

CURRICULUM VITAE ABREVIADO (CVA)

Part A. PERSONAL INFORMATION

First name	MICHELE				
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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, and their feedback effects.

In a nutshell, my activities led to

- Refereed publications (see [NASA ADS](#))
 - 120 papers, with 9800+ citations (H-index=53)
 - 33 papers as 1st, 2nd or 3rd author
 - 14 as 1st author, with 680+ citations
- Dissemination activities
 - 50+ talks in international conferences
 - 19+ invited lectures and talks
 - SOC and LOC for *JWST data reduction workshop NOVA* (2022), *Achieve your JWST data: getting ready for Cycle 4* (2024), and *GA-NIFS* workshops (2023-2025)
 - LOC for the conferences *Crossing the Rubicon. The fate of gas flows in galaxies* (2016) and *Galaxy origins in the JWST era* (2025); LOC for the workshop *JWST Cyl proposal preparation* (2020)
 - Outreach: several press releases and collaboration with media (see [here](#))
- Leadership in major projects
 - Science: JWST [GA-NIFS](#) (*Galaxy Assembly with NIRSpec IFS*, 330h of JWST time) and PUMA (*Physics of ULIRGs with MUSE (70h) and ALMA (50h)*) surveys

- Data treatment: JWST GTO IFS extragalactic surveys, and [SUPER](#) survey
- Participation in other major projects: [JADES](#) (*JWST Advanced Deep Extragalactic Survey*), [HARMONI](#) (ELT instrument), [SUBWAYS](#) and HYPERION (XMM-Newton large programs), among others
- Projects funding: 1.4 M€ for 7 projects (550 k€ as PI of 3 projects)
- Awarded observing time: >4000h in major facilities as co-I (>80h as PI on optical, near-infrared, sub-mm, and X-ray telescopes); observing experience at LBT (18 nights)
- Awarded post-doc positions (*accepted & declined*) at KIAA-PKU (2016), AAO (2017-2019; 2023; 2024), CAB (*Atracción de Talento*, 2019; 2023-2024), and Scuola Normale Superiore (2023)
- Awarded travel grants
 - 4months at ESO Garching (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); contribution to the training of 4 graduate/PhD students; reviewer and member of a thesis defense committee
- Reviewing activities: referee for A&A, ApJ, MNRAS, Science; peer review for GTC and ALMA

Career highlights

During my PhD (2013-2016) and my two-year post-doc at the AAO, I gained in-depth knowledge in the field of galaxy evolution, and I learned the state-of-art methods for the treatment of multi-wavelength data coming from world-leading telescopes. It follows a selection of my main contributions during this period of my career

- 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 large 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 extended my expertise by working on nearby starbursts, and establishing solid grounds for advancing in galaxy evolution studies through a very active participation in JWST projects, as part of the NIRSpec GTO team; I also participate in ELT/HARMONI projects as a member of its science team. My contributions include

- I have a leading role in PUMA, a survey aimed to study 25 nearby ULIRGs with VLT/MUSE and ALMA. So far, this work led to 5 refereed 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
 - I contributed to the evaluation of the JWST science performance during its commissioning, within the 'NIRSpec Science Readiness Team' (NSRT, [Böker+23](#), [Rigby+23](#))
 - I co-lead the GA-NIFS survey, overseeing various science projects and meetings
 - I am responsible of data reduction for 17 extragalactic programs, with contributions to the STScI pipeline (Sec. C.4)
 - I published 50+ refereed papers since 2023, 15 of them as 1st, 2nd or 3rd 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 performance of these instruments for outflow studies

Part C. RELEVANT MERITS

C.1. Publications (complete list of 120 refereed publications [here](#))

I select five 1st author refereed papers (out of 14):

(1/13) Perna M., Brusa M., Cresci G., Mignoli M., 2015, ‘*Galaxy-wide outflows in $z \sim 1.5$ luminous obscured QSOs revealed through near-IR slit-resolved spectroscopy*’, [A&A, 574, 82, 16pp. \[97 cit.\]](#)

This paper presents a detailed spectroscopic study of AGN feedback. 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](#)).

(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. \[76 cit.\]](#)

In this work I analysed the optical spectra of ~ 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](#)).

(1/14) Perna M., Sargent M., Brusa M., Vignali C., 2018b, ‘*Molecular gas content in obscured AGN at $z > 1$* ’, [A&A, 619, 90, 21pp. \[50 cit.\]](#)

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+25](#), in prep.).

(1/12) Perna M., Arribas S., Catalan Torrecilla C., Rodriguez del Pino B., 2020, ‘*MUSE view of Arp 220: Kpc-scale multi-phase outflow and evidence for positive feedback*’, [A&A, 643, 139, 34pp. \[53 cit.\]](#)

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](#)).

(1/18) 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 IFU*’, [A&A, 679, 89, 23pp. \[82 cit.\]](#)

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 data reduction pipeline, and provides a tool to remove instrumental features affecting point source data (Sec. C.4).

(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. \[38 cit.\]](#)

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](#), [Marshall, MP+23](#), [Übler+23](#), and [Zamora+24](#) (the latter reporting the discovery of another AGN pair at $z = 4.7$).

C.2. Congress (Complete list [here](#))

I select 10 contributions in international conferences (among 40+) and invited lectures/talks (among 19+) in the last two years:

- [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 talk: 18-22 Sept. 2023: “The environment of quasars in the early Universe – First results from the JWST GTO programme GA-NIFS”, ESA/ESAC ‘Engage Meeting’, Madrid, ES
- 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€.
- as principal-investigator: Ramón y Cajal at CAB, CSIC-INTA (Spain), code: RYC2023-044853-I, funds: 250 k€, period: 01/2025-01/2030; role: post-doctoral researcher
- as principal-investigator: Atracción de Talento Fellow at CAB, CSIC-INTA (Spain), code: 2018-T2/TIC-11715, funds: 140 k€, period: 05/2019-05/2023; role: post-doctoral 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). 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.