

-Curriculum Vitae-
Dr. Santiago Herrera Monroy

Massachusetts Institute of Technology & Woods Hole Oceanographic Institution
sherrera@alum.mit.edu

EDUCATION

- 2014 Ph.D. **Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography, Applied Ocean Science and Engineering**
Biological Oceanography, Advisor: Dr. Timothy M. Shank
- 2009 M.Sc. **Universidad de los Andes**, Bogotá, Colombia
Biological Sciences, Advisor: Dr. Juan A. Sánchez
- 2007 B.Sc. **Universidad de los Andes**, Bogotá, Colombia
Biology. Thesis advisors: Dr. Juan A. Sánchez & Dr. Santiago Madriñán
- 2007 B.Sc. **Universidad de los Andes**, Bogotá, Colombia
Microbiology. Thesis advisors: Dr. Juan A. Sánchez & Dr. Silvia Restrepo
- 2002 Colegio San Bartolomé La Merced, Bogotá, Colombia

PEER REVIEWED PUBLICATIONS

Herrera S. & Shank T.M. (*in prep.*) Genomics of adaptation potential of cold-water corals to environmental changes.

Herrera S. & Shank T.M. (*in prep.*) Population structuring in hydrothermal vent barnacles.

Herrera S. & Shank T.M. (*in prep.*) RAD sequencing of deep-sea octocorals provides unprecedented phylogenetic resolution and species delimitation.

Herrera S., P.H. Reyes-Herrera & T.M. Shank (in review) Genome-wide predictability of restriction sites across the eukaryotic tree of life. *bioRxiv* preprint doi: <http://dx.doi.org/10.1101/007781>. Git code repository: <https://github.com/phrh/PredRAD>

Herrera S., Watanabe H. & T.M. Shank (2015) Evolutionary history and biogeographical patterns of barnacles from deep-sea hydrothermal vents. *Molecular Ecology*, 24(3): 673-689. doi: 10.1111/mec.13054

Reitzel A.M.*, **S. Herrera***, M.J. Layden, M.Q. Martindale & T.M. Shank (2013) Going where traditional markers have not gone before: utility and promise for RAD-sequencing in marine invertebrate phylogeography and population genomics. *Molecular Ecology*, 22(11): 2953-2970. Special Issue: Genotyping by Sequencing
***Contributed equally**

Herrera S. T.M. Shank & J.A. Sánchez (2012) Spatial and temporal patterns of genetic variation in the widespread antitropical deep-sea coral *Paragorgia arborea*. *Molecular Ecology*, 21(24): 6053-6067.

Sánchez J.A., **S. Herrera**, R. Navas-Camacho, A. Rodríguez-Ramírez, P. Herron, V. Pizarro, A.R. Acosta, P.A. Castillo, P. Montoya & C. Orozco (2010) White plague-like coral disease in remote reefs of the Western Caribbean. *International Journal of Tropical Biology and Conservation*, 58 (Suppl. 1): 145-154.

Herrera S., A. Baco & J.A. Sánchez (2010) Molecular systematics of the bubblegum coral genera (Paragorgiidae, Octocorallia) and description of a new deep-sea species. *Molecular Phylogenetics and Evolution*, 55: 123-125.

NON-PEER REVIEWED PUBLICATIONS

Herrera S. & J.A. Sánchez (2013) Un Coral A la Conquista de los Océanos Profundos (A Coral Conquering the Deep Oceans). *Revista Hipótesis: apuntes científicos uniandinos*. Universidad de los Andes. Bogotá. (Special Anniversary Number): 76-79.

Shank T.M., E.T Baker, R.W. Embley, S. Hammond, J.F. Holden, S. White, S.L. Walker, M. Calderón, **S. Herrera**, T.J. Lin, C. Munro, T. Heyl, L.C. Stewart, M. Malik, E. Lobecker & J. Potter (2012) Exploration of the Deepwater Galápagos Region. *Oceanography* 25 Suppl.: 50-51.

Shank T.M., **Herrera S.**, Cho W., Roman C.N., Bell K.L.C. (2011) Exploration of the Anaximander Mud Volcanoes. *Oceanography* 24 Suppl.: 22-23.

