

## CURRICULUM VITAE OF RICARDO BETANCUR-R.

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ResearchGate: [https://www.researchgate.net/profile/Ricardo\\_Betancur-R](https://www.researchgate.net/profile/Ricardo_Betancur-R)

### EDUCATION

- 2004–2009** **Ph.D. Biological Sciences**, Auburn University, Auburn, Alabama. Supervisor: Dr. Jonathan W. Armbruster.  
**2001–2004** **M.Sc. Marine Biology**, Universidad Nacional de Colombia, Santa Marta/Bogotá, Colombia. *Magna Cum Laude* honors. Supervisor: Dr. Arturo Acero.  
**1994–2000** **B.Sc. Marine Biology** (with honors thesis), Universidad Jorge Tadeo Lozano, Bogotá, Colombia.

### PROFESSIONAL APPOINTMENTS

- 2019–** **Assistant Professor**, Department of Biology, U. Oklahoma, Norman, OK.  
**2019–2022** **Associate Editor: *Proceedings of the Royal Society B***.  
**2017–2018** **Associate Professor**, Department of Biology, UPR-RP, San Juan, PR.  
**2014–2017** **Assistant Professor**, Department of Biology, UPR-RP, San Juan, PR.  
**2009–** **Research Associate**, Smithsonian National Museum of Natural History, Washington D.C.  
**2013–2014** **Peter Buck Postdoctoral Fellow**, Smithsonian National Museum of Natural History, Washington D.C. Supervisor: Dr. Richard Vari.  
**2009–2013** **Postdoctoral Researcher**, The George Washington University, Washington D.C. Supervisor: Dr. Guillermo Ortí.  
**2004–2009** **Graduate Research and Teaching Assistant**: Department of Biological Sciences, Auburn University.  
**1999–2004** **Undergraduate/Graduate Research Assistant**: Centro de Estudios en Ciencias del Mar (CECIMAR/INVEMAR), Santa Marta, Colombia.

### REPRESENTATIVE PUBLICATIONS (28)

- 2019** Pedraza-Marrón, C.R.\* R. Silva, J. Deeds, S.M. Van Belleghem, A. Mastretta-Yanes, O. Domínguez-Domínguez, R.A. Rivero-Vega, L. Lutackas, D. Murie, D. Parkyn, L. Bullock, K. Foss, H. Ortiz-Zuazaga, J. Narváez-Barandica, A. Acero, G. Gomes & **Betancur-R., R.\*** Genomics overrules mitochondrial DNA, siding with morphology on a controversial case of species delimitation. *Proceedings of the Royal Society B*. In press. \*Equal contribution.  
**2019** Rincon-Sandoval, M.\* **Betancur-R., R.\*** & J. Maldonado-Ocampo. Comparative phylogeography of trans-Andean freshwater fishes based on genome-wide nuclear and mitochondrial markers. \*Equal contribution.  
**2018** Ribeiro, E.D., A. Davis, R. A. Rivero-Vega, G. Ortí, & **R. Betancur-R.** Post-Cretaceous bursts of evolution along the benthic-pelagic axis in marine fishes. *Proceedings of the Royal Society B*

