

ERICK MARCOS CASTILLO VARGAS, MSc
Predoctoral Research Fellow in Genetics
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SUMMARY

Biology graduate with an Extraordinary Degree Award, holding an MSc in Neuroscience and an MSc in Bioinformatics and Biostatistics, currently pursuing a PhD in Health Sciences. Recognized for academic excellence and active participation in research, teaching, and scientific dissemination.

- Awarded an Erasmus+ scholarship as an undergraduate to conduct an internship at University of Wrocław, Poland.
- Awarded a Formación Profesorado Universitario (FPU) fellowship to pursue a PhD in Health Sciences.
- Participated in three research projects and contributed to ten conference presentations and two poster sessions, serving as first author in seven oral communications (three at international conferences).
- Received two Best Oral Communication awards at international and national congresses, and a Congress Grant for outstanding abstract contribution.
- Co-supervising one undergraduate BSc thesis and mentoring first-year students in academic performance and adaptation to university life.
- Completed specialized courses and masterclasses totaling over 120 hours in professional development, innovation and leadership, scientific career skills, animal experimentation, and information resources for PhD research.

EDUCATION

University of La Laguna PhD in Health Sciences	San Cristóbal de La Laguna, Spain 2025-Present
Open University of Catalonia MSc in Bioinformatics and Biostatistics Grade: 9,45/10	Barcelona, Spain 2024-2026
University of Salamanca MSc in Neuroscience Grade: 9,12/10	Salamanca, Spain 2023-2024
University of Wrocław ERASMUS Student Grade: 5/5	Wrocław, Poland 2022-2023
University of La Laguna BSc in Biology Grade: 9,21/10	San Cristóbal de La Laguna, Spain 2019-2023

RESEARCH EXPERIENCE

Department of Genetics, University of La Laguna 2025-Present
Predoctoral Research Fellow

- Performed microbiome epigenome-wide association studies integrating respiratory microbiome with blood and nasal epigenome data to identify significant associations in asthma.

- Managed biological sample databases and processed raw respiratory microbiome data from asthma patients.

Department of Genetics, University of La Laguna

2024-2025

Bioinformatics Research Assistant

- Processed raw RNA-seq and microarray data and performed differential gene expression analysis stratified by sex to identify asthma-related traits.

Institute of Biomedical Technologies, University of La Laguna

2023

Research Assistant (Intern)

Performed genetic editing on mouse embryos to generate a transgenic mouse line expressing GFP.

ACADEMIC PROJECTS

Master's Thesis. *Epigenome-wide association study of the upper airway microbiome related to inhaled corticosteroids response.* Co-supervised by Dr. Javier Pérez García and Dr. Joan Muniesa Rubio. Department of Genetics, University of La Laguna, 2025-2026.

- Performed a microbiome epigenome-wide association studies integrating blood DNA methylation and upper-airway microbiome data in asthma patients to identify epigenetic markers associated with the respiratory microbiome previously linked to inhaled corticosteroids treatment response.

Master's Thesis. *MSK1 as a potential regulator of perineuronal net maturation in parvalbumin interneurons: a study in an Msk1 KO mouse model.* Supervised by Dr. Rubén Deogracias Pastor. Neuroscience Institute of Castile and León, University of Salamanca, 2023-2024.

- Investigated the role of MSK1 in the maturation of perineuronal nets, analyzing gene expression and structural development in MSK1 knockout mice compared to wild-type controls.
- Developed a preliminary deep learning model for image analysis, enabling detailed segmentation of perineuronal nets (PNNs) in individual parvalbumin-expressing interneurons.

Bachelor's Thesis. *Studying the effects of point mutations in the mouse Tardbp gene and their relationship with motor neuron degeneration.* Co-supervised by Dr. Abraham Acevedo Arozena and Dra. María Teresa Acosta Almeida. Research Unit, University Hospital of the Canary Islands, 2023.

- Investigated the role of TDP-43 in a murine model of amyotrophic lateral sclerosis, analyzing neuronal morphology and evaluating protein dysfunction.

TECHNICAL EXPERIENCE

Computational

- **Programming:** R, Bash, Nextflow, and Python.
- **Data processing:** Processing of raw RNA-seq (Trimmomatic, STAR, RSEM, Salmon, RNAseQC), microarray (affy, oligo, arrayQualityMetrics, SVA, limma), and microbiome data (QIIME2, phyloseq, decontam).
- **Statistical analysis:** Differential gene expression analysis (limma, DESeq2, EdgeR); Multi-omics integration of microbiome and epigenome data.
- **Data management & pipelines:** Management of biological sample databases (MySQL, Excel); Development of reproducible data analysis pipelines (Nextflow).

Experimental

- **Genetic editing:** CRISPR/Cas9 in mouse cells and embryos.