Herrera S., C.A. Hernandez & E. Bahamon (2008) Gerreros Fantasmales: comportamiento competitivo en el cangrejo *Ocypode gaudicaudii* de la isla Gorgona (Ghostly Warriors: competitive behavior of the crab *Ocypode gaudicaudii* in the Gorgona island). *Revista Hipótesis: apuntes científicos uniandinos*. Universidad de los Andes. Bogotá. (9): 34-35.

RESEARCH FUNDING

2013 National Geographic Society / Waitt Grants Program grant (\$12,000).

2011 Ocean Life Institute and Deep Ocean Exploration Institute award, Woods Hole Oceanographic Institution. Co-PI Timothy M. Shank (\$47,784).

2011 Ocean Ventures Fund Award, Woods Hole Oceanographic Institution (\$14,884).

2008 Systematics Research Fund Award of the Systematics Association & the Linnean Society of London. London, UK. (£1,500)

2007 Mini-grant. CenSeam (Global Census of Marine Life on Seamounts CenSeam– part of the worldwide Census of Marine Life CoML). Co-PI Juan A. Sánchez (\$4,700).

2007 Sigma Xi Grant-In-Aid of Research (\$1,000).

AWARDS & HONORS

2014 Deep Ocean Exploration Institute Graduate Student Fellowship, Woods Hole Oceanographic Institution (WHOI).

2012 Graduate Student Council travel award, Massachusetts Institute of Technology (MIT).

2012 Outstanding Student Presentation Award, 2012 Ocean Sciences Meeting, Salt Lake City, UT.

2010 Outstanding Student Paper Award, American Geophysical Union, Fall Meeting, San Francisco, CA.

2009-14 WHOI Graduate Research Fellowship.

2008 Smithsonian Graduate Fellowship, National Museum of Natural History, Smithsonian Institution.

2008 Travel Award. Foundation for the Promotion of Research and Technology, Bank of the Republic of Colombia.

2008 11th ICRS (International Coral Reef Symposium) travel scholarship.

POSITIONS

2009-14 **Graduate Research Assistant**, Woods Hole Oceanographic Institution, Woods Hole, MA.

2009 **Fellow; Smithsonian Graduate Fellowship**, National Museum of Natural History, Smithsonian Institution, Invertebrate Zoology Department & Laboratories of Analytical Biology, Washington, DC.

Project Title: Connectivity across the deep ocean: phylogeography and morphological variation of the cosmopolitan bubblegum octocoral *Paragorgia arborea* (Linnaeus). Supervisors: Dr. Stephen D. Cairns and Dr. Allen G. Collins.

- 2008 **Intern; United States Antarctic Program**, Marine Invertebrate Collections. National Museum of Natural History, Smithsonian Institution, Invertebrate Zoology Department. Washington, DC. Project Title: Transformation of the USAP collection into a web-based tool. Supervisors: Dr. Rafael Lemaitre, Dr. Jerry Harasewych, Dr. Jennifer Hammock and Dr. Stephen D. Cairns.
- 2008 **Fellow; External Fellowship** National Museum of Natural History, Smithsonian Institution, Invertebrate Zoology Department & Laboratories of Analytical Biology. Washington, DC. Research Focus: Systematics and Phylogeography of *Paragorgia* spp. and *Craspedacusta* spp. Supervisors: Dr. Stephen D. Cairns and Dr. Allen G. Collins.
- 2007 **Intern; Research Training Program (RTP)** of the National Museum of Natural History, Smithsonian Institution, Invertebrate Zoology Department & Laboratories of Analytical Biology. Washington, DC. Project Title: Molecular Diversity of the Freshwater Medusa *Craspedacusta sowerbii*. Supervisors: Dr. Stephen D. Cairns and Dr. Allen G. Collins.
- 2006 **Member and Volunteer** at the Natural History Museum of the Universidad de los Andes, Herbarium, Botany and Systematics Laboratory (Material collection/preparation. Primary organizer of the collections database). Bogotá, Colombia. Supervisor: Dr. Santiago Madriñan.
- 2004 **Volunteer Forest Ranger** at the Tayrona Natural National Park, National Natural Parks of Colombia-PNN, Colombian Department of Environment, Magdalena, Colombia.

