

Patricia Iglesias Navarro

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SUMMARY

Predoctoral researcher in galaxy formation and evolution at the Instituto de Astrofísica de Canarias (IAC), with expected thesis submission in early 2027. My research combines machine learning and simulation-based inference with photometric and spectroscopic data to study the physical properties of galaxies across cosmic time. I focus on pixel-level Bayesian SED fitting to map stellar populations and star formation histories, with applications including the outshining of stellar masses, the characterisation of star-forming clumps in galaxies, and the search for Population III stars, using survey data from JWST (JADES), Euclid and LSST. I am an LSST Discovery Alliance Data Science Fellow, author of 3 first-author papers and ~ 10 additional co-authored publications, and have given 2 invited and ~ 14 contributed conference talks.

EDUCATION

- **University of La Laguna (ULL)** Nov. 2023 – Present
PhD in Astrophysics (expected submission: early 2027)
Tenerife, Spain
 - Thesis: **Unveiling the Structural Transformations of Galaxies in the Era of JWST and Euclid with Artificial Intelligence.**
 - Supervisors: Prof. Marc Huertas-Company & Prof. Johan Knapen.
- **University of La Laguna (ULL)** Sep. 2021 – Jul. 2023
Master's Degree in Astrophysics and Cosmology (Theoretical & Computational specialization)
Tenerife, Spain
 - Supervisors: Prof. Marc Huertas-Company & Prof. Ignacio Martín-Navarro.
 - Master's thesis: **Deriving Star Formation Histories of Galaxies with Bayesian Deep Learning.** Novel probabilistic machine learning and likelihood-free inference approach to estimate SFHs from optical absorption spectra. Mark: 10/10.
- **University of La Laguna (ULL)** Sep. 2017 – Jul. 2021
Bachelor's Degree in Physics
Tenerife, Spain
 - Supervisor: Prof. Marc Huertas-Company.
 - Internship (420 hours) at IAC: applied supervised, unsupervised, and self-supervised machine learning to classify galaxy images (EuclidZoo) by morphology.
 - Final Degree Project: **Searching for Compaction in TNG50 Cosmological Simulation Using Deep Learning.** Used a CNN to identify 'Blue Nugget' galaxies in TNG50. Mark: 10/10.

RESEARCH EXPERIENCE

- **Instituto de Astrofísica de Canarias (IAC)** Nov. 2023 – Present
Predoctoral Researcher – FPI Fellowship
Tenerife, Spain
 - Galaxy formation and evolution.
 - Unveiling the structural transformations of galaxies in the era of JWST and Euclid with Artificial Intelligence.
- **Kavli Institute for Cosmology, University of Cambridge** Apr. 2026 – Jun. 2026
Research Visit – Host: Dr. Sandro Tacchella
Cambridge, UK
 - Analysis of clumps of star formation in JWST galaxies.
- **SkAI Institute & CIERA, Northwestern University** Sep. 2025 – Oct. 2025
Research Visit – Hosts: Dr. Tjitske Starkenburg & Dr. Aleksandra Ciprijanovic
Chicago, US
 - Analysis of galaxy data with artificial intelligence.
- **Universidad de La Laguna & Instituto de Astrofísica de Canarias** Nov. 2021 – Jul. 2022
Early-career Research Fellowship
Tenerife, Spain
 - Explored deep learning techniques for the study of barred galaxies.
 - Reconstruction of star formation histories of galaxies from spectra using IllustrisTNG simulations.
 - 300 hours over 9 months.

FELLOWSHIPS

- **LSST Discovery Alliance Data Science Fellowship Program** – LSST Discovery Alliance. 2025 – 2027
- **Grants for Predoctoral Contracts for Doctoral Training (FPI)** – Spanish State Research Agency. 2022

First author

- **Star-Forming Clumps in JWST Galaxies Across Cosmic Time: Robust Detection from Physical Property Maps** (in prep.).
Iglesias-Navarro, P., et al.
- **A Pixel-by-Pixel Path to Population III Discovery with JWST** (2026). Submitted to A&A. *arXiv:2606.30750*.
Iglesias-Navarro, P., Harvey, T., Huertas-Company, M., Lovell, C. C., Knapen, J. H., et al.
- **Simulation-based inference of galaxy properties from JWST pixels** (2025). A&A, 703, A229.
Iglesias-Navarro, P., Huertas-Company, M., Pérez-González, P., Knapen, J. H., et al.
- **Deriving the star formation histories of galaxies from spectra with simulation-based inference** (2024). A&A, 689, A58.
Iglesias-Navarro, P., Huertas-Company, M., Martín-Navarro, I., Knapen, J. H., Pernet, E.

