Dr. Giuseppe Morello

Ramón y Cajal Fellow (tenure-track research position in Spain)

Current Position

Ramón y Cajal Fellow (Tenure-Track) 2024 – Present
Instituto de Astrofísica de Andalucía (IAA-CSIC), Glorieta de la Astronomía s/n, 18008 Granada, Spain

- Lead Investigator for an independent research project advancing our understanding of exoplanetary systems through the detection and comprehensive characterisation of planets and their host stars.
- Board Member of the research group "Low-Mass Stars, Exoplanets and Instrumentation", contributing to decisions on strategic planning, funding opportunities, and research collaborations.
- Co-supervision of three PhD students (two internal, one external), two Master's theses, and one Bachelor's thesis.

Previous Positions

Severo Ochoa Fellow 2024 – 2024
Instituto de Astrofísica de Andalucía (IAA-CSIC), Glorieta de la Astronomía s/n, 18008 Granada, Spain

- Competitive fellowship funded through Spain's Severo Ochoa Centres of Excellence programme, concluded upon appointment as a Ramón y Cajal Fellow.

Ariel Postdoctoral Fellow 2023 – 2024
Chalmers University of Technology, Gothenburg, Sweden

- Competitive fellowship funded by the Swedish National Space Agency to lead an independent research programme on exoplanet detection and atmospheric characterisation, with a focus on the scientific exploitation of the ESA Ariel mission.
- Joined the supervisory team for the Chalmers Astrophysics & Space Sciences Summer (CASSUM) programme, where I continue to design and supervise 10-week research projects for BSc and MSc students.
- Secured funding to support an additional CASSUM student research project.

Marie Skłodowska-Curie Fellow 2020 – 2022
Instituto de Astrofísica de Canarias (IAC), La Laguna, Spain

- Lead Investigator for the "Exoplanets Molecular Atmospheric Composition" ExoMAC project (G.A. 895525), exploiting synergies between low-resolution space observations and high-resolution ground-based spectroscopy.
- Ongoing science team member and observer in the MuSCAT2 and CARMENES collaborations, contributing to the TESS Follow-up Observing Program (TFOP), including lead-author publications.

Postdoctoral Researcher in the H2020 ExoplANETS-A project 2017 – 2020
Commissariat à l'énergie atomique et aux énergies alternatives (CEA), Saclay, France

- Homogeneous analysis of Spitzer/IRAC and HST/WFC3 transit, eclipse, and phase-curve spectroscopy using blind source separation techniques that I previously developed to remove instrumental systematics.
- Development of the open-source Python package ExoTETHyS: Tools for Exoplanetary Transits around Host Stars.
- Co-supervision of a PhD student within the research group.

Postdoctoral Researcher in the ERC ExoLight project 2016 – 2017
University College London (UCL), London, United Kingdom

- New research direction on modelling stellar effects affecting exoplanet observations, particularly limb darkening, stellar activity, rotational distortion, and gravity darkening.
- Co-supervision of a PhD student within the research group.

IPAC Visiting Graduate Fellow 2016 – 2016
Infrared Processing and Analisys Center (IPAC), Caltech, Pasadena, USA

- Prestigious six-month graduate fellowship during which I developed machine-learning classification methods to identify Wolf-Rayet candidates in stellar catalogues, leading to the discovery of approximately a dozen new Wolf-Rayet stars.

Education

PhD in Astrophysics 2013 – 2016
UCL, UK

- Thesis: *A machine learning approach to exoplanet spectroscopy.*
- Advisors: Profs. Ian D. Howarth & Giovanna Tinetti

6-Month Training Period Abroad 2013 – 2013
UCL, UK

- Grant awarded from Università degli Studi di Palermo (UNIPA), Italy.
- Advisor: Prof. Giovanna Tinetti

MSc in Physics (Summa cum Laude and Honour Mention) 2010 – 2012
UNIPA, Italy

- Thesis: *The infrared radius of the exoplanet HD189733 b.*
- Advisors: Profs. Giovanni Peres & Giuseppina Micela

