

ADELA ROA-VARÓN, Ph.D.

Evolutionary Ichthyologist & Systematist | Collections-Based Biodiversity Science

Research Scientist, U.S. Geological Survey | Research Associate, NMNH & SERC

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RESEARCH PROFILE

Evolutionary ichthyologist and systematist leading Fish-ES (Fish Systematics & Evolution), a collections-based research program investigating how fish diversity originates, persists, and changes across oceans, depths, and evolutionary time. My research uses museum specimens as the foundation for integrating phylogenomics and comparative genomics, morphology, otoliths, spatial ecology, environmental data, fossils, and emerging biodiversity-monitoring approaches. Current research spans the evolutionary diversification of Gadiformes, connectivity and ecological differentiation in reef-associated fishes, and voucher-linked genomic resources for mesopelagic biodiversity monitoring. My work combines collections-based discovery, field research, international collaboration, student mentoring, and externally funded research.

ACADEMIC & RESEARCH APPOINTMENTS

Research Scientist, U.S. Geological Survey, based at Smithsonian NMNH | 2023–Present

- Lead multi-institutional research on fishes of the Gulf of Mexico and Aleutian Arc, integrating natural history specimens, field observations, genomics, morphology, otolith chemistry, and spatial/environmental data.
- Develop specimen-centered research linking vouchers, tissues, genomic resources, and biodiversity data to questions in fish systematics, evolutionary diversification, connectivity, and environmental change.
- Coordinate collaborators across federal agencies, museums, universities, sequencing facilities, and international partners; prepare manuscripts, proposals, data products, and public-facing science; mentor trainees.

Research Associate, Smithsonian Environmental Research Center | 2026–Present

Research Associate, Smithsonian National Museum of Natural History | 2024–Present

Postdoctoral Fellow, Smithsonian National Museum of Natural History | 2021–2022

- Investigated population structure, connectivity, and habitat use of commercially important Gulf fishes using RADseq, otolith microchemistry, voucher-linked specimens, and complementary oceanographic and ecological data.

NRC Research Associate, NOAA National Systematics Laboratory, Smithsonian NMNH | 2019–2021

- Conducted integrative taxonomy and species delimitation of commercially important hakes using genome-wide SNPs, comparative morphology, and museum collections; evaluated taxonomic identifications and conflicting molecular evidence.

Research Contractor, Smithsonian Institution Barcode Network, NMNH | 2019

- Generated voucher-linked genomic reference resources for deep-sea and Brazilian freshwater fishes; curated specimen, tissue, locality, and sequence metadata and prepared public records for GenBank/GBBN.

Predocctoral Fellow, Smithsonian National Museum of Natural History | 2017–2018

- Conducted phylogenomic research on Gadiformes with emphasis on hakes, integrating museum specimens, target-capture genomics, comparative morphology, fossils, and systematic literature.

Research Associate, Center for Marine Science, University of North Carolina Wilmington | 2007–2010

- Studied taxonomy, biodiversity, ecology, and population dynamics of shelf-edge, open-ocean, mesopelagic, deep-sea coral, and chemosynthetic fish communities; participated in research cruises, specimen identification, tissue and otolith sampling, database management, analysis, reports, and museum deposition.

EDUCATION

- Ph.D., Fisheries Sciences, Virginia Institute of Marine Science (VIMS), College of William & Mary, 2018. Dissertation: Multi-scale phylogenetics of Gadiformes with emphasis on hakes (*Merluccius*, Merlucciidae).
- M.Sc., Biological Sciences – Ecology, Evolution & Behavior, University of Nebraska–Lincoln, 2007. Thesis: Molecular approaches to study relationships among families of Gadiformes.
- B.Sc., Biology, major in Ichthyology, Universidad Nacional de Colombia, 2001. Thesis: Characterization of the demersal fish community of the Colombian Caribbean slope (300–500 m) and some zoogeographic comments. Magna Cum Laude.

