

SEBASTIAN CORREA-GALLEGO

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Research Interests

Life assembles into order under constraint. A microbial community drawn from the same pool of organisms may converge on a single reproducible state or settle into one of several alternatives depending on the order in which its members arrive, and what decides between these outcomes — whether assembly follows rules or depends on history — remains among the open questions in ecology and evolution. This tension between predictability and contingency reaches beyond any single system: it echoes the broader problem of how autonomous parts come to form integrated wholes, from the structure of a community to the major transitions in the organization of life. I am drawn to these questions, and to the possibility that collective outcomes might be anticipated from measurable properties of the organisms themselves — such as how a cell divides its finite resources between growth and metabolic efficiency. I hope to pursue them with growing quantitative rigor while keeping the living organism, in its real environment, at the center of the inquiry.

Education

Universidad EAFIT, B.Sc. in Biology
GPA: 4.44 / 5.00

2022–2026

Research Experience

Visiting Student Intern

Aug 2025–Jan 2026

The Evolution of Cells, Symbionts and Organelles Lab, Dept. of Biological Sciences, Purdue University

- Contributed to the project *Proteome Allocation Rules in Osmotrophic Eukaryotes*, studying how non-conventional osmotrophic yeasts (*K. marxianus* and *V. polyspora*) reorganize proteome investment under carbon limitation.
- Generated high-resolution growth curves to characterize the physiological response of the study organisms across defined carbon regimes, establishing the growth phenotypes underlying the downstream analysis.
- Contributed to proteomics-based workflows, including sample preparation and integrative analysis linking molecular allocation to cellular physiology.
- Tested and calibrated an automated continuous-culture system to support controlled cultivation for the lab's steady-state experiments.

Undergraduate Thesis Researcher

2024–2026

Universidad EAFIT, Advisor: Prof. Nicolás Pinel Peláez, Ph.D.

Thesis: *Cultivable Microbial Community Structure Along a Light Gradient in a Tropical Volcaniclastic Cave* [[permanent link](#)]

- Characterized the cultivable microbial fraction of the Organo San Antonio, a tropical volcaniclastic cave at ~2350 m a.s.l. in Támesis, Antioquia, across a light-defined spatial gradient spanning Entrance, Transition, and Dark sectors.
- Found systematic differences in cultivable abundance and community composition across zonation: the aphotic sector supported markedly reduced densities and a distinct assemblage relative to photic sectors, while the Transition zone harbored a partially unique community of its own.
- Established a spatially resolved cultivable baseline for an organo-type pseudokarstic cave system, designing a tractable cultivation study in the absence of sequencing infrastructure.

Academic Service

Student Director, Research Group on Microbiology and Astrobiology (SIAB)

Oct 2023–May 2025

Universidad EAFIT, affiliated with the Research Group on Geosciences and Biodiversity (GEBI)

- Led a student research group on microbiology, astrobiology, and extremophiles, working collaboratively with members to learn and apply microbiological techniques and explore the diversity of these organisms.
- Participated in a science-outreach initiative on the role of microorganisms in the maintenance of Andean forests, contributing science-communication material for the El Globo nature reserve (Támesis).

Conferences and Presentations

Research Proposal Presentation

2024

2nd Symposium of Biology, Universidad EAFIT

Oral Presentation

2024

XXIII Encuentro Departamental de Semilleros de Investigación, RedCOLSI, Antioquia, Colombia

Research Fair Presentation

2022

Feria de Semilleros de Investigación, Universidad EAFIT

Honors and Recognition

Fully Funded Internship, Fundación Fraternidad Medellín — UREP-C Program, Purdue University

2025

Award Winner, Research Proposal Presentation, 2nd Symposium of Biology, Universidad EAFIT

2024

Undergraduate Scholarship, Comfama and Fundación Fraternidad Medellín

2022

Certifications and Training

Responsible Conduct of Research (RCR) Training

Aug 2025

CITI Program, Credential ID 71597371, valid through Aug 2029

Technician in Agricultural Sciences

2019–2021

Servicio Nacional de Aprendizaje (SENA), Colombia

Technical Skills

Laboratory and biological methods: microbial cultivation and isolation, continuous-culture operation, growth-curve measurement, environmental sampling and ecological field records, molecular biology and biochemistry techniques, proteomics sample preparation, and microscopy-based observation.

Quantitative and computational tools: R, Python, Linux/bash, $\text{\LaTeX}$, and QGIS, applied to biological data analysis, statistics, and data visualization.

Scientific workflows: scientific writing, research communication, literature synthesis, and figure preparation.

References

Nicolás Pinel Peláez, Ph.D.

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Sergio A. Muñoz-Gómez, Ph.D.

Assistant Professor, Dept. of Biological Sciences
Purdue University
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