Carlos Antonio Rodríguez-Saltos, Ph.D.

Assistant Professor of Evolutionary Neurobiology
Department of Biological Sciences
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Education

2019 **Ph.D**. Emory University (Department of Psychology).

Dissertation: *"Song preferences in juvenile songbirds and their relationship to vocal learning"*. Advisor: Donna L. Maney, Ph.D.

2015 **M.A**. Emory University (Department of Psychology).

Thesis: "*Effects of endocrine state on sound-induced monoamine release in the auditory system and reward pathway of a seasonally-breeding songbird"*. Advisor: Donna L. Maney, Ph.D.

2011 **Lic**. Pontificia Universidad Católica del Ecuador (Department of Biological Sciences).

Thesis: *"Phylogeography of the Ecuadorian Hillstar (Oreotrochilus chimborazo)"*. Advisors: Elisa Bonaccorso, Ph.D.; Tjitte de Vries, Ph.D.

Fellowships, Honors, and awards

2019-2022 **Postdoctoral research fellowship**

Funded by a professor grant awarded to postdoctoral advisor Julia Clarke, PhD, by the Howard Hughes Medical Institute (HHMI). Fellowship covered my salary at the University of Texas at Austin for conducting research on the evolution of avian acoustic signals and assisting in the teaching an undergraduate seminar based on active learning. - $116000

2014-2017 **HHMI International Student Fellowship**

Tuition, stipend, and health insurance for doctoral studies at Emory University. - $129000

2012-2014
2017-2018 **Laney Graduate School Academic Merit Fellowship**

Tuition, stipend, and health insurance for doctoral studies at Emory University.

2005-2010 **Academic Scholarship**

Tuition discount awarded due to outstanding academic performance. Pontificia Universidad Católica del Ecuador.

Academic positions

2023- Assistant Professor of Evolutionary Neurobiology. Department of Biological Sciences. Illinois State University. Normal, Illinois.

2022-2023 Post-Doctoral Research Associate. Lynch Lab, Biology Department, Hofstra University. Hempstead, NY.

2022-2023 Visiting Researcher. Shea Lab, Cold Spring Harbor Laboratory. Cold Spring Harbor, NY.

Peer-reviewed publications

19. Legendre, L. J., **Rodriguez-Saltos, C. A.**, Eliason, C. M., & Clarke, J. A. (2023). Evolution of the syrinx of Apodiformes, including the vocal-learning Trochilidae (Aves: Strisores). *Zoological Journal of the Linnean Society,* zlae00. https://doi.org/10.1093/zoolinnean/zlae001

18. Chiappone, M., **Rodriguez-Saltos, C.**, Legendre, L. J., Li, Z., & Clarke, J. (2023). Ostrich (*Struthio camelus*) syrinx morphology and vocal repertoire across postnatal ontogeny and sex: Implications for understanding vocal evolution in birds. *Journal of Anatomy*, joa.13992. https://doi.org/10.1111/joa.13992

17. Pilgeram, N. R., Baran, N. M., Bhise, A., Davis, M. T., Kim, E., Lee, S., **Rodriguez-Saltos, C. A.**, & Maney, D. L. (2023). Oxytocin receptor antagonism during song tutoring in zebra finches reduces preference for and learning of the tutor's song. *Scientific Reports*, *13*(1), 1-12. https://doi.org/10.1038/s41598-023-33340-7

16. **Rodríguez-Saltos, C. A.**, Bhise, A., Karur, P., Khan, R. N., Lee, S., Ramsay, G., & Maney, D. L. (2023). Song preferences predict the quality of vocal learning in zebra finches. *Scientific Reports, 13(1)*: 605. https://doi.org/10.1038/s41598-023-27708-y

15. **Rodríguez-Saltos, C. A.**, Duque, F. G., & Clarke, J. A. (2022). Precise and non-scalar timing of intervals in a bird vocalization. *Animal Behaviour, 191: 165-177.* https://doi.org/10.1016/j.anbehav.2022.06.004

- Featured in All Things Considered (KUT 90.5, NPR), BirdNote.

14. Bonaccorso, E., **Rodríguez-Saltos, C. A.**, Freile, J. F., Peñafiel, N., Rosado-Llerena, L., & Oleas, N. H. (2021). Recent diversification in the high Andes: unveiling the evolutionary history of the Ecuadorian hillstar, *Oreotrochilus chimborazo* (Apodiformes: Trochilidae)*. Biological Journal of the Linnean Society, 132(2),* 451 – 470.

13. Duque, F. G., **Rodríguez-Saltos, C. A.**, Monteros, M. F., & Wilczynski. (2021). Transmission of high-frequency vocalizations from hummingbirds living in diverse habitats. *Biological Journal of the Linnean Society, 132(1),* 148 – 160.