PUBLICATIONS & SCHOLARLY PRODUCTS

Manuscripts under review

Roa-Varón, A., Prouty, G.N., Demopoulos, A.W.J., McCowen, P.J., Thornton, L., Harter, S., David, A.W., Herrera, S., Quattrini, A.M. 2026. High Connectivity, Local Signatures: Genomic and Otolith Evidence from Reef-Associated Snappers. *Evolutionary Applications*, under review. Preprint: bioRxiv. <https://doi.org/10.64898/2026.07.18.735000>

Peer-reviewed publications

1. Ridolfi, L., Schröder, A.E., Bahrami, A., Yazdi, M., Roa-Varón, A., Marramà, G., Carnevale, G. 2026. A new fossil from the Eocene of Iran provides new insights about the evolution of the morphologically bizarre tube-eye fish. *Papers in Palaeontology*. <https://doi.org/10.1002/spp2.70114>
2. Roa-Varón, A., Moulos, P., Harter, S., David, A., Quattrini, A.M., Herrera, S. 2025. Chromosome-level genome assembly of the Vermilion Snapper (*Rhomboplites aurorubens*). *Scientific Data* 12:1281. <https://doi.org/10.1038/s41597-025-05573-w>
3. Zhou, X., Lopera-Garcia, L., Roa-Varón, A., Bracco, A. 2024. Modeling the larval dispersal and connectivity of Red Snapper (*Lutjanus campechanus*) in the northern Gulf of Mexico. *Progress in Oceanography* 224:103265. <https://doi.org/10.1016/j.pocean.2024.103265>
4. Rotjan, R.D., Lynn, Croff Bell, K., Huber, J.A., Wheat, C.G., Fisher, A., Sylvan, R., McManus, J., Bigham, K.T., Cambronero-Solano, S., Cordier, C., Goode, S., Leonard, J., Murdock, S., Paula, F.S., Ponsoni, L., Roa-Varón, A., Seabrook, S., Schomberg, R., Van Audenhaege, L., Orcutt, B. 2023. COBRA Master Class: Deep-Sea expedition leadership training to accelerate early career advancement. *Frontiers in Marine Science* 10. <https://doi.org/10.3389/fmars.2023.1223197>
5. Roa-Varón, A. & Pirro, S. 2022. The Complete Genome Sequences of 18 Species of Gadiformes (Actinopterygii, Chordata). *Biodiversity Genomes*. <https://doi.org/10.56179/001c.56079>
6. Roa-Varón, A., Dikow, R., Carnevale, G., Tornabene, L., Baldwin, C.C., Li, C., Hilton, E.J. 2021. Confronting sources of systematic error to resolve historically contentious relationships: A case study using gadiform fishes (Teleostei, Paracanthopterygii, Gadiformes). *Systematic Biology* 70(4):739–755. <https://doi.org/10.1093/sysbio/syaa095>
7. Quattrini, A.M., McClain-Counts, J.P., Ross, S.W., Artabane, S., Roa-Varón, A., McIver, T.C., Rhode, M., Ross, S.W. 2019. Distribution of anguilliform leptocephali in the Gulf of Mexico, with notes on feeding habits based on stable isotope analysis. *Journal of Fish Biology*. <https://doi.org/10.1111/jfb.13933>
8. Quattrini, A.M., Demopoulos, A.W.J., Singer, R., Roa-Varón, A., Chaytor, J.D. 2017. Demersal fish assemblages on seamounts and other rugged features in the Northeastern Caribbean. *Deep Sea Research I: Oceanographic Research Papers*. <https://doi.org/10.1016/j.dsr.2017.03.009>
9. Gaither, M.R., Violi, B., Gray, H., Neat, F., Drazen, J.F., Grubbs, R.D., Roa-Varón, A., Sutton, T.T., Hoelzel, R. 2016. Depth as a driver of evolution in the deep sea: Insights from grenadiers (Gadiformes: Macrouridae) of the genus *Coryphaenoides*. *Molecular Phylogenetics and Evolution* 104:73–82. <https://doi.org/10.1016/j.ympev.2016.07.027>
10. Betancur-R, R., Broughton, R.E., Wiley, E.O., Carpenter, K., López, J.A., Li, C., Holcroft, N.I., Arcila, D., Sanciangco, M., Cureton II, J.C., Zhang, F., Buser, T., Campbell, M.A., Ballesteros, J.A., Roa-Varón, A., Willis, S., Borden, W.C., Rowley, T., Reneau, P.C., Hough, D.J., Lu, G., Grande, T., Arratia, G., Ortí, G. 2013. The Tree of Life and a New Classification of Bony Fishes. *PLOS Currents Tree of Life*. [10.1371/currents.tol.53ba26640df0ccae75bb165c8c26288](https://doi.org/10.1371/currents.tol.53ba26640df0ccae75bb165c8c26288)
11. Ross, W.S., Quattrini, A.M., Roa-Varón, A., McClain, J.P. 2010. Species composition and distributions of mesopelagic fishes over the slope of the north-central Gulf of Mexico. *Deep Sea Research II* 57(21–23):1926–1956. <https://doi.org/10.1016/j.dsr2.2010.05.008>
12. Roa-Varón, A. & Ortí, G. 2009. Phylogenetic relationships among families of Gadiformes (Teleostei, Paracanthopterygii) based on nuclear and mitochondrial data. *Molecular Phylogenetics and Evolution* 52:688–704. <https://doi.org/10.1016/j.ympev.2009.03.020>
13. Roa-Varón, A., Saavedra-Díaz, L.M., Acero, A.P., Mejía, L.S. 2007. First records of fishes for the Colombian Caribbean, orders Myctophiformes, Polymixiiformes, Gadiformes, Ophidiiformes, and Lophiiformes. *Boletín de Investigaciones Marinas y Costeras* 36:181–207. <https://doi.org/10.25268/bimc.invemar.2007.36.0.206>