ACADEMIC JOURNAL REVIEWER

Molecular Phylogenetics and Evolution; Symbiosis; Molecular Ecology.

TEACHING

- 2014 **Instructor** undergraduate winter course *Introduction to Oceanography*, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts.
- 2013 **Guest Lecturer** undergraduate course *Environment Sustainability*. Bunker Hill Community College, Boston, Massachusetts.
- 2011 **Guest Lecturer** undergraduate course *Introduction to Ocean Sciences*. Gordon University, Wenham, Massachusetts.
- 2010-14 **Mentor**, Woods Hole Oceanographic Institution, Woods Hole, MA. Training of WHOI summer fellows (4) and visiting students (8) in molecular techniques: DNA extraction, PCR, sequencing, and data analysis.
- 2009 **Guest Lecturer** graduate course *Bioinformatics*. Universidad de los Andes, Bogotá, Colombia.
- 2009 **Graduate Teaching Assistant** of the **Phylogenetic Systematics** class and laboratory. Developed syllabus, weekly lectures, exams and problem sets. Universidad de los Andes, Bogotá, Colombia.
- 2007 **Teaching Assistant** and tutor of the **Marine Ecology** class and laboratory, Universidad de los Andes, Bogotá, Colombia. Supervisor: Juan A. Sánchez.
- 2007 **Teaching Assistant** and tutor of the **Phylogenetic Systematics** class and laboratory, Universidad de los Andes, Bogotá, Colombia. Supervisor: Juan A. Sánchez.
- 2006 **Teaching Assistant** and tutor of the **Cell Biology** class laboratory, Universidad de los Andes, Bogotá, Colombia. Supervisor: René Cuéllar.
- 2006 **Private Tutor** in biology for high-school seniors.

CONFERENCE PAPERS

Herrera S.*, & T.M. Shank (2014), Phylogenomics of deep-sea octocorals: new approaches to solve long-standing problems. **Talk** presented at the Evolution Meeting 2014, Raleigh, NC.

Herrera S.*, P. Reyes-Herrera & T.M. Shank (2013), Genome-wide surveys of restriction-site associated DNA tags (RAD tags) in eukaryotic genomes: Implications for evolutionary studies. **Poster** presented at the Evolution Meeting 2013, Snowbird, UT.

Reitzel A.M.*, & **S. Herrera** (2013), Identification and Distribution of Loci under Selection in an Emerging Model Cnidarian. Poster presented at the Annual Conference of the Society for Molecular Biology and Evolution (SMBE) 2013, Chicago, IL.

Herrera S.* & T.M. Shank (2012) Evolutionary history and biogeographical patterns of barnacles from deep-sea hydrothermal vents. **Talk** presented at the 13th Deep-Sea Biology Symposium, Wellington, New Zealand.

Herrera S.* & T.M. Shank (2012) Phylogenomics of deep-sea octocorals: new approaches to solve long-standing problems. **Poster** presented at the 13th Deep-Sea Biology Symposium, Wellington, New Zealand.

Munro C.*, G.W. Luther III, R. Lutz, C. Vetriani, T. Moore, **S. Herrera** & T.M. Shank (2012) Temporal and spatial patterns of *in situ* community structure using time-lapse camera systems at a vent field in the East Pacific Rise. Talk presented at the 13th Deep-Sea Biology Symposium, Wellington, New Zealand.

Shank T.M.*, V. Tunnicliffe, D. Butterfield & **S. Herrera** (2012), Environmental factors determinant for connectivity in hydrothermal vent fauna. Talk presented at the 13th Deep-Sea Biology Symposium, Wellington, New Zealand.

Herrera S.*, J.A. Sanchez & T.M. Shank (2012), Are there true nearly cosmopolitan cold-water coral species? **Talk** presented at the 5th International Deep-Sea Coral Symposium, Amsterdam, Netherlands.

