



# Daniele Gasparri

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## WORK EXPERIENCE

03/2023 – 31/12/2024 Copiapó, Chile

**POST DOC FELLOWSHIP** UNIVERSIDAD DE ATACAMA

### Probing the Cold Dark Matter Hierarchical Formation of Bulgeless Galaxies: The BEARD Perspective

- Conducted data analysis and interpretation of long-slit optical observations of the BEARD sample of bulgeless spiral galaxies, focusing on gas and stellar kinematics, stellar population properties (age, metallicity, alpha-enhancement), and the reconstruction of their star formation histories (SFH).
- Evaluated and refined both standard and innovative methodologies for characterizing stellar content, including line-strength index analysis and full spectral fitting, integrating and developing machine learning algorithms to enhance performance.
- Advanced the development of Python-based GUI software for spectral manipulation and the analysis of large datasets, optimizing usability and efficiency.

08/2022 – 12/2022 Copiapó, Chile

**POST DOC FELLOWSHIP** UNIVERSIDAD DE ATACAMA

### Calibrating and Testing New NIR Line-Strength Indices for Unresolved Stellar Populations

- Calibrated near-infrared (NIR) line-strength indices for age, metallicity, and alpha-enhancement using observational data and semi-empirical simple stellar population (SSP) models.
- Applied NIR line-strength indices to spatially resolved spectra, comparing results with optical Lick/IDS indices and full spectral fitting techniques.
- Designed and developed a Python-based GUI software for efficient spectral manipulation and analysis, tailored to support both optical and NIR studies.

2010 – CURRENT

**AUTHOR**

Author of 40 astronomy books, including two in English and one in Spanish.

2004 – CURRENT

**FREELANCE SCIENCE WRITER**

More than 100 astronomy outreach articles written for Italian and international astronomy magazines.

2004 – CURRENT

**SCIENCE COMMUNICATOR**

- Seminars and courses about astronomy and astrophotography (in Italian, English and Spanish)
- Writer and presenter of documentaries about astronomy (in Italian and Spanish)

## TECHNICAL SKILLS

### Scientific technical expertise

- Five years experience with Python coding applied to research. I fully developed the first GUI software for advanced spectral analysis (<https://github.com/danielegasparri/span-gui>)
- Extensive knowledge of C++ and Fortran languages
- Eight years experience with optical and NIR long-slit and IFS spectroscopy, (AAOMEGA, Xshooter, MUSE, KMOS, TNG and WHT long-slit data).
- Experience with AO imaging using SPHERE at ESO VLT.

- Two years experience with high resolution time photometry for extrasolar planets and variable stars detection.
- Experience with data reduction pipelines and software: ESOREFLEX environment, AAOMEGA, and GIST pipelines, IRAF and PyIRAF software.
- Extensive experience with advanced data analysis techniques using Phyton libraries and algorithms (astropy, scikit-learn, scipy, pPXF, pandas).
- Extensive experience with advanced statistical analysis tools (e.g.: MonteCarlo simulation, bootstrap simulations, Gaussian process regression (GPR), Fourier analysis, model fitting).
- Base experience with n-body and hydrodinamical simulations.
- Experience with big data analysis techniques.
- Base experience with machine-learning models.

## SCIENTIFIC COLLABORATIONS

### Most relevant projects

- Member of the BEARD (Bulgeless Evolution and the Rise of Disks) project, a team of 24 international experts from 9 institutions across 6 countries (P.I. J. Mendez-Abreu, IAC). Analysis and interpretation of photometric and long-slit data (2022-current).
- Participation to the SHINE (SpHere INfrared survey for Exoplanets) project, a 500-star survey performed with SPHERE on the Very Large Telescope (2018-2022).
- Collaboration with the planetary science group lead by Prof. Giovanni Leone at INCT (University of Atacama, Chile) focused to the study of martian and lunar environments (2018-2023).

## EDUCATION AND TRAINING

2018 – 2022 Copiapó, Chile

**PHD IN ASTRONOMY AND PLANETARY SCIENCES** Universidad de Atacama

Definition of a system of new Near-Infrared spectroscopic indices to be used as diagnostic tools for unresolved stellar population spectra. Definition of new indices on stellar library spectra, calibration with the stellar parameters (T, log g, [Z/H]). Testing of the indices on a sample of high S/N spectra of local and known galaxies. Definition and calibration of new age, metallicity and alpha diagnostics in the NIR.

Supervisor: Lorenzo Morelli, Valentin Ivanov.