Co-authored

- **Semiresolved Stellar Populations as Distance Indicators** (2026). ApJL, 1006, L58.
Martín-Navarro, I., Iglesias-Navarro, P., La Barbera, F., Vazdekis, A., et al.
- **FASTAR: II. Semi-resolved evolutionary stellar population models** (2026). A&A, 711, A283.
Martín-Navarro, I., Vazdekis, A., Peralta de Arriba, L., Alonso Asensio, I., Iglesias-Navarro, P., et al.
- **FASTAR: I. Continuous and differentiable evolutionary stellar population models** (2026). A&A, 711, A282.
Martín-Navarro, I., Vazdekis, A., Peralta de Arriba, L., Alonso Asensio, I., Angeloudi, E., Iglesias-Navarro, P., et al.
- **Euclid Q1: XI. A first look at the fraction of bars in massive galaxies at $z < 1$** (2026). A&A, 711, A11.
Euclid Collaboration, Huertas-Company, M., Walmsley, M., Siudek, M., Iglesias-Navarro, P., et al.
- **Simulation-based inference from the Lyman-alpha forest 1D power spectrum with CAMELS** (2026).
arXiv:2603.13011.
Sinigaglia, F., Iglesias-Navarro, P., Viel, M.
- **Flexible simulation-based inference for galaxy photometric fitting with synthesizer** (2026). MNRAS, 547.
Harvey, T., Lovell, C. C., Newman, S., Conselice, C. J., et al. (incl. P. Iglesias-Navarro).
- **ZF-UDS-7329: A relic galaxy in the early Universe** (2025). A&A, 694, L7.
Hartmann, E. A., Martín-Navarro, I., Huertas-Company, M., Benedetti, J. P. V., Iglesias-Navarro, P., et al.
- **The building up of observed stellar scaling relations of massive galaxies and the connection to black hole growth in the TNG50 simulation** (2022). MNRAS, 509, 2654.
Varma, S., Huertas-Company, M., Pillepich, A., et al. (incl. P. Iglesias-Navarro).

Collaboration papers

- **Euclid Q1: XIII. Exploring galaxy properties with a multi-modal foundation model** (2026). A&A, 711, A13.
Euclid Collaboration, Siudek, M., Huertas-Company, M., et al. (incl. P. Iglesias-Navarro).
- **JADES Data Release 5: stellar population catalogue for galaxies in GOODS-N and GOODS-S** (2026).
arXiv:2605.21599.
Duan, Q., Tacchella, S., Johnson, B. D., et al. (incl. P. Iglesias-Navarro).
- **Euclid preparation: LXXXI. Nonparametric SFHs on spatially resolved galaxy property estimation** (2026). A&A, 707, A231.
Euclid Collaboration, Nersesian, A., et al. (incl. P. Iglesias-Navarro).
- **Euclid preparation: LXVIII. Extracting physical parameters from galaxies with machine learning** (2025). A&A, 695, A284.
Euclid Collaboration, Kovačić, I., Baes, M., et al. (incl. P. Iglesias-Navarro).

TALKS AND POSTERS

Invited Talks

- **EAS Annual Meeting 2026** – Invited talk (LS3a). Lausanne, Switzerland. Jul. 2026
- **Simulation-based Inference for Galaxy Evolution 2025** – Invited talk. Bristol, UK. May 2025

Contributed Talks and Posters

- **EAS Annual Meeting 2026** – Contributed talks (SS38b, S9e). Lausanne, Switzerland. Jul. 2026
- **Simulation-based Inference for Galaxy Evolution 2026** – Contributed talk. Cambridge, UK. Jun. 2026
- **BeyondHubble: Revisiting the Hubble Sequence** – Contributed talk. Cambridge, UK. Apr. 2026
- **Open SkAI** – Contributed talk. Chicago, US. Sep. 2025
- **CRISOL25: Galaxy Origin in the JWST Era** – Poster contribution. Toledo, Spain. May 2025
- **EDUCADO Annual Meeting** – Contributed talk. La Palma, Spain. Jan. 2025

- **Cosmology and Galaxy Astrophysics with Simulations and ML** – Contributed talk. New York, US. Dec. 2024
- **LSST@Europe6** – Contributed talk. La Palma, Spain. Sep. 2024
- **IAU General Assembly 2024** – Poster contribution. Cape Town, South Africa. Aug. 2024
- **EAS Annual Meeting 2024** – Contributed talk. Padova, Italy. Jul. 2024
- **JWST/CEERS Team Meeting 2024** – Contributed talk. Madrid, Spain. May 2024
- **Star Formation Across Cosmic Scales (ML)** – Online contributed talk. Budapest, Hungary. May 2024
- **Simulation-based Inference for Galaxy Evolution** – Contributed talk. Bristol, UK. Apr. 2024
- **Galaxies & AGN with the first Euclid Data and Beyond** – Contributed talk. Bologna, Italy. Feb. 2024
- **A Life Devoted to Stellar Populations** – Poster contribution. Puerto de La Cruz, Spain. Oct. 2023

