

Julián Olaya Restrepo

SEASCAPE ECOLOGY · MARINE BIOLOGY · SUSTAINABILITY · SOCIOECOLOGICAL SYSTEMS · MARINE PROTECTED AREAS

Postdoctoral Scholar - Stanford University

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Summary

Marine ecologist and sustainability scientist focused on understanding and strengthening the links between ecosystems, people, and policy. My work brings together ecology, spatial analysis, and social sciences to create practical knowledge for the conservation and sustainable management of marine and coastal systems. I have led projects in coral reefs, mangroves, seagrass meadows, small-scale fisheries, and Marine Protected Areas across North and South America, Europe, and the Caribbean. Through research, teaching, and community collaboration, I seek to generate science that not only advances knowledge but also improves management, fosters equity, and supports local livelihoods.

Education

Federal University of Paraná

Brazil

PHD IN ZOOLOGY

2016 - 2020

- Thesis: "Coral reefs conservation in a network of MPAs in Brazil". Advisor: Dr. Marcos S. Barbeitos

UGent

Belgium

EMBC MASTER IN MARINE BIODIVERSITY AND CONSERVATION

2012 - 2014

- Thesis: "Ecology of *Holothuria arguinensis*: Estimation of population parameters and relationship with substrate types". Advisor: Dra. Mercedes González-Wangüemert

University of Antioquia

Colombia

BIOLOGY

2000 - 2006

- Gpa: 4.4/5.0 - Thesis: "Characterization of reef fish communities in the Santa Marta area (Colombian Caribbean)" Advisor: Dra. Catalina Reyes-Nivia

Professional Experience

2024–Present. **Postdoctoral Scholar – Stanford University.** Evaluated the socio-ecological benefits of coral reef and mangrove restoration for small-scale fisheries and coastal communities across Belize, Miami, and the U.S. Virgin Islands.

- Develop an integrated fisheries model that links ecosystem health, fish biomass, and economic outcomes by combining ecological datasets, fisher interviews, and social network analysis across Belize, Miami, and the U.S. Virgin Islands.
- Develop spatial datasets for coral reefs, mangroves, and MPAs across project geographies.
- Conduct interviews with fishers and restaurant workers to assess fishing practices and value-chain dynamics.
- Lead participatory mapping activities to integrate traditional ecological knowledge into spatial planning.
- Build socio-ecological and fisheries models using ecological and socio-economic data.
- Produce outreach and dissemination materials (interviews, videos, booklets, scientific publications).

2021–2023. **Research Consultant – Institute of Regional Studies, University of Antioquia.** Facilitated participatory sessions to strengthen social ownership and assess stakeholder engagement in implementing a protected-area governance model, supporting conservation planning and socio-environmental conflict management.

- Facilitating the systematic documentation of the participatory engagement of social actors in four state-designated protected areas.
- Apply the Environmental Territorial Governance Model (GOTA) to the management of protected areas.
- Promoting cooperation between the academic and governmental sectors.
- Created and enhanced methodologies for social participation in the formulation and updating of environmental management plans.

2022–2023. **Research Consultant – Institute of Marine Sciences, University of Antioquia.** Lead the project focused on verifying the presence and distribution of key fish species, including Goliath grouper (*Epinephelus itajara*), hammerhead shark (*Sphyrna lewini*), tarpon (*Megalops atlanticus*), and especially the bighead sea catfish (*Notarius bonillai*, synonym: *Ariopsis canteri*) within the direct impact area of Antioquia's Port.

- Conducted a comprehensive literature review on the conservation status and ecological characteristics of the target species.
- Developed management recommendations for the waters under the influence of Puerto Antioquia.
- Reviewed and evaluated the port's existing fisheries monitoring plan.
- Planned and executed experimental fishing activities to detect the occurrence of the focal species.

2015–2016. **Research Consultant – University of Antioquia.** Priority Guidelines for Developing a Fisheries Management Plan for the Gulf of Urabá (LOPEGU).

- Executed fieldwork to support stock assessments of commercially important fish species.
- Planned and executed more than 900 exploratory fishing surveys in collaboration with fishers across 23 localities.
- Processed, analyzed, and identified biological samples collected during fieldwork.
- Synthesized field and laboratory data and prepared technical reports.

2009–2012. **Biologist – National Natural Parks of Colombia.** Led the development and implementation of the research and monitoring program at Utría National Natural Park.

- Developed and implemented the Park's Research Plan and Monitoring Program, emphasizing priority conservation values and monitoring indicators.
- Guided and supervised external research activities; prepared technical evaluations for the Technical department.
- Conducted field assessments to support species diagnostics, monitoring frameworks, and adaptive management for priority conservation species.
- Led fisheries monitoring within the park and in adjacent communities.
- Led contributions to interagency planning meetings, workshops, and governance committees focused on hydrobiological, fisheries, and marine-coastal resource management.
- Provided substantive leadership in developing, refining, and implementing the marine-coastal zoning framework.