Shank T.M., **S. Herrera***, W. Cho, T. Heyl, C. Munro, E. Cordes, A. Quattrini, P-Y. Hsing, A. Demopolous & C. Fisher (2012), Biodiversity in coral ecosystems from the deep Gulf of Mexico: 2012 Expedition Highlights. **Talk** presented at the 5th International Deep-Sea Coral Symposium, Amsterdam, Netherlands.

Herrera S.*, J.A. Sanchez & T.M. Shank (2012), Spatial Patterns Of Genetic Variation In The Widespread Cold-Water Bubblegum Coral *Paragorgia arborea*. Abstract 12829 **talk** presented at the 2012 Ocean Sciences Meeting, AGU/TOS/ASLO, Salt Lake City, UT. **Outstanding Student Presentation Award**

Shank T.M.*, J.F. Holden, **S. Herrera**, C. Munro, T.H. Muric, J. Lin & L. Stewart (2011), Discovery of Nascent Vents and Recent Colonization Associated with (Re)activated Hydrothermal Vent Fields by the GALREX 2011 Expedition on the Galápagos Rift. Abstract OS22A-07 talk presented at the 2011 Fall Meeting, AGU, San Francisco, CA.

Shank T.M., **S. Herrera***, E. Bors, C. Munro, E. Sibert, N. Nganro, S. Makarim, S. Wirasantosa, V. Tunnicliffe, E. T. Baker, D. A. Butterfield, J. F. Holden, S. R. Hammond (2010), Hydrothermal Vents and Organic Falls in the Heart of the Coral Triangle: Chemosynthetic Communities Discovered via Telepresence in the Sangihe-Talaud Region, Northern Sulawesi, Indonesia. Abstract OS11D-04 **talk** presented at the 2010 Fall Meeting, AGU, San Francisco, CA.

Herrera S.*, C. Munro, N. Nganro, V. Tunnicliffe, S. Wirasantosa, E. Sibert, S. R. Hammond, E. Bors, D. Butterfield, J. F. Holden, E. T. Baker, J. Sherrin, S. Makarim, R. Troa, T. M. Shank (2010), Biodiversity of the Deep-Sea Benthic Fauna in the Sangihe-Talaud Region, Indonesia: Observations from the INDEX-SATAL 2010 Expedition. Abstract OS13C-1234 **poster** presented at the 2010 Fall Meeting, AGU, San Francisco, CA. **Outstanding Student Paper Award**

Butterfield D.A.*, J.F. Holden, T.M. Shank, V. Tunnicliffe, J. Sherrin, **S. Herrera**, E.T. Baker, D. Lovalvo, S. Makarim, M.A. Malik, S. Wirasantosa, S. R. Hammond (2010) Video Observations by Telepresence Reveal Two Types of Hydrothermal Venting on Kawio Barat Seamount. Abstract OS13C-1236 poster presented at the 2010 Fall Meeting, AGU, San Francisco, CA.

Herrera S*, J.A. Sánchez & A.R. Baco (2008), Evolution in the Bubblegum Octocorals: DNA vs. Morphology. **Poster** presented at the 4th International Deep-Sea Coral Symposium, Wellington, New Zealand.

Baco A.R.*, J.A. Sánchez, **S. Herrera**, & S. Cairns (2008). Phylogeographic patterns of deep-sea corals on north Pacific seamounts. Talk presented at the World Conference on Marine Biodiversity, MarBef, Valencia, Spain.

Herrera S* & Sánchez J.A. (2008), On the White Plague Disease in Corals, With Remarks on the Interactions Between Disease, Environment and Host. 7.208 **poster** presented at the 11th International Coral Reef Symposium, Ft. Lauderdale, FL.

Sanchez J.A.*, C. Granados, D. Dorado, N. Ardila, N. Manrique, L. Dueñas, O. Torres, M. Cardenas, **S. Herrera**, C. Agudelo (2008) Intra-genomic ITS2 Variation: Low Rates Of Concerted Evolution Are Concordant With Recent Species Radiations in Reef Octocorals. Talk presented at the 11th International Coral Reef Symposium, Ft. Lauderdale, FL.