14. Saavedra-Díaz, L.M., Roa-Varón, A., Acero, A.P., Mejía, L.S. 2004. New records of fishes for the Colombian Caribbean slope: orders Albuliformes, Anguilliformes, Osmeriformes, Stomiiformes, Ateleopodiformes, Aulopiformes, and Pleuronectiformes. *Boletín de Investigaciones Marinas y Costeras* 33:181–207. <https://doi.org/10.25268/bimc.invemar.2004.33.0.254>
15. Roa-Varón, A., Acero, A., Mejía, L.S., Saavedra, L.M. 2003. New records of fishes for the Colombian Caribbean slope of the orders Beryciformes, Zeiformes, Perciformes, and Tetraodontiformes. *Boletín de Investigaciones Marinas y Costeras* 32:3–24. <https://doi.org/10.25268/bimc.invemar.2003.32.0.257>
16. Mejía, L.S., Acero, A., Roa-Varón, A., Saavedra, L.M. 2001. Review of the fishes of the genus *Synagrops* from the Tropical Western Atlantic (Perciformes: Acropomatidae). *Caribbean Journal* 37(3–4):202–209.

Technical reports

- Ross, S.W., Demopoulos, A., Kellogg, C.A., Morrison, C.L., Nizinski, M.S., Ames, C.L., Casazza, T., Gualtieri, D., Kovacs, K., McClain, J.P., Quattrini, A.M., Roa-Varón, A., Thaler, A.D. 2012. Deepwater Program: Studies of Gulf of Mexico lower continental slope communities related to chemosynthetic and hard substrate habitats. U.S. Geological Survey. <https://doi.org/10.3133/ofr20121032>
- Ross, S.W., Quattrini, A.M., Roa-Varón, A., McClain, J.P. 2009. Community structure of mesopelagic fishes over the slope of the north-central Gulf of Mexico. U.S. Geological Survey Deepwater Program.
- Ross, S.W., Quattrini, A.M., Roa-Varón, A., McClain, J.P. 2009. Diets and feeding behavior of midwater fishes over cold seep sites in the north-central Gulf of Mexico. U.S. Geological Survey Deepwater Program.
- Roa-Varón, A. & Solano, O.D. 2001–2003. Evaluation of the ecological impacts caused by the construction of Urrá I Hydroelectric dam on the fish community structure of the Sinú River. Quarterly reports to the Government of Colombia.