2007. **Research Consultant - Biology Department, University of Antioquia.** Conducted a comprehensive literature review on marine-coastal ecosystems and their species in the Department of Antioquia.

- Compiled and spatialized species records documenting 581 marine taxa across pelagic and benthic ecosystems from coastal zones to 800 m depth.
- Assessed the state of scientific knowledge across major taxonomic groups and ecosystems, identifying well-studied habitats (e.g., seagrass beds, coral reefs) and knowledge gaps in rocky shores, soft-bottom environments, and understudied taxa.
- Synthesized biodiversity data to establish a baseline for expanding sampling coverage and improving species inventories.

Major Research Projects & Scholarly Collaborations

2024–Present Large-scale CoPe: Strong Coasts — Developing Solutions with Nature and People (NSF Award 2209284).

A multi-institutional NSF-funded project quantifying ecological and socio-economic benefits of coral reef and mangrove restoration across Belize, USVI, and Miami.

- Lead development of spatial data products, including coral reef, mangrove, and MPA condition layers across all geographies.
- Co-design and facilitate community-engaged research activities, including participatory mapping, stakeholder interviews, and six regional workshops.
- Develop reproducible data workflows ensuring cross-team integration and open-science standards.
- Contribute to two manuscripts for peer-reviewed publication.

2016–2021 Development of new molecular markers in stony corals (Cnidaria: Scleractinia) and evaluation of their utility for species delimitation, genetic diversity characterization, and connectivity assessment among coral populations along the Brazilian Coast.

- Planned coral (DNA) sample collection activities, including itinerary design, number of dives, and in-water safety procedures.
- Designed and validated molecular workflows for coral DNA extraction and enzymatic digestion efficiency.
- Designed and optimized genetic libraries for sequencing and SNP identification.

2011–2012 Identification of Key Nursery Areas for *Sphyrna lewini* in Utría National Park. Funded by USAID and the Natural Heritage Fund.

- Principal Investigator.
- Spearheaded the development and submission of the grant proposal and prepared progress and final reports for donors.
- Led the design, implementation, and reporting of field and analytical components of the project.
- Captured and tagged 20 juvenile scalloped hammerhead sharks (*Sphyrna lewini*) and deployed acoustic sensors to monitor movement patterns.

- Generated baseline ecological data to inform national shark conservation policies.

2007 “Antioquia Expedition” – Marine-Coastal Biodiversity Assessment.

- Conducted literature-based assessment of marine-coastal ecosystems in the Department of Antioquia.
- Synthesized ecological data to support regional conservation and planning efforts.

2005–2006 Condition of the Reef Fish Communities of the Santa Marta Area: A Foundation for the Management of Tayrona National Park. Marine and Coastal Research Institute of Colombia (INVEMAR).

- Conducted over 160 underwater visual censuses and benthic assessments across reef sites.
- Analyzed ecological datasets and authored technical reports to support marine conservation planning.

2005–2006 National System of Coral Reef Monitoring (SIMAC)

- Performed reef fish censuses at three key monitoring sites: Tayrona National Park, Corales del Rosario National Park, and Capurganá.
- Contributed to national long-term coral reef monitoring datasets used in marine management decisions.

Publications

INDEXED PUBLICATIONS

- 2025 Networks of interactions between Marine Protected Areas and their effects on the conservation of the South American sea lion and the Southern right whale in the Western South Atlantic Ocean. Oliveira do Nascimento, L., Zapelini, C., **Olaya-Restrepo J**, Cinti, A., Chalar, G., Machado, R., Schiavetti, A. *Journal of Environmental Management* 392, 126679. <https://doi.org/10.1016/j.jenvman.2025.126679>
- 2024 AI-based coral species discrimination: A case study of the Siderastrea Atlantic Complex. Barbeitos MS, Perez FA, **Olaya-Restrepo J**, Winter APM, Florindo JB, Laureano EE. *PLoS ONE* 19(12): e0312494. <https://doi.org/10.1371/journal.pone.0312494>
- 2024 Environmental, social, and management aspects in a hotspot: interaction networks between marine protected areas. Zapelini C, Sampaio de Souza D, Oliveira de Santana R, **Olaya-Restrepo, J**, Schiavetti A. *Ocean and Coastal Management*, Volume 251, ISSN 0964-5691, <https://doi.org/10.1016/j.ocecoaman.2024.107068> .
- 2022 A multilayered network analysis of social participation in the management of Marine Protected Areas in Brazil. **Olaya-Restrepo, J**, Alexandre Schiavetti, Marcos S. Barbeitos. *Marine Policy*, 146, 105329. <https://doi.org/10.1016/j.marpol.2022.105329>
- 2017 Estimation of growth parameters for the exploited sea cucumber *Holothuria arguinensis* from South Portugal. **Olaya-Restrepo, J**, Karim Erzini, Mercedes González-Wangüemert. *Fish. Bull.* 116:1–8, doi: 10.7755/FB.116.1.1
- 2016 Assembly of Reef Fish in the Santa Marta Area and Tayrona National Natural Park. **Olaya-Restrepo, J**, María Catalina Reyes Nivia, Alberto Rodríguez Ramírez. *Bol. Investig. Mar. Costeras*, 37(1): 111-127. <https://doi.org/10.25268/bimc.invemar.2008.37.1.185>

