; [MP+21](#), [+22](#) present the stellar and gas kinematics of the entire sample
- Within the JWST/NIRSpec activities,
  - I was responsible for the development of IFS simulations before the JWST launch, and I contributed to the evaluation of the science performance during its commissioning, within the ‘NIRSpec Science Readiness Team’ (NSRT, [Böker+23](#), [Rigby+23](#))
  - I co-lead the [GA-NIFS](#) collaboration, overseeing various science projects and meetings
  - I am responsible for data reduction of 20+ IFS programs, with contributions to the STScI pipeline
  - I published 80+ refereed papers since 2023, 17 of them as 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> author
- I developed a tool to generate mock data simulating the 3D galaxy morpho-kinematics, to be ingested in the NIRSpec and HARMONI pipelines, and used to test the instruments’ performance

## **Part C. RELEVANT MERITS**

### **C.1. Publications** (complete list of publications [here](#))

Six selected 1<sup>st</sup> author refereed papers (out of 16):

(1/25) Perna M., Arribas S., Lamperti I., Witstok J., 2025b, ‘GA-NIFS: *A high number of dual AGN at  $z > 3$* ’, [A&A, 696, 59, 25pp. \[64 cit.\]](#)

This paper announces the discovery of four AGN pairs and a triple AGN at  $z > 3$ . This study doubles the count of known multiple AGN systems in the remote Universe, and challenges prevailing theories of galaxy evolution that predict their scarcity. Other closely related works include [MP+23a](#), [+26a](#), [Übler+24](#), [Zamora+24](#), [Scialpi+26](#), reporting the discovery of further AGN pairs at high- $z$ . This project also motivated a joint JWST+ALMA [program led by me](#), aimed at studying the gas and stellar populations within one of these newly identified multiple-AGN systems.

(1/18) Perna M., Arribas S., Marshall M., Scholtz J., 2023, ‘*GA-NIFS: The ultra-dense, interacting environment of a dual AGN at  $z \sim 3.3$  revealed by JWST/NIRSpec IFS*’, [A&A, 679, 89, 23pp. \[128 cit.\]](#)  
This study shows some of the earliest JWST data, targeting the most distant spectroscopically-confirmed dual AGN at that time (see also [MP+25b](#)). It also presents key improvements of the STScI pipeline, and provides a tool to remove instrumental features affecting point source data (Sec. C.4).

(1/12) Perna M., Arribas S., Catalan Torrecilla C., Rodriguez del Pino, 2020, ‘*MUSE view of Arp220: Kpc-scale multi-phase outflow and evidence for positive feedback*’, [A&A, 643, 139, 34pp. \[58 cit.\]](#)  
This study is part of the PUMA project, a survey of 25 ULIRGs observed with MUSE and ALMA (see also e.g. [MP+21](#), [+22](#)). It presents the first detailed characterization of the gas and stellar conditions in the prototypical ULIRG Arp220. These results have been combined with JWST follow-up data in two sibling papers, led by me and a supervised PhD student ([MP+24](#), [Ulivi](#), [MP+25](#)).

(1/14) Perna M., Sargent M., Brusa M., Vignali C., 2018b, ‘*Molecular gas content in obscured AGN at  $z > 1$* ’, [A&A, 619, 90, 21pp. \[53 cit.\]](#)  
In this work I proved that outflows can significantly reduce the cold gas content of AGN host galaxies with respect to inactive galaxies, by exploiting interferometric data of a large sample of  $z > 1$  galaxies. Within the [SUPER](#) collaboration, we are expanding the sample and corroborating these early results (e.g. [Circosta+21](#); [Bertola+24](#); [Ricci+26](#), in prep.).

(1/5) Perna M., Lanzuisi G., Brusa M., Mignoli M., Cresci G., 2017a, ‘*An X-ray/SDSS sample. I. Multi-phase outflow incidence and dependence on AGN luminosity*’, [A&A, 603, 99, 15pp. \[89 cit.\]](#)  
In this work I analysed the optical spectra of  $\sim 650$  AGN at  $z < 0.8$ , deriving the incidence of ionised and neutral outflows, and discovering a significant correlation between outflow power and AGN luminosity. This relation is now implemented in important cosmological simulations (e.g. [Bradley+22](#)). This paper also motivated the development of the [SUBWAYS](#) survey, and two follow-up projects ([MP+17b](#), [+19](#)).

(1/13) Perna M., Brusa M., Cresci G., Mignoli M., 2015a, ‘*Galaxy-wide outflows in  $z \sim 1.5$  luminous obscured QSOs revealed through near-IR slit-resolved spectroscopy*’, [A&A, 574, 82, 16pp. \[100 cit.\]](#)  
This paper presents one of the very first detailed spatially resolved studies of AGN feedback at high- $z$ . It is a part of a series of publications providing an in-depth, multiwavelength analysis of outflow properties in  $z \sim 2$  AGN (e.g. [MP+15b](#); [Brusa](#), [MP+16](#); [Brusa+18](#); [Cresci](#), [Tozzi](#), [MP+23](#)).