Biographical profiles and memorials

- Roa-Varón, A., Arce H., M., Bell, R., Franklin, M., Wehrle, B.A. 2021. Margaret Hamilton Storey. *Ichthyology & Herpetology* 109(2):641–642.
- Wehrle, B.A., Arce, M.H., Bell, R., Franklin, M., Roa-Varón, A. 2021. John Widgeon. *Ichthyology & Herpetology* 109(2):640.
- Bell, R., Arce, M.H., Franklin, M., Roa-Varón, A., Wehrle, B.A. 2021. Helen Thompson Gaige. *Ichthyology & Herpetology* 109(1):322.
- Arce, M.H., Bell, R., Franklin, M., Roa-Varón, A., Wehrle, B.A. 2021. Rosa Smith Eigenmann. *Ichthyology & Herpetology* 109(1):323.
- Urbano-Bonilla, A., Roa-Varón, A., Arce, M.H. 2021. Dr. Javier Alejandro Maldonado-Ocampo. *Ichthyology & Herpetology* 109(4):1073–1074.

Conservation assessments

- Roa-Varón, A., Iwamoto, T.; and Roa-Varón, A., Ross, S.W., Iwamoto, T. 2019. Co-author of 73 IUCN Red List species assessments of deep-sea bony fishes (67 with T. Iwamoto; 6 with S.W. Ross and T. Iwamoto).

INVITED TALKS

- 2024. Diving Deep: Leveraging Museum Collections to Understand the Drivers of Fish Biodiversity in a Changing Planet. University of Massachusetts, Department of Ecology and Evolutionary Biology.
- 2024. Fish-ES Chronicles: Exploring Evolution and Systematics in the Anthropocene. University of Massachusetts Research Museum Center.
- 2023. Fish Systematics in the 21st Century: Bridging Gaps from Taxonomy to Conservation in a Changing Planet. University of Massachusetts Amherst.
- 2021. Fish Biodiversity, Evolution, and Systematics Across Scales. Scripps Institution of Oceanography.
- 2018. Challenges of Big Data Analyses Using Gadiform Fishes (Paracanthopterygii: Gadiformes) as a Model Clade. The George Washington University.
- 2016. The More, The Merrier in Phylogenetics? A Case Study Using Gadiformes. Virginia Institute of Marine Science.
- 2015. A Fish Genomic Tale in Shanghai. China University of Mining and Technology.

SELECTED CONFERENCE PRESENTATIONS

- 2026. Roa-Varón, A. Tiny Fish, Global Signals: *Cyclothone* as a Mesopelagic Sentinel. Midwater Science and Engineering Community (MidSEC), Bäckaskog Castle, Sweden.
- 2026. Roa-Varón, A., Prouty, N.G., McCowen, P.J., Thornton, L., Harter, S., Demopoulos, A.W.J., Herrera, S., Quattrini, A.M. High Gene Flow, Hidden Structure: Unraveling Snapper Connectivity Across Scales. Joint Meeting of Ichthyologists and Herpetologists, New Orleans, Louisiana.
- 2025. Roa-Varón, A. From Codfishes to Rattails: Resolving Long-standing Taxonomic Challenges through Phylogenomics. Indo-Pacific Fish Conference, Taipei, Taiwan.
- 2024. Roa-Varón, A., Prouty, N., Demopoulos, A.W., McCowen, P., David, A.W., Harter, S., Herrera, S., Quattrini, A. Exploring Red Snapper and Vermilion Snapper Habitat Connectivity in the Northern Gulf of Mexico: Insights from Genomics and Otolith Microchemistry. Ocean Sciences Meeting, New Orleans, Louisiana.
- 2021. Ilves, K.L., Roa-Varón, A., Terrab, D.C., Gangone, M., de Gedio, M., Lesnick, W., Quattrini, A.M. Biodiversity of Fishes in the Deep Gulf of Mexico: Continued Insights from Mitochondrial Barcoding and Voucher Specimens. JMIH, Phoenix, Arizona.
- 2018. Roa-Varón, A., Li, C., Baldwin, C., Dikow, R., Ortí, G., Hilton, E.J. A Phylogenomic Perspective on the Relationships of Gadiform Fishes. Deep-Sea Biology Symposium, Monterey, California.
- 2017. Roa-Varón, A., Li, C., Hilton, E.J. Using Phylogenomics to Study the Interrelationships of Gadiformes. ASIH, Austin, Texas.
- 2016. Roa-Varón, A., Wang, W., Li, C., Hilton, E.J. Phylogenetic Relationships within the Family Merlucciidae Using Genome-Wide Protein Coding Genes. ASIH, New Orleans, Louisiana.
- 2013. Roa-Varón, A., McDowell, J., Hilton, E. Back from the Dead or Alive and Well All Along? The Family Lyconidae. ASIH, Albuquerque, New Mexico.
- 2013. Roa-Varón, A., Ortí, G., Hilton, E. Systematics of the Gadiformes: Past, Present and Future. ACICTIOS, Bogotá, Colombia.
- 2009. Roa-Varón, A., Ross, S.W. Diel Vertical Distribution of Bristlemouths (*Cyclothone*) in the Gulf of Mexico. JMIH, Portland, Oregon.