Herrera S.*, A.G. Collins, S.D. Cairns, T. Jankowski, T.L. Peard (2008), Molecular Diversity of the Freshwater Medusa *Craspedacusta sowerbii* (Hydrozoa, Olindiasidae). **Talk** presented at the Evolution Meeting 2008, Minneapolis, MN.

*Presenter

INVITED SEMINARS & PRESENTATIONS

Herrera S (2014), Coral genomics and evolution. Brown University, Dunn Lab, Providence, RI.

Herrera S (2014), Phylogenomics of deep-sea octocorals. Northwest Fisheries Science Center, Seattle, WA.

Herrera S (2013), Systematics of deep-sea bubblegum corals (family Paragorgiidae). National Institute of Water and Atmospheric Research, Wellington, New Zealand.

Herrera S (2013), Genomics of deep-sea corals: new approaches to solve long-standing problems in ecology and evolution. Biology Department Seminar. Woods Hole Oceanographic Institution, Woods Hole, MA.

Herrera S (2013), Evolution and biogeography of deep-sea hydrothermal vent barnacles. Challenger Expeditions Biology Forum. Woods Hole Oceanographic Institution, Woods Hole, MA.

Herrera S (2013), Deep-sea biology and exploration. Institutional visit of the Admiral Guillermo E. Barrera CNO Distinguished International Fellow at the U.S Naval War College to the Woods Hole Oceanographic Institution, Woods Hole, MA.

Herrera S (2012), Research on deep-sea corals. Institutional visit of the Harbor Branch Oceanographic Institution to the Woods Hole Oceanographic Institution, Woods Hole, MA.

Herrera S (2011), Deep-sea Biology and Exploration in the Age of Genomics. Universidad de los Andes, Bogota, Colombia.

Herrera S (2011), Deep-sea biology: applications and challenges. Institutional visit of BP plc. to the Woods Hole Oceanographic Institution, Woods Hole, MA.

Herrera S. (2010), Biological Observations in the INDEX-SATAL 2010 Expedition. Deep-Sea Exploration in Sangihe-Talaud 2010 (INDEX-SATAL 2010) Scientific Results Colloquium, Sam Ratulangi University, Manado, North Sulawesi, Indonesia.

Herrera S. (2010), Deep-sea biogeographical patterns in the Sangihe-Talaud region. Talk presented at the Indonesia-US Science Team Workshop, Deep-Sea Exploration in Sangihe-Talaud 2010 (INDEX-SATAL 2010), Manado, North Sulawesi, Indonesia.

SYNERGISTIC ACTIVITIES

2014 **Invited participant**, Next Generation Sequencing of Deep Sea Corals Workshop, National Oceanic and Atmospheric Administration (NOAA), Seattle, WA.

2013 **Invited emerging taxonomist**, Deep-Sea Coral Taxonomy Workshop, National Institute of Water and Atmospheric Research, Wellington, New Zealand.

- 2013 **Invited participant**, Ocean Exploration 2020: A National Forum, National Oceanic and Atmospheric Administration (NOAA), Aquarium of the Pacific, Long Beach, CA.
- 2011 **Invited participant**, Northeast Atlantic Deep-Sea Coral Research Priorities Workshop, National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program (CRCP), James J. Howard Marine Sciences Lab, Sandy Hook, NJ.
- 2011 **Student representative and president** of the MIT/WHOI Joint Program Student Organization for the MIT Association of Student Activities. Massachusetts Institute of Technology, MA.
- 2010- **Web manager and co-developer**, Woods Hole Oceanographic Institution, Woods Hole, MA. <http://sba.whoi.edu>, Barcoding Seamount Life: Advancing the capacity to discover, conserve, and manage biodiversity on seamounts, Seamount Barcoding Association.

PROFESSIONAL SOCIETIES

Sigma Xi, The Scientific Research Society; Society of Systematic Biologists (SSB); American Association for the Advancement of Science (AAAS); The Oceanography Society (TOS); American Geophysical Union (AGU); American Society of Limnology and Oceanography (ASLO), American Academy of Underwater Sciences (AAUS), Society for the Study of Evolution (SSE), Society for Molecular Biology and Evolution (SMBE).