**Thesis** Near-Infrared spectroscopic indices for unresolved stellar populations

2017 Bologna, Italy

**MASTER'S DEGREE IN ASTROPHYSICS AND COSMOLOGY** Alma Mater Studiorum, Università di Bologna

**Final grade** 110/110

2014 Bologna, Italy

**BACHELOR'S DEGREE IN ASTRONOMY** Alma Mater Studiorum, Università di Bologna

**Final grade** 110/110

## LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	C1	C1	C1	C1	B2
<b>SPANISH</b>	C2	C2	C2	C2	C1
<b>PORTUGUESE</b>	B1	A2	A1	A2	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

## ● **DIGITAL SKILLS**

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Python | C++ | Fortran | IDL | Office suite | Linux, Windows, Mac environment | Adobe Photoshop | Social media (Facebook, Instagram, YouTube, Twitter)

## ● **OUTREACH AND TEACHING**

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2015 – CURRENT

### **Writer and presenter of astronomy documentaries**

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- "Arriba en las Estrellas": A series of documentaries in Spanish funded by the Chilean government and the regional government of the Atacama region, produced in collaboration with LOOPS Plataforma Creativa.
- Web series on space exploration and the International Space Station, funded by Pininfarina company and created in collaboration with Altec Space, produced with the MPR Srl agency.

2003 – CURRENT

### **Speaker and educator**

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Most relevant activities:

- Diversity, equity, and inclusion (DEI) activities in schools and underserved areas of the Atacama Region in collaboration with PAR Explora Atacama, Chile;
- Multilingual lectures, courses, and seminars on astronomy for general audiences, educational institutions, and science festivals in Chile, Brazil, USA, UK, Italy.

## ● **PUBLICATIONS**

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2024

### **SPAN, a GUI cross-platform software for spectral manipulation and analysis in the optical and near-infrared bands**

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Gasparri, D., et al., in preparation

2024

### **Spatially resolved near-infrared spectroscopic indices for the massive elliptical galaxy IC 4296**

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Gasparri, D., et al., 2024. Submitted to Astronomy and Astrophysics

2024

### **[Estimating Masses of Supermassive Black Holes in Active Galactic Nuclei from the H \$\alpha\$ Emission Line](#)**

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Dalla Bontà, E., et al., 2024, eprint arXiv:2410.21387

2024

### **[The dynamical state of bars in cluster dwarf galaxies: the cases of NGC 4483 and NGC 4516](#)**

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Cuomo, V., et al., 2024, Monthly Notices of the Royal Astronomical Society, V.527, Issue 4

2024

### **[Near-infrared spectroscopic indices for unresolved stellar populations. III. Composite indices definition as age and metallicity tracers and model comparison](#)**

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Gasparri, D., et al., 2024, Monthly Notices of the Royal Astronomical Society, V.530, Issue 1

2023

### **[Sverdrup-Henson crater: A candidate location for the first lunar South Pole settlement](#)**

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Leone, G., et al., 2023, iScience, vol. 26, issue 10, p. 107853

2022

### **[A slow lopsided bar in the interacting dwarf galaxy IC 3167](#)**

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Cuomo, V. et al., 2022, Monthly Notices of the Royal Astronomical Society

2022

**[Geomorphological and morphometric characteristics of the volcanic edifices along a volcanic alignment of Tharsis on Mars](#)**

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Leone, G., et al., 2022, *Geomorphology*, Volume 414

2022

**[New binaries from the SHINE survey](#)**

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Bonavita, M., et al., 2022, *Astronomy and Astrophysics*, vol. 663

2021

**[Near-infrared spectroscopic indices for unresolved stellar populations - II. Index measurements](#)**

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Gasparri, D., et al., 2021, *Monthly Notices of the Royal Astronomical Society*

2021

**[Investigating three Sirius-like systems with SPHERE](#)**

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Gratton, R., et al., 2021, *Astronomy and Astrophysics*

2020

**[The Infrared Telescope Facility \(IRTF\) spectral library. II. New indices in Y, J, H, and L atmospheric windows](#)**

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Morelli, L., et al., 2020, *Astronomy and Astrophysics*, vol. 641

2020

**[Lava filling of Gale crater from Tyrrhenus Mons on Mars](#)**

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Gasparri, D. et al., 2020, *Journal of Volcanology and Geothermal Research*, vol. 389

2019

**[Exploring the R CrA environment with SPHERE. Discovery of a new stellar companion](#)**

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Mesa, D., et al., 2019, *Astronomy and Astrophysics*, vol. 624

2007

**[HD 17156b: a transiting planet with a 21.2-day period and an eccentric orbit](#)**

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Barbieri, M., et al., 2007, *Astronomy and Astrophysics*, vol. 476