CURATORIAL & COLLECTIONS EXPERIENCE

Extensive collections-based ichthyological research involving museum specimens, vouchers, tissues, otoliths, specimen-linked genomic resources, and associated metadata, together with examination of type and non-type material through research visits and specimen loans from major ichthyological collections worldwide, including CAS, MCZ, MNHN, USNM/NMNH, FLMNH, NHMUK, CSIRO, SAIAB, and others.

FIELD & COLLECTION-BASED RESEARCH EXPERIENCE

Freshwater and estuarine fieldwork

- Sampling expeditions in the Amazon River and Yahuaraca Lakes, Colombia–Brazil.
- Sampling expeditions in the Magdalena River, Serranía de las Quinchas, and Ciénaga de Guarinocito, Colombia.
- Three years of repeated sampling in the Sinú River and Cispatá Bay across freshwater, estuarine, and marine habitats, Colombia.

Research cruises and deep-sea exploration

- R/V Cape Hatteras. Deep coral ecosystems of North Carolina.
- R/V Seward Johnson. DISCOVRE: diversity, systematics, and connectivity of vulnerable reef ecosystems of the Gulf of Mexico.
- R/V Nancy Foster. U.S. Geological Survey Deepwater Program: lower continental slope chemosynthetic communities, Gulf of Mexico.
- R/V Cape Hatteras. Chemosynthetic communities on the lower continental slope of the Gulf of Mexico.
- R/V Ancón. INVEMAR Macrofauna I Expedition, Colombian Caribbean slope.

ADVISORY & PROFESSIONAL EXPERTISE

- IUCN Red List invited expert; co-author of 73 species assessments of deep-sea bony fishes of the Atlantic and Gulf of Mexico.

- Nautilus Scientist Ashore. Gadiformes identification via satellite telepresence during Exploration Vessel Nautilus expeditions in the eastern Pacific (2018).
- Scientist Ashore. Charles Darwin Foundation / Ocean Exploration Trust: image-based Gadiformes identification from E/V Nautilus video transects in the Galápagos Marine Reserve.
- Scientist Ashore. NOAA Okeanos Explorer, Océano Profundo 2015: Exploring Puerto Rico's Seamounts, Trenches, and Troughs.
- Scientific review: Review Editor, Fish Genetics and Evolutionary Biology; reviewer for journals including Molecular Phylogenetics and Evolution, Frontiers in Marine Science, Scientific Data, Zootaxa, and Bulletin of Marine and Coastal Research; reviewer of grant proposals and science-communication materials.

STUDENT MENTORING & RESEARCH TRAINING

Mentored undergraduate, master's, and doctoral researchers from U.S. and Latin American institutions in collections-based ichthyology, taxonomy, molecular methods, genomics, data analysis, otolith-based approaches, manuscript preparation, and scientific communication.