- 2018** **Betancur-R., R.\***, D. Arcila\*, R. Vari, L. Hughes, M. Sabaj, C. Oliveira & G. Ortí. Phylogenomic incongruence, hypothesis testing, and taxonomic sampling: the monophyly of characiform fishes. *Evolution* (doi:10.1111/evo.13649). \*Equal contribution.
- 2018** Hughes, L.C., G. Ortí, Y. Huang, Y. Sun, C.C. Baldwin, A.W. Thompson, D. Arcila, **Betancur-R., R.**, C. Li, L. Becker et al. et al. Comprehensive phylogeny of ray-finned fishes (Actinopterygii) based on transcriptomic and genomic data. *Proceedings of the National Academy of Sciences*.
- 2017** Zhong, B.\* & **R. Betancur-R.\*** Expanded taxonomic sampling coupled with Gene Genealogy Interrogation provides unambiguous resolution for the evolutionary root of angiosperms. *Genome Biology and Evolution* 9(11): 3154-3161. \*Equal contribution.
- 2017** **Betancur-R., R.**, E. O. Wiley, G. Arratia, A. Acero, M. Miya, G. Lecointre & G. Ortí. Phylogenetic classification of bony fishes. *BMC Evolutionary Biology* 17(162): DOI: 10.1186/s12862-017-0958-3.
- 2017** A. Davis & **R. Betancur-R.** Widespread ecomorphological convergence in multiple fish families spanning the marine-freshwater interface. *Proceedings of the Royal Society B* 284(1854). **Featured in** PNAS "Journal Club" analysis.
- 2017** Arcila, D., R. Vari, J. W. Armbruster, M. Stiassny, K. D. Ko, M. H. Sabaj, J. Lundberg, L. Revell, G. Ortí & **Betancur-R., R.\*** 2017. Genome-wide interrogation advances resolution of recalcitrant groups in the Tree of Life. *Nature Ecology and Evolution* 1:0020. \*Senior/corresponding author. **Featured in** "News and Views" about the paper by S. Mirarab, News Outlet, El Tiempo, UPR and "Behind the Paper" post.
- 2016** Sanciangco, M. D., K. Carpenter & **R. Betancur-R.** Phylogenetic placement of enigmatic percomorph families (Teleostei: Percomorphaceae). *Molecular Phylogenetics and Evolution* 94(2016): 505-576.
- 2016** A. Davis, P. Unmack, R. Vari & **R. Betancur-R.** Herbivory promotes lineage diversification and dental disparification in grunters (Teleostei: Terapontidae), a freshwater adaptive radiation. *The American Naturalist* 187(3).
- 2015** **Betancur-R., R.**, G. Ortí & R. A. Pyron. Fossil-based comparative analyses reveal ancient marine ancestry erased by extinction in ray-finned fishes. *Ecology Letters* 18: 441–450.
- 2015** Arcila, D.\*, G. Ortí, R. A. Pyron & **R. Betancur-R.\*** An evaluation of fossil tip-dating versus node-age calibrations in tetraodontiform fishes (Teleostei: Percomorphaceae). \*Equal contribution. *Molecular Phylogenetics and Evolution* 82(2015): 131-145.
- 2014** Thompson, A.W., **R. Betancur-R.**, H. López-Fernández & G. Ortí. A time-calibrated, multi-locus phylogeny of piranhas, pacus, and allies (Characiformes: Serrasalminidae) and a comparison of species tree methods. *Molecular Phylogenetics and Evolution* 81(2014): 242-257.
- 2014** **Betancur-R., R.** & G. Ortí. Molecular evidence for the monophyly of flatfishes (Carangimorpharia: Pleuronectiformes). *Molecular Phylogenetics and Evolution* 73(2014): 18-22.
- 2014** **Betancur-R., R.**, G. Naylor & G. Ortí. Conserved genes, sampling error, and phylogenomic inference. *Systematic Biology* 63(2): 257-262.
- 2013** **Betancur-R., R.**, T. A. Munroe, C. Li, J. A. Ballesteros & G. Ortí. Addressing gene tree discordance and non-stationarity to resolve a multi-locus phylogeny of the flatfishes (Teleostei: Pleuronectiformes). *Systematic Biology* 62(5): 763–785.
- 2013** **Betancur-R., R.**, R.E. Broughton, E.O. Wiley, K. Carpenter, J.A. Lopez, C. Li, G. Arratia, N.I. Holcroft, D. Arcila, M. Sanciangco, J. Cureton, F. Zhang, T. Buser, M. Campbell, T. Rowley, J.A. Ballesteros, G. Lu, T. Grande, G. Ortí.

2013. The tree of life and a new classification of bony fishes. *PLoS Currents Tree of Life*. **Press releases:** *ScienceDaily*, e! Science News, PLoS Blogs, GWU.
- 2013** Broughton, R.E., **R. Betancur-R.**, C. Li, G. Arratia, & G. Ortí. Multi-locus phylogenetic analysis reveals the pattern and tempo of bony fish evolution. *PLoS Currents Tree of Life*.
- 2012** **Betancur-R., R.** G. Ortí, A. M. Stein, A. P. Marceniuk & R. A. Pyron. Apparent signal of competition limiting diversification after ecological transitions from marine to freshwater habitats. *Ecology Letters* 15 (8): 822–830.
- 2011** **Betancur-R., R.**, A. Hines, A. Acero P., G. Ortí, A.E. Wilbur and D.W. Freshwater. Reconstructing the lionfish invasion of the Western Atlantic: insights into Greater Caribbean biogeography. *Journal of Biogeography* 38 (7): 1281-1293. **Press release:** *Frontiers in Ecology and the Environment* 2011: 9(6).
- 2011** Li, C., **Betancur-R., R.**, Smith, W. L., & G. Ortí. Monophyly and interrelationships of Snook and Barramundi (Centropomidae sensu Greenwood) and five new markers for fish phylogenetics. *Molecular Phylogenetics and Evolution* 60 (2011): 463–471.
- 2010** **Betancur-R., R.**, A. Acero P., H. Duque-Caro, & S.R. Santos. Phylogenetic and morphologic analyses of a coastal fish reveal a marine biogeographic break of terrestrial origin in the southern Caribbean. *PLoS ONE* 5(7): e11566.
- 2010** **Betancur-R., R.** Molecular phylogenetics supports multiple evolutionary transitions from marine to freshwater habitats in ariid catfishes. *Molecular Phylogenetics and Evolution* 55(1): 249-258.
- 2009** **Betancur-R., R.** & J.W. Armbruster. Molecular clocks provide new insights into the evolutionary history of galeichthyine sea catfishes. *Evolution* 63(5): 1232-1243.
- 2009** **Betancur-R., R.** Molecular phylogenetics and evolutionary history of ariid catfishes revisited: a comprehensive sampling. *BMC Evolutionary Biology* 2009 9: 175. Highly accessed paper.
- 2007** **Betancur-R., R.**, A. Acero P., E. Bermingham & R. Cooke. Systematics and biogeography of New World sea catfishes (Siluriformes: Ariidae) as inferred from mitochondrial, nuclear, and morphological evidence. *Molecular Phylogenetics and Evolution* 45(1): 339–357.
- 2007** **Betancur-R., R.** & P.W. Willink. 2007. A new freshwater ariid (Otophysi: Siluriformes) from the Río Usumacinta basin. *Copeia* 2007(4): 818–828.