BSc in Physical Sciences (Summa cum Laude) 2007 – 2010
UNIPA, Italy

- Thesis: *I pianeti extrasolari.*
- Advisor: Prof. Giovanni Peres

Research Leadership

- **ESA/Ariel Target Parameters Committee (ATPC)**
  Responsible for providing parameter values and uncertainties for the Mission Candidate Sample (MCS), overseeing the work done by the Working Groups (WGs) in the consortium and evaluating existing online catalogues.
- **Ariel - Activity Correction for Planetary Spectra (ACPS)**
  Leader of a sub-WG (>30 members) developing methods to mitigate the effects of stellar activity on exoplanet transit spectroscopy.
- **Ariel Data Challenge 2025**
  Ariel Data Challenge 2025 Member of the Organising Team for a NeurIPS competition fostering the machine learning community to develop innovative approaches for atmospheric retrievals of a large exoplanet dataset (1,038 participants; $ 50,000 prize pool). Contributed to synthetic data generation and implementation oversight.
- **ESA/PLATO Working Package (WP)122400**
  Responsible for providing the official stellar limb-darkening and gravity-darkening coefficients for the PLATO mission.
- **JWST Transiting Exoplanet Community - Early Release Science (JTEC-ERS)**
  Co-I of a large JWST Early Release Science programme (∼100 hours awarded), contributing to numerous publications, including six in Nature.
- **JWST General Observer Programme GO 6219**
  Co-I of a JWST Cycle 3 programme exploring a novel MIRI/LRS slit spectroscopy mode for exoplanet

time-series observations, to be offered to the community in future JWST observing cycles.

- **CASSUM Research Fellowship Programme**
  Supervisor of eight student research projects (two annually) and co-supervisor of three additional projects, with outcomes presented at international conferences, workshops and peer-reviewed publications (one published, three near submission, others in preparation).
- **MuSCAT2 Collaboration**
  Scientific Member and Observer, contributing to the validation and discovery of exoplanets through multiband photometric follow-up within the TESS Follow-up Observing Program (TFOP). Led two first-author publications and supervising a student whose work has resulted in two publications, with further manuscripts in preparation.
- **CARMENES Consortium**
  Science Team Member contributing to exoplanet discovery, mass measurements, and atmospheric characterisation. Supervised PhD work developing improved methods for measuring stellar rotation and generating a new reference catalogue.
- **Ground-based Observing Programmes**
  PI and leading Co-I of several competitively awarded observing programmes, including ESO VLT/CRIRES+ programmes for exoplanet atmospheric characterisation and programmes with other facilities for exoplanet mass measurements.

Research Grants & Awards

- **Ramón y Cajal Fellowship** 2024 – 2029
  Project: *Exoplanet Targets: Composition of Atmospheres, Formation and Evolution (ET CAFE).*
  Budget: **€244,350.00**. Funding body: Spanish Ministry of Science, Innovation and Universities (MICIU) / State Research Agency (AEI). Reference: RYC2022-037854-I.
- **Marie Skłodowska-Curie Actions - Individual Fellowship** 2020 – 2022
  Project: *Exoplanets Molecular Atmospheric Composition (ExoMAC).*
  Budget: **€160,932.48**. Funding body: European Commission (Horizon 2020). Reference: G.A.895525.
- **CAIXA Postdoctoral Junior Leader Fellowship** 2020
  Project: *Exoplanets Molecular Atmospheric Composition (ExoMAC).*
  Budget: ∼ **€300,000**. Funding body: "la CAIXA" Foundation. Notes: Award due to prior acceptance of the Marie Skłodowska-Curie Individual Fellowship.
- **Ariel Postdoctoral Fellowship** 2023 – 2024
  Project: Research activities in preparation for the ESA/Ariel mission.
- **IPAC Visiting Graduate Fellowship** 2016
  Project: Development of machine-learning techniques for the identification of Wolf-Rayet star candidates in large stellar catalogues.
- **Wilhelm and Martina Lundgrens - Small Research Grant** 2023
  Purpose: Support of the CASSUM Fellowship Programme
  Budget: ∼ **€3,400**. Funding body: "Wilhelm and Martina Lundgrens" Foundation.
- **Six-Month International Research Stay** 2013
  Purpose: Research on exoplanet atmospheres at UCL.
  Budget: **€6,000.00**. Funding body: UNIPA.