- Yamali Barragan. Ph.D. student, American Museum of Natural History, City University of New York.
- Nina Ramos. Ph.D. student, Florida State University.
- María del Pilar González García. Master's student, University of Puerto Rico at Mayagüez.
- José Orozco Juarbe. Master's student, University of Puerto Rico at Mayagüez.
- Adriana Rodríguez. Master's student, Universidad de los Andes, Bogotá, Colombia.
- Jennie McClain-Counts. Master's student, University of North Carolina Wilmington.
- Kaela Coil. Undergraduate, University of Maryland; Research Intern, NMNH.

TEACHING EXPERIENCE

- Teaching Assistant, Introductory Biology Laboratory, University of Nebraska–Lincoln: laboratory instruction, scientific-article discussions, group problem-solving, quizzes, short writing assignments, and formative assessment.
- Teaching Assistant, Fish Diversity & Fish Seminar, INVEMAR, Colombia: laboratory instruction and discussion of foundational scientific papers, culminating in student presentations and review papers.

SERVICE & LEADERSHIP

- Early Career Representative, Crustal Ocean Biosphere Research Accelerator (COBRA) Executive Committee (present).
- Nominations Committee, American Society of Ichthyologists and Herpetologists (2024–2025).
- Chair, Diversity, Equity, Inclusion & Belonging Committee, American Society of Ichthyologists and Herpetologists (2022; member 2020–2024).
- Organizing Committee, Species Delimitation Workshop, Smithsonian NMNH (2021).
- Member, Smithsonian Committee for Diversity, Antiracism & Belonging (2020–2022).
- International Student Representative, Virginia Institute of Marine Science (2012–2016).

OUTREACH & EDUCATION

- Invited Panelist, Career Day Survey, Lynbrook School Community (4th–6th grades), Springfield, Virginia (2023–2024).
- Invited Speaker, “Ladies, Let's Talk About Becoming an Evolutionary Ichthyologist!” Microbiology Girls Club, Miami Dade College.
- World Ocean Week: Natural History at Home — Oceans in Movement.
- Virtual Science Café: Sexy Corals, Unassuming Fish, Assassin Flies.
- Smithsonian National History Explorations: What Makes a Fish a Fish?
- Smithsonian Science How: What Makes Fish So Fishy?
- Science in Color: Becoming an Ichthyologist, Middle School 390, Bronx, New York.
- Science Day, Key Elementary School Spanish-immersion program: What Makes a Fish a Fish? Interactive activity for first- and second-grade students.
- Bilingual science writing: “Who Are the Gadiformes and Why Should We Study Them?” NOAA Okeanos Explorer (English/Spanish); USGS blog on Aleutian Arc fisheries, exploration, and conservation.

SELECTED PROFESSIONAL DEVELOPMENT

- 2025. Analyzing Biodiversity through Time and Space Using R, Physalia.
- 2025. eDNA and Metabarcoding Workshop, Smithsonian NMNH.
- 2023. National Science Foundation Writing Workshop, Mountain Lake Biological Station.
- 2022. COBRA Early Career Fellowship — Deep-Sea Expedition Planning Master Class.
- 2021. Eukaryotic Metabarcoding, Physalia.
- 2021. Big Data Biogeography, Physalia.
- 2020. Seascape Genomics, Physalia.
- 2019. Genome Annotation, Smithsonian NMNH.
- 2018. Introductory Population Genomics: From Data to Inference, Université Laval.
- 2017. Basics of CT Data Acquisition, Visualization and Analysis, University of Texas.
- 2017. Bodega Applied Phylogenetics Workshop, University of California Davis.
- 2015. Larval Fish Workshop, Virginia Institute of Marine Science.
- 2014. Workshop on Molecular Evolution, Marine Biological Laboratory.
- 2014. Next-generation Sequencing for Phylogenetics and Phylogeography, National Evolutionary Synthesis Center.
- 2013. Marine Ecological & Environmental Genomics, Station Biologique de Roscoff, Sorbonne University.

PROFESSIONAL SOCIETIES

American Society of Ichthyologists and Herpetologists; National Museum of Natural History Senate of Scientists; Society for Conservation Biology; Deep Sea Biology Society; Society of Systematic Biologists; Society for Advancement of Chicanos/Hispanics & Native Americans in Science; Association for Women in Science; Fisheries Society of the British Isles.

LANGUAGES

Spanish (native); English (fluent).