BOOK CHAPTERS

- 2019 Dialogue Between Worlds: Integrated Quilombola Knowledge in Mammal Conservation. In: SANTOS, M. P. dos (Org.); CUNHA JUNIOR, H. (Org.). *Afro Patrimônio Cultural. Series African and Afro-Brazilian Knowledge* 1st Edition. Fortaleza. Editora Via Dourada, v. 1. 331p. ISBN - 978-65-80609-00-0
- 2010 Toward the Sustainability of Coastal Marine Ecosystems in Utría Natural Park. Ed. Nancy Bohórquez and JC Troncoso. Medellín (Colombia): Ministry of Environment, Housing, and Territorial Development, Colombian National Natural Parks system. - 122 p. ISBN: 9789588426341
- 2007 State of Coral Reefs and Coral Reef Fish Communities in Santa Marta. In: Chapter III. State of Knowledge of Coral Reefs. Report on the State of Coastal and Marine Environments in Colombia: Year 2006
- 2006 Evaluation and Monitoring of SIMAC in the Santa Marta Zone. In: Chapter II. State of Coral Reefs in Colombia. Report on the State of Marine Environments in Colombia: Year 2005. INVEMAR, Series of Periodic Publications, No. 8, 360p

Relevant Courses and Certifications

Human Subjects Research Protections - IRB nonmedical research. CITI Program, Collaborative Institutional Training Initiative, 2024

The Art of Reproducible Science. 2024. Stanford Biosciences, Stanford University, CA, USA.

GIS Challenge - Biodiversity and Environment. 2023. Introduction to Niche Modeling and Geoportals; Visual Analysis of Images and Spectral Indices with Google Earth, ArcGIS, QGIS, and R; Exploratory Data Analysis with R. GIS Environmental Institute, Colombia

Genomics in Ecology and Evolution: An Introduction to RAD-Seq Methodology. 2018. Oswaldo Cruz Institute FIOCRUZ, Rio de Janeiro.

Introduction to the Science of Sustainability in Marine and Coastal Spaces. 2015. University of Magdalena, Colombia.

Scientific Diving, Specialty Course. 2014. SSI Scuba School International, Portugal.

Introduction to Ocean Data Management. 2013. International Oceanographic Data and Information Exchange (IODE) Program, Belgium.

Estuarine Fish Ecology: Sampling Design and Hypothesis Testing. 2007. National University of Colombia.

Multivariate Analysis of Biodiversity and Environmental Impact in Protected Areas. 2007. Pedagogical and Technological University of Colombia (UPTC), Tunja, Colombia.

Ecosystem Approach Applied to Fisheries Ecology. 2005. University of Magdalena, Santa Marta, Colombia

Teaching and Mentoring Experience

Metazoa III (BZO48) – Teaching Assistant (Graduate Course), Federal University of Paraná, Graduate Program in Zoology (PPG Zoologia). Supported students' critical understanding of Ecdysozoan evolution, morphology, phylogeny, and classification. Delivered four course components across lecture and laboratory settings.

- Delivered lectures on Copepoda, Cirripedia, and Ostracoda taxonomy and function.
- Led laboratory modules on Cirripedia morphology and Copepoda diversity.
- Facilitated integrated lecture-lab sessions on comparative crustacean morphology.

Doctoral Co-Advisor, Postgraduate Program in Ecology and Biodiversity Conservation, Universidade Estadual de Santa Cruz, Brazil. *“The beings of drua wandra: the biocultural diversity of ethnic communities and its relationship with protected-area management in Colombia.”*

- Advised conceptual framing and interdisciplinary methodology integrating ecology and ethnoconservation.
- Guided development of community-engaged field protocols and qualitative analysis.

Mentor – BioBUDS Research Internship, Stanford University. Integrated undergraduates into coral reef and fisheries modeling research through the Natural Capital Project.