- **Molecular biology:** RNA/DNA isolation and quantification from cells and tissues; PCR, RT-PCR, RT-qPCR, and Western Blot; immunofluorescence in cells and tissue.
- **Cell culture:** Primary neuronal culture, and HEK293 cell culture.
- **Histology:** Cryostat sectioning; Nissl staining.
- **Microscopy & image analysis:** Confocal microscopy (Leica LAS X); image processing and analysis using ZEISS Arivis Pro.

HONORS AND AWARDS

Congress Grant. *The Upper-Airway Microbiome Involved in Asthma Exacerbations is Associated with Methylation Markers Linked to Immunity and Asthma Comorbidities.* EAACI Annual Congress, Turkey, 2026. Awarded to the best abstracts presented at the congress.

Best Oral Communication Award. *Study of the interaction between the epigenome and the microbiome linked to asthma exacerbations in a Spanish pediatric population.* SENP Congress, Spain, 2026.

Best Oral Communication Award. *Epigenome-wide association study of the nasal microbiome involved in asthma exacerbations in severe asthma patients.* EAACI ISAF-RHINA Congress, Portugal, 2025.

Best Oral Communication Award. *The blood epigenome is associated with nasal bacteria involved in asthma exacerbations.* NEUMOCAN Congress, Spain, 2025.

Extraordinary Degree Award. BSc in Biology, University of La Laguna, Spain, 2023. Awarded for achieving one of the highest academic records in the Biology degree program.

ECTS credits with honors: 42 (BSc in Biology), 20 (MSc in Bioinformatics and Biostatistics).

FELLOWSHIPS AND SCHOLARSHIPS

FPU Predoctoral Fellowship 2025–2029

Highly competitive national PhD fellowship funded by the Spanish Ministry of Science, Innovation, and Universities.

ERASMUS Scholarship 2022–2023

European mobility program used to study at the University of Wrocław, Poland.

PARTICIPATION IN RESEARCH PROJECTS

EpiMAT: Epigenomics and Microbiome in Asthma Treatment (Ref: 009/2024). Researcher (contracted position), University of La Laguna, 2024-2026. Principal Investigator: Javier Pérez-García.

MOTA: Precision Multi-Omics Approach for the Identification of Biomarkers and Therapeutic Targets in T2 Asthma (Ref: PIFIISC24/35). Researcher, University of La Laguna and University Hospital of the Canary Islands, 2025-2026. Principal Investigators: Ruperto González Pérez and María del Mar del Pino Yanes.

SIGMA: Effect of Biological Sex on Asthma Susceptibility: Role of the Microbiome and Its Interaction with Genetic Variants (Ref: PIFIISC25/42). Researcher, University of La Laguna and University Hospital of the Canary Islands, 2026-2028. Principal Investigators: Paloma Poza-Guedes and Fabián Lorenzo-Díaz.

CONFERENCE COMMUNICATIONS

Oral communications

E. Castillo-Vargas, M. Martin-Almeida, E. Martin-Gonzalez, et al. *Methylation markers related to immunity and asthma comorbidities are associated with the upper airway microbiome linked to asthma exacerbations.* ATS International Conference, Orlando, United States, 2026.

- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *The Upper-Airway Microbiome Involved in Asthma Exacerbations is Associated with Methylation Markers Linked to Immunity and Asthma Comorbidities*. EAACI Annual Congress, Istanbul, Turkey, 2026.
- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *Interactions Between the Host Epigenome and the Upper Airway Microbiome in Asthma Exacerbations*. IMFAHE International Conference, Santa Cruz de Tenerife, Spain, 2026.
- O. Sardón-Prado, **E. Castillo-Vargas**, M. Martin-Almeida, et al. *Study of the Interaction Between the Epigenome and the Microbiome Associated with Asthma Exacerbations in Pediatric Populations*. XLVII Meeting of the Spanish Society of Pediatric Pulmonology, Zaragoza, Spain, 2026.
- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *Epigenome-wide association study of the nasal microbiome involved in asthma exacerbations in severe asthma patients*. EAACI ISAF-RHINA Congress, Porto, Portugal, 2025.
- E.L. García, **E. Castillo-Vargas**, M. Pino-Yanes, et al. *Exploring the impact of sex on asthma through transcriptomic analysis of airway epithelial cells*. EAACI ISAF-RHINA Congress, Porto, Portugal, 2025.
- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *The blood epigenome is associated with nasal bacteria involved in asthma exacerbations*. NEUMOCAN Congress, Las Palmas de Gran Canaria, Spain, 2025.
- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *Association of the blood epigenome with the upper airway microbiome involved in asthma exacerbations*. ABRE Congress, San Cristóbal de La Laguna, Spain, 2025.
- E.L. García, **E. Castillo-Vargas**, M. Pino-Yanes, et al. *Transcriptomic analysis of the effect of sex on asthma in airway epithelial cells*. ABRE congress, San Cristóbal de La Laguna, Spain, 2025.
- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *Epigenome-wide association study in blood of the salivary microbiome involved in asthma exacerbations*. ECIC-BiOR Congress, San Cristóbal de La Laguna, Spain, 2025.
- E. Castillo-Vargas**, J.M. Brito Armas, R.A. de Bustillo Alfaro, et al. *Study of the effects of point mutations in the Tardbp gene of mice and their relationship with motor neuron degeneration*. XVII Genetics Conference, San Cristóbal de La Laguna, Spain, 2023.