## COMPLETE LIST OF 60 PEER-REVIEWED PUBLICATIONS:

<http://www.fishphylogeny.org/publications/allpubs>

## MAJOR RESEARCH GRANTS

- 2018-2022** Pending: NSF-DEB-CAREER, project “Investigating the factors shaping marine-derived freshwater fish radiations in tropical rivers of Australia and New Guinea”
- 2015–2020** PI, NSF-DEB (GoLife), project “Collaborative Research: FishLife: genealogy and traits of living and fossil vertebrates that never left the water.” DEB-1541491 (**\$384,000**). A collaborative grant including other PIs from George Washington U., U. Chicago, Smithsonian NMNH, and College of Charleston.
- 2015–2018** PI, NSF-DEB (Phylogenetic Systematics), project “Collaborative Research: The role of habitat transitions in parallel marine fish radiations.” DEB-1457184 (**\$375,000**). A collaborative grant with G. Ortí (George Washington U.).
- 2017–2019** PI, FIPI-UPR (intramural), project “Cryptics among cryptics: bridging macro- and micro-evolution in tropical reef blennies (Labrisomidae: *Malacoctenus*)” (**\$35,000**).

- 2015–2017 PI, FIPI-UPR (intramural), project “Genomics to the rescue: when mitochondrial DNA and morphology conflict on the species delimitation of two red snappers” (**\$35,000**).
- 2013–2015 Peter Buck Postdoctoral Fellowship; Smithsonian Institution, Washington D.C. Project “Reconstructing the evolutionary history of the most diverse group of freshwater fishes: a genome-wide phylogeny and biogeography of Ostariophysi” (**\$100,000**).
- 2009–2013 Co-PI, project “The lionfish (*Pterois volitans*) invading Colombian reefs: biology, ecology, and origin”, funded by Universidad Nacional de Colombia, El Banco de la República, and Colciencias (1361-521-28271), Colombia (**\$95,000**).
- TOTAL = \$1,024,000**

## SMALLER RESEARCH AWARDS

- 2007 PI, project “A catfish survey of Papua New Guinea”, funded by All Catfish Species Inventory (ACSI) project, supported by NSF (**\$17,000**).
- 2007 PI, project “Examination of Ariidae (Otophysi: Siluriformes) types deposited in the Muséum National d'Histoire Naturelle, Paris (MNHN)”, funded by MNHN, France (**\$5,000**).
- 2006 PI, project “Molecular systematics of sea catfishes (Siluriformes: Ariidae) of the world”, funded by DeepFin, supported by NSF (**\$4,000**).
- 2006 PI, project “The specific status of the New Granada Sea Catfish (Ariidae: *Ariopsis*) from Colombia”, funded by ACSI (NSF, **\$2,000**).
- 2006 PI, project “Description of a new freshwater ariid species from Middle America”, funded by ACSI (NSF, **\$3,000**).
- 2005 PI, project “Survey of ariid catfishes of Indonesia”, funded by ACSI (NSF, **\$8,000**).
- 2004 PI, Project “Description of two new species of sea catfishes from the tropical Eastern Pacific”, funded by ACSI (NSF, **\$4,000**).
- 2004 Co-PI, project “Description of two new species of sea catfishes from the Colombian Caribbean”, funded by ACSI (NSF, **\$4,000**),
- 2002 PI, Project “Evolution of New World sea catfishes”, funded by Andrew J. Mellon Foundation, Smithsonian Tropical Research Institute (STRI), Panamá (**\$ 3,000**).
- TOTAL = ca. \$50,000**