- Supervised research question design, data analysis in R and GIS, and modeling workflows.

Private Instructor – Inferential Statistics, Graduate Program in Food Science and Human Nutrition, University of Antioquia (Virtual). Provided tailored instruction during the COVID-19 pandemic, focusing on statistical inference in public health using SPSS and R.

- Delivered virtual lectures on hypothesis testing, confidence intervals, and evidence interpretation.
- Guided applied analyses using epidemiological datasets.

Undergraduate Research Mentor, University of Antioquia. Engaged students in biodiversity and fisheries research within coastal Colombia.

- Trained students in sampling design, fieldwork techniques, and ecological data processing.
- Supervised species identification and lab analysis of fish and invertebrates.

Community-Based Marine Science Instructor, Led educational workshops for local divers and community groups.

- Taught coral reef ecology and behavioral ecology of Caribbean reef fishes.
- Conducted sessions on species identification and fish systematics.

Thesis and Academic Reviewer

- Evaluated master's theses in marine science and conservation.
- Reviewed doctoral research proposals, providing feedback on analytical design.

Scientific Presentations

XVI COLACMAR-SENALMAR Conference Video-poster "Evaluation of Fishing Ground Productivity in the Gulf of Urabá, Colombian Caribbean". Santa Marta, Colombia. 2015.

Workshop NGOs Under Examination – Planning and Execution Team Member. Collaborated in the design and delivery of an interdisciplinary workshop exploring the role of NGOs in conservation, climate adaptation, and environmental governance. University of Oviedo, Spain, 2014.

- Co-developed workshop themes, session topics, and discussion prompts on NGO influence, ethics, and policy roles.
- Identified and invited key NGO participants, including representatives from Greenpeace and Ocean Flag.
- Designed interactive session formats, presentations, moderated panels, and participatory debate.
- Coordinated event logistics, agenda design, room booking, and participant outreach.
- Facilitated group discussions and synthesized key reflections from participants and NGO speakers.

Workshop "Sea Cucumber: The New Resource for a Hungry Fishery (CUMFISH)" Invited speaker: "Ecology of *Holothuria arguinensis*: Estimation of Population Parameters and Relationship with Substrate Types". University of Algarve, Portugal. 2014.

III Colombian Zoology Congress, symposium *Knowledge for the Management and Conservation of Wildlife in National Parks*. Oral presentation "Development of a Management Zoning Proposal for Utría National Natural Park". Based on Fisheries Monitoring Results. Colombia. 2010.

II Colombian Zoology Congress. Poster presented "Effectiveness of Tayrona National Natural Park in Conserving Reef Fish Communities". Santa Marta, Colombia. 2006.

58th Annual Gulf and Caribbean Fisheries Institute Meeting. Poster presented "Reef Fish Assemblages in Marine Protected Areas Under Pressure: Tayrona National Park (Colombian Caribbean)". Colombia. 2006.

Awards, Scholarships, and Grants

2016 Professional Development Program for Higher Education Personnel. National Council for Scientific and Technological Development (CAPES-CNPq), Brazil. Competitive grant supporting advanced academic training. Award amount: \$7,000 USD.

2012 Credit-Scholarship Program. COLFUTURO, Colombia. Merit-based graduate scholarship to support international academic training. Award amount: \$25,760.91 USD.

2011 Research Fund of the National Parks System: "Mono Hernández". USAID and the Natural Heritage Fund, Colombia. Grant supporting research on marine conservation and protected-area management. Award amount: \$12,441 USD.

Research Affiliations

Natural Capital Project - NatCap, Stanford University

<https://naturalcapitalproject.stanford.edu/>

Fundación Habitando. A non-profit organization dedicated to the knowledge, research, and conservation of biodiversity in Colombia.

<https://fundacionhabitando.org/>

Interdisciplinary Research Group on Marine and Coastal Systems - GISMAC, University of Antioquia.

Professional References

Dr. Marcos Soares Barbeitos

Professor, Department of Zoology, Federal University of Paraná

PhD Advisor

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Dr. Anne Guerry

Chief Strategy Officer and Lead Scientist at the Natural Capital Project

Stanford University

Principal Investigator during my postdoctoral fellowship

Email: anne.guerry@stanford.edu

Dr. Jade M. Delevaux

Lead Consultant and Co-founder

Seascape Solutions - Natural Capital Project
Research coordinator during my postdoctoral fellowship
Telephone: (+1 808) 3725794
Email: jade@seascape.solutions

Dr. Alexandre Schiavetti

Laboratory of Ethnoconservation and Protected Areas
State University of Santa Cruz
Academic Advisor during the Doctoral Thesis
Telephone: (+573) 36805262, Email: aleschi@uesc.br