OUTREACH

Weblogs

[Discovery of the *Tempus fugit* Vent Field](#), Heyl C, **Herrera S**, Munro T & Shank TM (2011) Signature Exploration: Galápagos Rift Expedition 2011, GALREX 2011, NOAA, Office of Ocean Exploration and Research. July 24, 2011.

[Exploring the Paramount Seamounts](#), Munro C, **Herrera S** & Heyl T (2011) Signature Exploration: Galápagos Rift Expedition 2011, GALREX 2011, NOAA, Office of Ocean Exploration and Research. July 14, 2011.

[High Biodiversity in the Deep-Sea](#), **Herrera S** (2010) Signature Exploration: Indonesia-USA Deep-Sea Exploration of the Sangihe Talaud Regions, NOAA, Office of Ocean Exploration and Research. July 11, 2010.

[Coral reefs in the deep sea](#), **Herrera S** (2010) KARMA Cruise: Kermadec ARc MinerAls, CenSeam, Census of Marine Life on Seamounts, Census of Marine Life. June, 2010.

[Seeing it First Hand!](#) **Herrera S** (2009), Signature Exploration: Lophelia II 2009: Deepwater Coral Expedition: Reefs, Rigs and Wrecks, NOAA, Office of Ocean Exploration and Research. August 23, 2009

Public seminars

Herrera S (2012), Are There True Cosmopolitan Deep-Sea Coral Species? The Case of the Bubblegum Coral *Paragorgia arborea*, Ocean Science Journalism Fellowship, WHOI.

Herrera S (2011), Deep-sea Coral Biogeography and Evolution in the Age of Genomics, WHOI Fall Annual Meeting of the Board of Trustees and Corporation, WHOI. October 2011.

Herrera S (2011), Recent Discoveries of Benthic Biodiversity via Telepresence in the Deep-Sea, Ocean Science Journalism Fellowship, WHOI.

Herrera S, Shank TM, Madin L & Fornari D (2011), A Journey into Inner Space with WHOI – Galapagos Rift Live Event, NOAA Signature Exploration GALREX 2011, event with prospective donors, WHOI.

Herrera S & Shank TM (2011), Live from the Galapagos Rift, NOAA Signature Explorations: INDEX-SATAL 2010 and GALREX 2011, Peanut Butter Club, WHOI.

Herrera S (2010) Deep Water Corals: Importance, Diversity & Relevance, WHOI Fall Annual Meeting of the Board of Trustees and Corporation, Ocean Life Institute, WHOI.

K-12 Activities

- Associate Teacher, Science 8 5-6 (W), Madawaska Middle/High School, Madawaska, ME. 2010-212.
- Judge, Falmouth Public Schools Science Fair 2011, Falmouth MA.