Poster presentation

- E. Castillo-Vargas**, M. Martin-Almeida, E. Martin-Gonzalez, et al. *The leukocyte epigenome is associated with salivary bacteria involved in asthma exacerbation*. ERS congress, Amsterdam, Netherlands, 2025.
- J.M. Brito Armas, R.A. de Bustillo Alfaro, **E. Castillo-Vargas**, et al. *Effect of mutations in the C-terminal region of Tardbp in knock-in mice at the phenotypic and molecular level*. ENCALS Meeting, Barcelona, Spain, 2023.

ATTENDANCE TO CONFERENCE AND COURSES

Conferences

- **EAACI ISAF-RHINA congress**, Porto, Portugal, 20–22 November 2025 (25 hours).
- **IMFAHE International Conference**, Santa Cruz de Tenerife, Spain, 25 May 2026 (7 hours)
- **NEUMOCAN congress**, Las Palmas de Gran Canaria, Spain, 7-8 November 2025 (15 hours).
- **XV Symposium on Bioinformatics**, Madrid, Spain, 22-24 October 2025 (18 hours).
- **ABRE congress**, San Cristóbal de La Laguna, Spain, 21-23 July 2025 (14 hours).
- **ECIC-BiOR congress**, San Cristóbal de La Laguna, Spain, 4-6 June 2025 (14 hours).
- **XVII Genetics Conference**, San Cristóbal de La Laguna, Spain, 28 December 2023 (5 hours).

Courses

- **Professional Development.** Expert-led masterclasses and practical exercises focused on developing essential professional skills for career advancement. International Mentoring Foundation for the Advancement of Higher Education, 2026 (30 hours).
- **Innovation, Entrepreneurship and Leadership.** Expert-led sessions and practical exercises to cultivate the mindset and skills necessary to drive innovation, launch entrepreneurial ventures, and lead with impact. International Mentoring Foundation for the Advancement of Higher Education, 2026 (30 hours).
- **Carrer in Science.** Expert-led sessions and practical exercises aimed at developing the skills and confidence of early-career researchers for careers in academia and industry. International Mentoring Foundation for the Advancement of Higher Education, 2026 (30 hours).
- **Animal Experimentation.** Laboratory animal handling and ethics. University of La Laguna, 2025 (3 hours).
- **Information resources for doctoral research.** Bibliographic search, citation management, open science, and research visibility. University of La Laguna, 2025 (25 hours).

LANGUAGES

- **Spanish:** Native.
- **English:** B2 (CEFR), certified.

LEADERSHIP AND VOLUNTEER EXPERIENCE

Science Outreach Volunteer

- **Canary Islands Science and Innovation Week**, San Cristóbal de La Laguna, Spain, 2025. Organized by the Canary Islands Agency for Research, Innovation, and Information Society (ACIISI).
- **III Science, Art and Technology Fair of Granadilla de Abona (MUCAT)**, Granadilla de Abona, Spain, 2025. Organized by the Youth Department of the Granadilla de Abona City Council and the Scientific Culture and Innovation Unit, University of La Laguna.

TEACHING/MENTORING EXPERIENCE

Co-supervisor of Bachelor's Thesis

2025-2026

University of La Laguna, Spain

- Co-supervised the Bachelor's thesis *Microbiome and Sex Differences in Asthma* (systematic literature review) for a BSc in Biology student, together with Dr. Fabián Lorenzo Díaz.

Tutor in the Orientation and Tutorial Action Plan

2021-2022

University of La Laguna, Spain

- Guided and supported first-year undergraduate BSc in Biology students, helping improve academic performance and addressing challenges such as study strategies, time management, and adapting to university life.

MEMBERSHIPS AND AFFILIATIONS

Genetics and Health group, University of La Laguna, Spain, 2024-present.

EAACI Junior Member, European Academy of Allergy and Clinical Immunology, Switzerland, 2025-present.

Trainee ATS Member, American Thoracic Society, United States, 2025-present.

JINTE Member, Asociación de Jóvenes por la Investigación de Tenerife, Spain, 2026-present.