## TEACHING EXPERIENCE

- 2018 Latin American Macroevolution Workshop – Mexico D.F., Mexico. Co-taught with Liam Revell, Mike Alfaro & Luke Harmon.
- 2018 CMOB 8687 - Marine Ichthyology (graduate; 5 credits) - Department of Marine Sciences UPR Mayaguez. Co-taught with Dahiana Arcila & Arturo Acero.
- 2018 Lecturer: BIOL-4345 (3 credits; undergraduate) - Evolution. UPR-RP.
- 2017 Latin American Macroevolution Workshop – Cordoba, Argentina. Co-taught with Liam Revell & Luke Harmon.
- 2017 Lecturer: BIOL-6996-013 (3 credits; graduate) - Seminar in Zoology: Field Biology. UPR-RP.
- 2016 Lecturer: BIOL-4345 (3 credits; undergraduate) - Evolution. UPR-RP.
- 2016 Latin American Macroevolution Workshop – San Juan, Puerto Rico. Co-taught with Liam Revell, Luke Harmon & Mike Alfaro.
- 2016 Lecturer: BIOL-6120 (3 credits; graduate) - Phylogenetics and macroevolution. UPR-RP.

- 2015–2016** Organizer: BIOL-6001 & BIOL-6002 (1 credit; graduate) - Departmental Seminars - Colloquium I & II (graduate). UPR-RP.
- 2015** Lecturer: Phylogenetic comparative methods (workshop). Leticia, Colombia.
- 2015** Lecturer: BIOL 6120 (3 credits; graduate) - Phylogenetics and macroevolution. UPR-RP.
- 2013** Lecturer: Assembly of large phylogenetic datasets (workshop). Old Dominion U.
- 2010–2014** Molecular Phylogenetics (guest lecturer). GWU.
- 2008–2009** Survey of Life laboratory (spring semester; Biol-1010, Auburn U.).
- 2008** Comparative Anatomy laboratory (summer semester; Biol-3010, Auburn U.).

## STUDENT MENTORING & COMMITTEES

- 2015–** Graduate students in my lab at UPR-RP: Emanuell Ribeiro (PhD), Carmen Pedraza (PhD), Aintzane Santaquiteria (PhD), and Rafael Rivero (MSc). Undergraduate students: Keila Velazquez, Nicole Colón, Claudia Colón, Rachael Miranda Narváez, Carlos Colón, Jose Mora, Xavier Cruz.
- 2014–** Committee member at UPR-RP: three PhD and two MSc students.
- 2012–2013** Honors B.Sc. thesis advisor: Ariel M. Stein, GWU.
- 2012** Honors B.Sc. thesis co-advisor: Lina M. Gutierrez, Universidad de los Andes.
- 2010** Doctoral committee member: Alexandra Herrera, GWU.

## INVITED TALKS

- 2017** Sam Noble Museum of Natural History, U. Oklahoma, Norman, OK. Invited by C. Siler.
- 2017** Swedish Museum of Natural History, Stockholm, Sweden. Invited by K.-A. Johanson.
- 2017** Australian Museum, Sydney, Australia. Invited by A. Hay & M. McGrouther.
- 2016** Universidad Michoacana de San Nicolas de Hidalgo, Mexico. Invited by Omar Dominguez.
- 2015** University of Puerto Rico, Mayagüez. Invited by Audrey Majeske.
- 2015** Keynote for XXI Encontro Brasileiro de Ictiologia, Recife, Brazil. Invited by R. Torres.
- 2014** Keynote for IV Congreso Colombiano de Zoología, Cartagena, Colombia. Invited by J. Mojica.
- 2014** University of Massachusetts, Boston. Invited by Liam Revell.
- 2014** Universität Zürich and Universität Basel, Switzerland. Invited by Marcelo Sánchez-Villagra and Walter Salzburger.
- 2013** University of Puerto Rico, Río Piedras, San Juan, PR. Invited by Mitch Aide and Riccardo Papa.
- 2013** Old Dominion University, Norfolk, VA. Invited by Kent Carpenter.
- 2013** University of Kansas, Lawrence, KS. Invited by Rob Moyle.
- 2011** Vertebrate Zoology Seminars, Smithsonian NMNH (team talk with G. Ortí). Invited by Rich Vari.
- 2009** Universidad de los Andes, Bogotá, Colombia. Invited by Daniel Cadena.