SCIENTIFIC EXPEDITIONS

- 2014 R/V *Thomas G. Thompson*, HROV Nereus, TN309 Cruise: Hadal Ecosystems Studies (HADES), Kermadec Trench, New Zealand. Chief scientist: Tim Shank (WHOI).
- 2014 R/V *Tangaroa*, Deep Towed Camera System DTIS (NIWA), TAN1402 Cruise: Vulnerable Marine Ecosystems survey of the Louisville Seamounts, New Zealand. Chief scientist: Ashley Rowden/Malcom Clark (NIWA).
- 2013 (Telepresence) R/V *Okeanos Explorer*, ROV Deep Discoverer, EX1304 [Northeast U.S. Canyons Expedition 2013](#). North Atlantic Ocean. Chief scientists: Tim Shank (WHOI), Amanda Demopoulos (USGS) and Martha Nizinski (NOAA).
- 2013 **Chief Scientist.** Technical scuba diving, Cold-Water Coral Collection Expedition in British Columbia Fjords. British Columbia, Canada.
- 2012 R/V *Falkor*, ROV Global Explorer MK3, Deep-Sea Coral Shakedown. Gulf of Mexico. Chief scientist: Peter Etnoyer (NOAA)
- 2012 (Telepresence) R/V *Okeanos Explorer*, ROV Little Hercules, EX1202 [GoMEX 2012](#): Gulf of Mexico Expedition 2012. Gulf of Mexico. Chief scientists: Tim Shank (WHOI) and Jamie Austin (UTexas).
- 2011 M/V *Holiday Chouest*, ROV UHD-34, NRDA Deepwater ROV Sampling to Assess Potential Impacts to Hardbottom Coral Communities and Associates from the Deepwater Horizon Oil Spill. Gulf of Mexico. Chief scientist: Charles Fisher (Penn. State U.)
- 2011 (Telepresence) R/V *Okeanos Explorer*, ROV Little Hercules, EX1103 [GALREX 2011](#): Galápagos Rift Expedition 2011. Galapagos Rift, Ecuador. Chief scientist: Tim Shank (WHOI)
- 2011 RSS *James Cook*, ROV Isis, [JC055 Cruise](#): Chemosynthetic Ecosystems of the Southern Ocean: exploring deep-sea vents around Antarctica. Bransfield strait, Sandwich backarc and East Scotia Ridge, Southern Ocean, Antarctica. Chief scientist: Paul Tyler (NOCS)
- 2010 **Dive lead** (Telepresence). E/V *Nautilus*, ROV Hercules, NA010, cruise: [Nautilus 2010](#), Anaximander Seamounts. Anaximander Seamounts, Turkey. Chief scientists: Tim Shank (WHOI) and Robert Ballard (URI)
- 2010 **Lead Scientist.** R/V *Okeanos Explorer*, ROV Little Hercules, EX1004 leg 3, cruise: [INDEX-SATAL 2010](#): Indonesia-USA Deep-Sea Exploration of the Sangihe Talaud Region. Sangihe Talaud, Indonesia.
- 2010 (Telepresence) R/V *Okeanos Explorer*, ROV Little Hercules, EX1004 leg 2, cruise: [INDEX-SATAL 2010](#): Indonesia-USA Deep-Sea Exploration of the Sangihe Talaud Region. Sangihe Talaud, Indonesia.
- 2010 R/V *Tangaroa*, Deep Towed Camera System DTIS (NIWA), [KARMA](#) TAN1007 Cruise: Kermadec ARc MinerAls. Kermadec arc, New Zealand. Chief scientist: Malcom Clark (NIWA).
- 2009 R/V *Ronald H. Brown*, ROV *Jason II*, [Lophellia II](#) 2009 Cruise: Deepwater Coral Expedition: Reefs, Rigs, and Wrecks. Gulf of Mexico, USA. Co-chief scientists: Charles Fisher (Penn. State U.) and Erik Cordes (Temple U.)
- 2009 SSV *Corwith Cramer*, Jake Peirson Summer Cruise. Atlantis Canyon, North Atlantic Ocean.

ADDITIONAL TRAINING

Deep-Sea Coral Taxonomy Workshop, National Institute of Water and Atmospheric Research, Wellington, New Zealand, 2013.

WHOI AAUS Scientific Diver, since 2012 (dry suit, cold-water, technical diving).

Workshop Identification of deep-sea corals from imagery data, Amsterdam, The Netherlands. 2012.

Workshop on Genomics, Cesky Krumlov, Czech Republic. 2012.

Workshop on Molecular Evolution, Marine Biological Laboratory, Woods Hole, MA, USA. 2009.

Advanced SCUBA Diver (PADI & NAUI), EANx Diver (NAUI), and oxygen administrator (DAN). Diving frequently since 2002.

MEDIA FEATURES

Dinero (magazine), featured as one of the '[101 Most Creative and Innovative People in Colombia](#)', Dec. 2013.

CNN in Spanish, live interview at the *Encuentro* TV show, August 28 2013.

EFE, [Un Colombiano en el grupo del programa de exploración del océano en EEUU](#), covered by [Univision](#), [El Espectador](#), [El Nuevo Herald](#), [CM&](#), [El Colombiano](#), 2013.

El Tiempo, [Colombianos dan cátedra sobre un coral gigante](#) (front page printed edition), Feb. 2, 2013.

Live Science, [How a Bubblegum Coral Conquered the Globe](#), covered by [YAHOO News](#), [MSNBC News](#), [CBS News](#), [Discovery News](#), [Consortium for Ocean Leadership](#), 2012.