## C.2. Congress (Complete list of attended conferences and invited lectures/talks [here](#))

Selected invited contributions to international conferences and lectures:

- [Invited talk](#) (17 March 2026): “A triple AGN system at  $z = 3$  revealed by combined VLT/MUSE and JWST data”, ESTEC Workshop on Dual and Binary AGN, Noordwijk, NL
- [Invited review talk](#) (10 Oct 2025) “AGN-driven multiphase outflows: observational perspectives and challenges”, Royal Astronomical Society’s specialist discussion, London, UK
- [Invited talk](#) (11 June 2025): “GA-NIFS: a high number of dual AGN at  $z > 3$ ”, IFPU Focus Week Luminous quasars as laboratories for the evolution of SMBH/galaxy systems, Trieste, IT
- [Invited lecture](#) (26 May 2025): “The GA-NIFS approach to JWST NIRSpec IFU data reduction & Insights from a  $z \sim 3$  ring galaxy”, ESO seminar, Garching, DE
- [Invited talk](#) (23 Apr. 2025): “The GA-NIFS initiative for a shared approach to refine JWST NIRSpec IFU data processing”, MIRI European Consortium, Madrid, ES
- [Invited talk](#) (13 Jan. 2025): “GA-NIFS: a high number of dual AGN at  $z > 3$ ”, IFPU Focus Week The quest for dual and binary SMBHs in the multi-messenger era, Trieste, IT
- [Invited lecture](#) (4 June 2024): “GA-NIFS: the dense environment of AGN at  $z > 3$ ”, Osservatorio Astronomico di Brera colloquium, Milan, IT
- [Invited lecture](#): 7 Dec. 2023: “Galaxy Assembly with JWST/NIRSpec IFS (GA-NIFS): the dense environment of AGN at  $z > 3$ ”, European Space Agency (ESA) SCI-S seminar (virtual)

- Invited talk: 14-17 Nov. 2023: “The GA-NIFS initiative for a shared approach to refine JWST NIRSpec IFU data processing”, Improving JWST data products workshop, STScI, Baltimore, US
- Invited lecture: 30 May 2023: “First results from the JWST programme GA-NIFS: the gaseous environment and ISM properties of quasars at  $z \sim 3-7$ ”, Osservatorio Astronomico di Roma, IT
- Invited lecture: 17 May 2023: “The ultradense, interacting environment of a dual AGN at  $z \sim 3.3$  revealed by JWST/NIRSpec IFS”, University of Cambridge IoA, UK

### C.3. Research projects

**Funded projects:** It follows a list of present and past funded projects in which I have participated. It includes JWST programs in which I am currently deeply involved (with a leading role for some of them), as well as projects related to the latest and next generation of IFS instruments (e.g. VLT/ERIS, ELT/ HARMONI).

- as principal-investigator: ‘*Proyectos de Generación de Conocimiento*’ proposal titled ‘Unveiling AGN Feeding and Feedback Across Cosmic Time with the James Webb Space Telescope’, reference: PID2024-159902NA-I00; funds: 160 k€. The project received an additional 4-year contract for developing a PhD thesis.
- Ramón y Cajal Fellow at CAB, CSIC-INTA (Spain), code: RYC2023-044853-I, funds: 250 k€, period: 01/2025-01/2030; role: tenure track fellow researcher
- Atracción de Talento Fellow at CAB, CSIC-INTA (Spain), code: 2018-T2/TIC-11715, funds: 140 k€, period: 05/2019-05/2023; role: fellow researcher
- as co-investigator: ‘The metal circle: a new sharp view of the baryon cycle up to Cosmic Dawn with the latest generation IFU facilities, PI: G. Cresci (INAF- Arcetri Observatory, Italy), code: CUP C13C22000740005, capitulo 1.01.01.01.009, funds: 200 k€; period: 2023-2024; roles: development of the project ‘HIPER’, preparation of observations, data reduction and analysis
- as co-investigator: ‘Participación Española en el telescopio espacial James Webb’; PIs: S. Arribas and L. Colina (CAB, CSIC-INTA, Spain); code: PID2021-127718NB-I00; funds: 400 k€; period: 2022-2026; roles: GA-NIFS co-lead, responsible for data processing of GTO NIRSpec IFS data
- as co-investigator: ‘Participación Española en el telescopio espacial James Webb’; PIs: S. Arribas and A. Labiano Ortega (CAB, CSIC-INTA, Spain); code: PID2019-106280GB-I00; funds: 221 k€; period: 2020-2022; roles: development of simulations, responsible for data processing of NIRSpec IFS data, member of the JWST/NIRSpec Science readiness team
- as co-investigator: ‘Participación del centro de Astrobiología en el desarrollo del instrumento HARMONI para el ELT: fase D1’, PI: M. Pereira Santaella (CAB, CSIC-INTA, Spain); code: PID2019-105423GA-I00; funds: 433 k€; period: 2020-2022; roles: development of simulations to test the instrument capabilities

**Other international research projects:** In addition to the projects in which I have a leading role (e.g. JWST/GA-NIFS), I also participate in other projects that allow me to expand and enrich my expertise in the field of extragalactic astronomy. Among them, JWST/JADES, for which I contributed to the development of the pipeline and collaborated to >20 refereed papers, and other projects awarded with significant amount of observing time on world’s top telescopes: e.g. SUPER (ESO *large program* (280h) with several follow-up), PUMA (granted with MUSE (70h) and ALMA (50h) time), SUBWAYS and HYPERION (XMM-Newton *large programs* (1400h) with several follow-up), KateMOSS (KMOS, 1300h). Competitive observing programmes as PI include a recently approved joint JWST+ALMA program (30h), and a NOEMA program (45h). These projects involve major experts worldwide in the galaxy evolution field and cutting-edge instrumentation.

### C.4. Contracts, technological or transfer merits

In the framework of the JWST/NIRSpec team, I am developing specialized tools and scripts for the data processing and reduction that are used for the analysis of NIRSpec IFS scientific data; these open access tools (see [MP+23](#), [GitHub webpage](#)) benefit the whole community.

Similarly, as part of the ELT/HARMONI team at CAB, I’m developing analysis tools for this future first-light instrument, that will eventually transfer to the ESO community at large.