Student Supervision and Mentoring

Research supervision and mentoring are central components of my academic activity. I have supervised or co-supervised multiple PhD, MSc and BSc research projects, as well as 11 undergraduate research internships through the CASSUM programme. Supervised projects have contributed to peer-reviewed publications, conference presentations and ongoing manuscripts (see Publications).

PhD students:

- **Gareb Fernández-Rodriguez**, University of La Laguna / IAC, Spain 2025 – present
  Topics: JWST exoplanet spectroscopy, including instrument systematics and stellar activity correction.
- **Alberto Peláez-Torres**, IAA-CSIC, Spain 2025 – present
  Topics: Validation and discovery of transiting exoplanets. Precision radial-velocity measurements for exoplanet mass determination. Ground-based high-resolution spectroscopy for atmospheric characterisation of exoplanets.
- **Gloria Canocchi**, Stockholm University, Sweden 2023 – 2025
  Topics: Modelling the Rossiter-McLaughlin effect and centre-to-limb variation in high-resolution exoplanet spectroscopy using 3D NLTE stellar models.
- **Gianluca Cracchiolo**, UNIPA, Italy 2020 – 2023
  Topics: Development of algorithms to model exoplanet transits affected by stellar spots and faculae, and mitigation methods for stellar contamination in transmission spectroscopy.
- **Achrène Dyrek**, CEA, France 2020 – 2023
  Topics: Preparatory science for JWST, including modelling and analysis of exoplanet phase-curves.
- **Marine Martin-Lagarde**, CEA, France 2017 – 2020
  Topics: Development of the JWST/MIRI simulator ExoNoodle, tools to quantify self- and phase-blending effects in JWST spectroscopy, and contributions to the ExoTETHyS software package.
- **Mario Damiano**, UCL, UK 2015 – 2018
  Topics: HST/WFC3 transmission spectroscopy, including data detrending with parametric and blind source separation techniques.

MSc students:

- **Gerardo Mancebo Landa**, International University of Valencia, Spain 2026 – present
  Topics: Modelling stellar activity effects in low- and high-resolution exoplanet spectroscopy.
- **Fernando Diz-Lois Pradas**, University of Zaragoza, Spain 2025 – 2026
  Topics: Atmospheric retrievals of JWST exoplanet spectra using TauREx.
- **Luciana Ziino**, UNIPA, Italy 2014 – 2015
  Topics: Application of blind source separation techniques to CoRoT photometric data.

BSc students:

- **Hugo Rubio Fernández**, University of Santiago de Compostela, Spain 2024 – 2025
  Topics: High-resolution spectroscopy of exoplanet atmospheres using principal component analysis techniques.

Selected Publications

Research impact indicators (NASA ADS, July 2026):
4,752 citations; h-index = 33; i10-index = 72; 12 papers with >100 citations.
107 publications, including 6 papers in *Nature* and 2 in *Nature Astronomy*.
19 first-author publications, including 15 Q1 papers.

First-author and single-author publications:

1. **Morello, G.**, Peláez-Torres, A., Pozuelos, F. J., et al. (2026), *The K-dwarfs survey – I. Four validated planets from the radius valley to the Neptune desert*, MNRAS, 549, stag183;
2. **Morello, G.**, Changeat, Q., Dyrek, A., Lagage, P.-O., & Tan, J. C. (2023), *Spitzer thermal phase curve of WASP-121 b*, A&A, 676, A54;
3. **Morello, G.**, Parviainen, H., Murgas, F., et al. (2023), *TOI-1442 b and TOI-2445 b: Two potentially rocky ultra-short period planets around M dwarfs*, A&A, 673, A32;
4. **Morello, G.**, Dyrek, A., & Changeat, Q. (2022), *Is binning always sinning? The impact of time-averaging for exoplanet phase curves*, MNRAS, 517, 2151;

5. **Morello, G.**, Gerber, J., Plez, B., et al. (2022), *First Release of PLATO Consortium Stellar Limb-darkening Coefficients*, RNAAS, 6, 248;

6. **Morello, G.**, Danielski, C., & Sarkar, S. (2022), *The Ariel 0.6 - 7.8 μm stellar limb-darkening coefficients*, Exp. Astr., 53, 533;