WHOI News Release, [Genetic Patterns of Deep-Sea Coral Provide Insights into Evolution of Marine Life](#), covered by [Science Daily](#), [Science Codex](#), [e! Science News](#), [phys.org](#), 2012.

Scientific American, [Indonesia expedition maps rich undersea life](#), 2010.

Our Amazing Planet, [Possible New Species Found in Ocean Crossroads](#), covered by [MSNBC News](#), 2010.

NOAA News, [U.S. and Indonesian Scientists Find Biodiversity Runs Deep in Sulawesi Sea](#), 2010.

RELEVANT COURSEWORK

UNDERGRADUATE:

Molecular Biology (UniAndes); Phylogenetic Systematics (UniAndes); Evolutionary Biology (UniAndes); Evolutionary Genetics (UniAndes); Biogeography (UniAndes); Biodiversity (UniAndes); Marine Ecology (UniAndes); Developmental Biology (UniAndes); Zoology of Invertebrates and Vertebrates (UniAndes); Animal Physiology (UniAndes); Botany (UniAndes); Plant Physiology (UniAndes); Human Genome (UniAndes); From Evolution to Human Culture (UniAndes); Immunology (UniAndes); Parasitology (UniAndes); Medical Microbiology (UniAndes); Medical Biology (UniAndes).

GRADUATE:

Topics in Evolutionary Ecology (UniAndes); Advanced Phylogenetic Systematics (UniAndes); Bioinformatics (UniAndes); Molecular Phylogenetics (UniAndes); Microsatellites Development, (UniAndes); Phylogenetics in the Era of Genomics (Harvard); Deep-sea Biology (Harvard); Biological Oceanography (MIT/WHOI), Evolutionary Genetics (Harvard); Statistics for Biology (Harvard); Chemical Biology (MIT); Physical Oceanography (MIT/WHOI); Marine Chemistry (MIT/WHOI); Marine Geology and Geochemistry II (MIT/WHOI); Applied Statistics (MIT/WHOI), Deep-Sea Ecosystems and Conservation (MIT/WHOI).

TECHNICAL SKILLS

COMPUTER PROGRAMMING:
Python, BASH, R, HTML, Matlab.

LANGUAGES:
Spanish (proficient), English (proficient).

LABORATORY TECHNIQUES:
DNA purification, DNA quantification (spectrometry and fluorescence) PCR, gel electrophoresis, Sanger sequencing, primer design, DNA digestion and ligation, DNA preparation for Illumina sequencing, SNP discovery, light microscopy, electron scanning microscopy.

BIOINFORMATICS SOFTWARE:
BioPython, Stacks, Bowtie, Prinseq, FastQC, Trinity, IGV, Eigensoft, Structure, Lositan, Geneious, Galaxy, Migrate, Arlequin, PhyML, RAxML, Garli, Mr. Bayes, PAUP*, jModelTest, BLAST, Mega, Muscle, MAFFT, *BEAST, BEAST, BEST, DNAsp, Mesquite, McClade, DAMBE.

GEOGRAPHIC INFORMATION SOFTWARE:
QGIS, Fledermaus, iMap, Google Earth, GeoMapApp.

UTILITIES SOFTWARE:
Word, Excel, Power Point, Pages, Numbers, Keynote, TexWrangler, Acrobat Professional, Photoshop, Illustrator, Dreamweaver, VLC, DataGraph, EndNote, iMovie, iView.

OPERATING SYSTEMS:
Mac OS X, Linux, Windows.

REFERENCES

Dr. Timothy M. Shank
Woods Hole Oceanographic Institution
Woods Hole, MA, USA
tshank@whoi.edu

Dr. Ann Tarrant
Woods Hole Oceanographic Institution
Woods Hole, MA, USA
atarrant@whoi.edu

Dr. Adam M. Reitzel
University of North Carolina
Charlotte, NC, USA
areitze2@unc.edu

Dr. Juan A. Sánchez
Universidad de los Andes
Bogotá, Colombia
juansanc@uniandes.edu.co