PROFESSIONAL ACTIVITIES

- **SOC** – EAS 2026 Special Session SS38: *Machine Learning for Spectroscopy*. Jun.–Jul. 2026
- **Reviewer** – Astronomy & Astrophysics (A&A). 2024 – Present
- **SOC** – Simulation-based Inference for Galaxy Evolution 2026. Cambridge, UK. Jun. 2026
- **SOC** – Simulation-based Inference for Galaxy Evolution 2025. Bristol, UK. May 2025
- **Roman Space Telescope Cycle 1 (Co-PI), Proposal 10245 (accepted)** – *Mapping the Dark Matter Halo Profiles of Spiral Galaxies with Weak Lensing*. 2026
- **Co-editor** – Conference Proceedings LSST@Europe6. La Palma, Spain. 2024
- **Co-chair LOC** – LSST@Europe6. La Palma, Spain. Sep. 2024
- **Co-organizer** – Weekly *Galaxy Coffees* seminar series, IAC. 2023 – Present

SUPERVISION AND TEACHING

- **Orestis Zoumpoulakis** Jul. 2026 – Sep. 2026
Erasmus+ Research Traineeship (co-supervisor with Prof. Johan Knapen) Instituto de Astrofísica de Canarias
◦ *Spatially resolving stellar populations across cosmic time: application of SBIPIX to the COSMOS-Web JWST survey.*
- **Cristina Bolaños Quevedo** 2025 – 2026
Master's Thesis (co-supervisor with Prof. Marc Huertas-Company) University of La Laguna
◦ *The evolution of the mass-size relation of galaxies from $z = 2.5$ from resolved stellar populations with JWST.* Defended Jun. 2026.

COMPUTING SKILLS

- **Programming:** Python (advanced), LaTeX (advanced), Bash (intermediate), Fortran (intermediate), R (basic), IDL (basic).
- **Machine Learning & Inference:** TensorFlow, Keras, PyTorch, SBI, ilu-ltu.
- **Astronomical Tools:** Astropy, TOPCAT, DS9.
- **Other Tools:** GitHub, Jupyter Notebook, Google Colab, Slack, Microsoft Office Suite.
- **Operating Systems:** Linux, macOS.

OUTREACH ACTIVITIES

- **Co-founder & Co-organizer** – Monthly event *Astronomy on Tap – Canary Islands (AstroTragos)*. 2025 – Present
- **Round table** – *Volver a soñar: estrellas*. Museo de la Ciencia y el Cosmos, Tenerife. Mar. 2026
- **Chatea con una Astrónoma (IX edition)** – Sociedad Española de Astronomía. Online. Feb. 2026
- **Radio programme** – *Soñando Estrellas*, Episode 5. Dec. 2025
- **Public talk** – *El universo bajo la lupa de la IA*. Ciclo *Del cielo a la tesis*, MCC, Tenerife. Oct. 2025
- **Public conference** – *Un paseo cosmológico: galaxias, materia oscura e inteligencia artificial*. Tenerife. Oct. 2024
- **Organization of Open Days** – Teide Observatory. Jun. 2024

OTHER TRAININGS AND CERTIFICATIONS

- **Writing in Astronomy** – IACTec, La Laguna. Facilitators: Prof. J. Knapen & S. Comerón (5 sessions). Jan. 2026
- **EDUCADO Intensive Observation School** – Roque de los Muchachos, La Palma (WHT & GTC). Jun. 2025
- **Second EDUCADO Training School: Foundations & Applications of Computer Science** – La Laguna. Jun. 2025
- **XXXV Canary Islands Winter School: Baryonic Cycle Across Space & Time** – IAC. Oct. 2024
- **5th Summer School at ICE-CSIC** – Modified gravities, Inflation and Primordial Perturbations. Jul. 2022
- **Introduction to TensorFlow for AI, ML, and Deep Learning** – Coursera (30 hours). 2020
- **Introductory Course to University Mathematics** – University of La Laguna (3 ECTS). 2017
- **Information Sources for University Education** – University of La Laguna (1 ECTS). 2017
- **Skills to Speak in Public** – Habor (8 hours). 2016

LANGUAGES

Spanish (Native) | English (Advanced, C1) | Italian (Basic, B1) | French (Basic, A2)

COLLABORATIONS

- **Euclid Consortium**
- **LSST Discovery Alliance**
- **JADES** – JWST Advanced Deep Extragalactic Survey.

ADDITIONAL INFORMATION

Driving license: Class B. Geographic mobility: Yes.