7. **Morello, G.**, Casasayas-Barris, N., Orell-Miquel, J., Pallé, E., Cracchiolo, G., & Micela, G. (2022), *The strange case of Na I in the atmosphere of HD 209458 b. Reconciling low- and high-resolution spectroscopic observations*, A&A, 657, A97;

8. **Morello, G.**, & Chiavassa, A. (2021), *A Shortcut to Calculate SPAM Limb-darkening Coefficients*, RNAAS, 5, 247;

9. **Morello, G.**, Zingales, T., Martin-Lagarde, M., Gastaud, R., & Lagage, P.-O. (2021), *Phase-curve Pollution of Exoplanet Transmission Spectra*, AJ, 161, 174;

10. **Morello, G.**, Claret, A., Martin-Lagarde, M., Cossou, C., Tsiara, A., & Lagage, P.-O. (2020), *ExoTETHyS: Tools for Exoplanetary Transits around host stars*, JOSS, 5, 1834;

11. **Morello, G.**, Claret, A., Martin-Lagarde, M., Cossou, C., Tsiaras, A., & Lagage, P.-O. (2020), *The ExoTETHyS Package: Tools for Exoplanetary Transits around Host Stars*, AJ, 159, 75;

12. **Morello, G.**, Danielski, C., Dickens, D., Tremblin, P., & Lagage, P.-O. (2019), *An Independent Analysis of the Spitzer/IRAC Phase Curves of WASP43 b*, AJ, 157, 205;

13. **Morello, G.** (2018), *A SEA BASS on the Exoplanet HD 209458b*, AJ, 156, 175;

14. **Morello, G.**, Morris, P. W., Van Dyk, S. D., Marston, A. P., & Mauerhan, J. C. (2018), *Applications of machine-learning algorithms for infrared colour selection of Galactic Wolf-Rayet stars*, MNRAS, 473, 2565;

15. **Morello, G.**, Tsiaras, A., Howarth, I. D., & Homeier, D. (2017), *High-precision Stellar Limb-darkening in Exoplanetary Transits*, AJ, 154, 111;

16. **Morello, G.**, Waldmann, I. P., & Tinetti, G. (2016), *Repeatability of Spitzer/IRAC Exoplanetary Eclipses with Independent Component Analysis*, ApJ, 820, 86;

17. **Morello, G.** (2015), *A Blind Method to Detrend Instrumental Systematics in Exoplanetary Light Curves*, ApJ, 808, 56;

18. **Morello, G.**, Waldmann, I. P., Tinetti, G., Howarth, I. D., Micela, G., & Allard, F. (2015), *Revisiting Spitzer Transit Observations with Independent Component Analysis: New Results for the GJ 436 System*, ApJ, 802, 117;

19. **Morello, G.**, Waldmann, I. P., Tinetti, G., Peres, G., Micela, G., & Howarth, I. D. (2014), *A New Look at Spitzer Primary Transit Observations of the Exoplanet HD 189733b*, ApJ, 786, 22;

Publications arising from student supervision:

1. **Fernández-Rodríguez, G.**, **Morello, G.**, Tan, J. C., et al. (2026), *The atmospheric composition of the sub-Neptune K2-18b and insights into its formation*, A&A, 710, A375;

2. **Peláez-Torres**, A., Pozuelos, F. J., **Morello, G.**, et al. (2026), *A gem system with a lava world and a habitable zone sub-Neptune orbiting TOI-1752*, MNRAS, 548, stag713;

3. **Varas, R.**, **Morello, G.**, Zechmeister, M., et al. (2026), *The CARMENES search for exoplanets around M dwarfs: A homogeneous catalogue of projected rotational velocities accounting for limb darkening*, A&A, 709, A244;

4. **Peláez-Torres, A.**, Sánchez-López, A., Nortmann, L., et al. (2026), *Tighter constraints on the atmosphere of GJ 436 b from combined high-resolution CARMENES and CRIRES$^+$ observations*, A&A, 705, A256;

5. **Canocchi, G.**, **Morello, G.**, Lind, K., Carleo, I., Stangret, M., & Pallé, E. (2024), *Probing Na in giant exoplanets with ESPRESSO and 3D NLTE stellar spectra*, A&A, 692, A43;