## HONORS AND AWARDS

- 2015** Outstanding Faculty at the Department of Biology, UPR-RP (excellence in teaching and research).

- 2009** Outstanding International Graduate Student, Auburn University. Overall winner within the College of Sciences and Mathematics (five departments).
- 2004** Thesis M.Sc. *Magna Cum Laude* honors, Universidad Nacional de Colombia.
- 2001–2003** Tuition waiver award: best student during five semesters (MSc program, Universidad Nacional de Colombia).

## SYNERGISTIC ACTIVITIES

- 2019–2022** Associate Editor: *Proceedings of the Royal Society B*.
- 2002–** *Ad hoc* referee for Systematic Biology (6), Evolution (4), American Naturalist (2), Molecular Ecology (3), Journal of Biogeography (2), Molecular Phylogenetics and Evolution (16), BMC Evolutionary Biology (3), Copeia (2), Journal of Fish Biology (5), Neotropical Ichthyology (7), Biological Journal of the Linnean Society (2), Zoological Journal of the Linnean Society (2), Zoological Letters, PLoS One, Biological Bulletin, Biological Invasions, Coral Reefs, Zookeys, Journal of Sea Research, Hidrobiologica, Revista de Biología Tropical, Gayana, and Boletín de Investigaciones Marinas y Costeras (7).
- 2007–2011** Assessor for the IUCN Sampled Red List Index: Panamá City, Panamá (2007); remote assessment (2009); Brasilia, Brazil (2011).

## FIELDWORK EXPERIENCE\*

See also: <http://www.fishphylogeny.org/Underwater> & <http://www.fishphylogeny.org/Fieldwork>

- 2017** **Galapagos:** Surveys of reef fishes via SCUBA – E. Pacific.
- 2017** **Colombia:** Surveys of reef fishes via SCUBA – E. Pacific.
- 2016** **Mexico:** Surveys of reef fishes via SCUBA – E. Pacific.
- 2016** **Colombia:** Surveys of reef fishes via SCUBA – Caribbean.
- 2015–2016** **Puerto Rico:** Surveys of reef fishes via SCUBA.
- 2015** **Philippines:** Surveys of reef fishes via SCUBA. Organized by California Academy of Sciences.
- 2014** **Curacao:** Surveys of reef fishes via submersible (*Curasub*) and SCUBA. Smithsonian Institution.
- 2009–2012** **Colombia:** Surveys of reef fishes via SCUBA – Caribbean (3 trips).
- 2007** **United Arab Emirates:** Surveys of marine fishes – Sharjah.
- 2007** **Papua New Guinea:** Surveys of freshwater and marine fishes – Fly and Sepik river systems and coastal areas.
- 2007** **Brazil:** Surveys of marine fishes – Sao Paulo state.
- 2007** **Panama:** Surveys of marine fishes – Bahía de Montijo.
- 2005** **Venezuela:** Surveys of marine fishes along the coast; surveys of freshwater fishes – upper Orinoco basin.
- 2005** **Indonesia:** Surveys of marine fishes – Java and southern Sumatra.
- 2004** **U.S.:** Surveys of freshwater fishes – Tennessee and Alabama.
- 2002** **Panama:** Oceanographic cruise on board of RV/ Urraca (STRI) - Darién.
- 2003** **Panama:** Surveys of freshwater fishes – Caribbean and Pacific basins (2 trips).
- 1999–2007** **Colombia:** Surveys of marine fishes – Caribbean and Pacific basins (5 trips).
- 1999–2004** **Colombia and Panama:** Surveys of reef fishes via SCUBA – Caribbean and Pacific (several trips).

\*Scientific diver through Smithsonian NMNH and UPR.

## CURATORIAL EXPERIENCE

See <http://research.calacademy.org/research/ichthyology/catalog/collections.asp> for collection abbreviations.

See also: <http://www.fishphylogeny.org/Database>

- 2000–** **Museum visits:** examination of type and non-type material of fishes deposited at INVEMAR-PEC, ICN-MHN, Universidad del Valle, IAVHP (Colombia); STRI (Panamá); USNM, AUM, UF, AMNH, UMMZ (U.S.); Biocentro, Unellez, Guanare (Venezuela); LBN (Indonesia); MZUSP, LPB (Brazil); MNHN (France).
- 2002–** **Material examined through loans:** type and non-type material of fishes deposited at BNHM (England); CAS, MCZ, USNM, AUM, AMNH, FMNH, FU (U.S.); MHNG (Switzerland); MNHN (France); MZUT (Italy); NMW (Austria); UCR (Costa Rica); ZMB (Germany).