6. **Cracchiolo, G.**, Micela, G., **Morello, G.**, & Peres, G. (2021), *Correcting the effect of stellar spots on ARIEL transmission spectra - II. The limb-darkening effect*, MNRAS, 507, 6118;

7. **Martin-Lagarde, M.**, **Morello, G.**, Lagage, P.-O., Gastaud, R., & Cossou, C. (2020), *Phase-curve Pollution of Exoplanet Transit Depths*, AJ, 160, 197;

8. **Damiano, M.**, **Morello, G.**, Tsiaras, A., Zingales, T., & Tinetti, G. (2017), *Near-IR Transmission Spectrum of HAT-P-32b using HST/WFC3*, AJ, 154, 39.

Selected collaborative publications:

1. Palle, E., Yan, F., **Morello, G.**, et al. (2025), *Exploring the atmosphere of GJ 1132 b with CRIRES+*, A&A, 697, A31;

2. Carter, A. L., May, E. M., Espinoza, N., et al. (2024), *A benchmark JWST near-infrared spectrum for the exoplanet WASP-39 b*, Nature Astronomy, 8, 1008;

3. Bell, T. J., Crouzet, N., Cubillos, P. E., et al. (2024), *Nightside clouds and disequilibrium chemistry on the hot Jupiter WASP-43b*, Nature Astronomy, 8, 879;

4. Flagg, L., Weinberger, A. J., Bell, T. J., Welbanks, L., **Morello, G.**, et al. (2024), *Debris Disks Can Contaminate Mid-infrared Exoplanet Spectra: Evidence for a Circumstellar Debris Disk around Exoplanet Host WASP-39*, ApJL, 969, L19;

5. Goffo, E., Chaturvedi, P., Murgas, F., **Morello, G.**, et al. (2024), *TOI-4438 b: a transiting mini-Neptune amenable to atmospheric characterization*, A&A, 685, A147;

6. Powell, D., Feinstein, A. D., Lee, E. K. H., et al. (2024), *Sulfur dioxide in the mid-infrared transmission spectrum of WASP-39b*, Nature, 626, 979;

7. Changeat, Q., Skinner, J. W., Cho, J. Y.-K., et al. (2024), *Is the Atmosphere of the Ultra-hot Jupiter WASP-121 b Variable?*, ApJS, 270, 34;

8. Thompson, A., Biagini, A., Cracchiolo, G., et al. (2024), *Correcting Exoplanet Transmission Spectra for Stellar Activity with an Optimized Retrieval Framework*, ApJ, 960, 107;

9. Esparza-Borges, E., López-Morales, M., Adams Redai, J. I., et al. (2023), *Detection of Carbon Monoxide in the Atmosphere of WASP-39b Applying Standard Cross-correlation Techniques to JWST NIRSpec G395H Data*, ApJL, 955, L19;

10. Feinstein, A. D., Radica, M., Welbanks, L., et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRISS*, Nature, 614, 670;

11. Alderson, L., Wakeford, H. R., Alam, M. K., et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec G395H*, Nature, 614, 664;

12. Rustamkulov, Z., Sing, D. K., Mukherjee, S., et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM*, Nature, 614, 659;

13. Ahrer, E.-M., Stevenson, K. B., Mansfield, M., Moran, S. E., Brande, J., **Morello, G.**, et al. (2023), *Early Release Science of the exoplanet WASP-39b with JWST NIRCam*, Nature, 614, 653;

14. JWST Transiting Exoplanet Community Early Release Science Team, Ahrer, E.-M., Alderson, L., et al. (2023), *Identification of carbon dioxide in an exoplanet atmosphere*, Nature, 614, 649;

15. Mugnai, L. V., Modirrousta-Galian, D., Edwards, B., Changeat, Q., Bouwman, J., **Morello, G.**, et al. (2021), *ARES. V. No Evidence For Molecular Absorption in the HST WFC3 Spectrum of GJ 1132 b*, AJ, 161, 284;

16. Tsiaras, A., Waldmann, I. P., Zingales, T., Rocchetto, M., **Morello, G.**, et al. (2018), *A Population Study of Gaseous Exoplanets*, AJ, 155, 156;

17. Howarth, I. D., & **Morello, G.** (2017), *Rapid rotators revisited: absolute dimensions of KOI-13*, MNRAS, 470, 932;

18. Tsiaras, A., Waldmann, I. P., Rocchetto, M., Varley, R., **Morello, G**, et al. (2016), *A New Approach to Analyzing HST Spatial Scans: The Transmission Spectrum of HD 209458 b*, ApJ, 832, 202;

19. Ingalls, J. G., Krick, J. E., Carey, S. J., et al. (2016), *Repeatability and Accuracy of Exoplanet Eclipse Depths Measured with Post-cryogenic Spitzer*, AJ, 152, 44;

20. Tsiaras, A., Rocchetto, M., Waldmann, I. P., Venot, O., Varley, R., **Morello, G.**, et al. (2016), *Detection of an Atmosphere Around the Super-Earth 55 Cancri e*, ApJ, 820, 99.

Talks & Seminars

I have delivered more than 40 oral presentations at national and international conferences and workshops, in addition to numerous co-authored contributions. I have also presented over 15 invited seminars at universities and research institutes in Europe and internationally. Selected invited seminars and conference presentations are listed below.

- **Talk.** *Disentangling Stellar Activity in High-Precision Exoplanet Transmission Spectroscopy.* Exoplanets 6. Porto, Portugal (2026).
- **Invited Talk.** *Using JWST and Ariel exoplanet spectra to probe planet formation theories.* CICO-VICO Topical Workshop - Planet Formation and Exoplanet Evolution - from JWST to Ariel. Gothenburg, Sweden (2026).
- **Talk.** *Sinergies between Ariel/JWST with Photonic EMARCOT* Photonic EMARCOT Workshop. Granada, Spain (2025).
- **Invited Seminar.** *A holistic approach to exoplanet spectroscopy.* Stockholm University, Sweden (2025).
- **Invited Seminar.** *Deciphering Exoplanet Atmospheres with Space- and Ground-Based Multiresolution Spectroscopy.* ESO Santiago, Chile (2024).
- **Talk.** *Constraints on the formation of a hot Jupiter through JWST and ground-based observations.* The Olympian Symposium - Star formation in the era of JWST. Paralia Katerini, Greece (2023).
- **Talk.** *Synergies between Twinkle and ground-based telescopes.* Twinkle and the Next Generation of European Extrasolar Scientists Conference. Blue Skies Space, Online (2022).
- **Invited Seminar.** *Modeling Tools and Analysis Methods for the Ariel Exoplanet Mission.* Warsaw University, Poland (2022).

Professional Service and Outreach

Academic Leadership and Community Service:

- **Scientific Organising Committee (SOC) Member**, Joint DPS–EPSC Meeting (2023), a major international planetary science conference (over 1,000 participants).
- **Scientific Session Organiser**, Europlanet Science Congress, multiple editions (2020–2026).
- **SOC Member**, *Exoplanet Atmosphere Characterisation: from HST and Spitzer to JWST* (2021), online conference organised within the H2020 ExoplANETS-A project (∼150 participants).
- **Selection Committee Member**, CASSUM Fellowship Programme (2023–present).

Proposal and Journal Reviewing:

- **Calar Alto Observatory (CAHA) Time Allocation Committee (TAC)** – Permanent member (2026B–present); alternate member (2024B).
- **JWST Proposal Reviewer** – Cycle 5 (2025–2026).
- **Spitzer Director's Discretionary Time (DDT) Proposal Reviewer** (2016).
- **Referee** for more than 30 manuscripts for leading international journals, including *Science*, *Nature Astronomy*, *ApJS*, *ApJ*, *AJ*, *A&A*, *MNRAS*, and *Experimental Astronomy*.

Teaching and Outreach:

- **Demonstrator**, Certificate in Astronomy – Practical Course, University of London Observatory (2014–2015).
- **Exam Marker**, University College London:
  - Physics of the Exoplanets (PHAS G337, 2016–2017);
  - Mathematical Methods I (PHAS1245, 2013–2014; 2015–2016);
  - Classical Mechanics (PHAS1247, 2014–2015).
- **Private Tutor in Mathematics and Physics** (2007–present): supervised more than 50 students across secondary, undergraduate, postgraduate, entrance examination, and adult education levels.