12. Duque, F. G., **Rodríguez-Saltos, C. A.**, Uma, S., Nasir, I., Monteros, M. F., Wilczynski, W., & Carruth, L. L. (2020). High-frequency hearing in a hummingbird. *Science Advances, 6(29),* eabb9393.

- Featured in more than 30 international outlets, including ABC News, AFP, BBC News, and El Pais.

11. Bonaccorso, E., **Rodríguez-Saltos, C.**, Vélez-Márquez, A., & Muñoz, J. (2020). Population genetics of the Plumbeous Sierra-finch (*Geospizopsis unicolor*) across the Ecuadorian paramos: Uncovering the footprints of the last ice age. *Journal of Ornithology, 161,* 115 – 123. https://doi.org/10.1007/s10336-019-01700-8

10. Duque, F. G., **Rodríguez-Saltos, C. A.**, & Wilczynski, W. (2018). High-frequency vocalizations in Andean hummingbirds. *Current Biology*, *28*(17), R927–R928. https://doi.org/10.1016/j.cub.2018.07.058

- Featured in Popular Science.

9. **Rodríguez-Saltos, C. A.**, Lyons, S. M., Sockman, K. W., & Maney, D. L. (2018). Sound-induced monoaminergic turnover in the auditory forebrain depends on endocrine state in a seasonally-breeding songbird. *Journal of Neuroendocrinology*, *30*(6), e12606. https://doi.org/10.1111/jne.12606

8. Oleas, N. H., Harvey, N., **Rodríguez-Saltos, C. A.**, & Bonaccorso, E. (2017). Isolation and Characterisation of 11 Microsatellite Loci in the Ecuadorian Hillstar (*Oreotrochilus chimborazo*). *Ardeola*, *64*(1), 85–89. https://doi.org/10.13157/arla.64.1.2017.sc3

7. **Rodríguez-Saltos, C. A.** (2017). To Become Senders, Songbirds Must be Receivers First. *Integrative and Comparative Biology*, *57*(4), 910–919. https://doi.org/10.1093/icb/icx106

6. Escallón, C., Weinstein, N. M., Tallant, J. A., Wojtenek, W., **Rodríguez-Saltos, C. A.**, Bonaccorso, E., & Moore, I. T. (2016). Testosterone and Haemosporidian Parasites Along a Tropical Elevational Gradient in Rufous-Collared Sparrows (*Zonotrichia capensis*): Testosterone and parasitism in a tropical bird. *Journal of Experimental Zoology Part A: Ecological Genetics and Physiology*. https://doi.org/10.1002/jez.2034

5. **Rodríguez Saltos, C. A.**, & Bonaccorso, E. (2016). Understanding the evolutionary history of a high Andean endemic: The Ecuadorian Hillstar (*Oreotrochilus chimborazo*). *Neotropical Biodiversity*, *2*(1), 37–50. https://doi.org/10.1080/23766808.2016.1155280

4. Freile, J. F., Krabbe, N., Piedrahita, P., Buitrón-Jurado, G., **Rodríguez-Saltos, C. A.**, Ahlman, F., Brinkhuizen, D. M., & Bonaccorso, E. (2014). Birds, Nangaritza river valley, Zamora Chinchipe province, southeast Ecuador: Update and revision. *Check List*, *10*(1), 54–71.

3. Fortune, E. S., **Rodriguez, C.**, Li, D., Ball, G. F., & Coleman, M. J. (2011). Neural Mechanisms for the Coordination of Duet Singing in Wrens. *Science*, *334*(6056), 666–670. https://doi.org/10.1126/science.1209867.

- Featured in The New York Times, Discover Blogs, and National Geographic.

2. Freile, J. F., Piedrahita, P., Buitrón-Jurado, G., **Rodríguez, C. A.**, Jadán, O., & Bonaccorso, E. (2011). Observations on the natural history of the Royal Sunangel (*Heliangelus regalis*) in the Nangaritza Valley, Ecuador. *The Wilson Journal of Ornithology*, *123*(1), 85–92.

1. Brinkhuizen, D. M. & **Rodríguez, C. A**. (2008). First record of Willet (*Catoptrophorus semipalmatus*) in the Ecuadorian highlands. *Cotinga*, 30, 81–82.

Book chapters

Maney, D. L., & **Rodriguez-Saltos, C. A.** (2016). Hormones and the Incentive Salience of Bird Song. In *Hearing and Hormones* (Vol. 57, pp. 101–132). Springer International Publishing.

Research and travel grants

2024-2025 **New Faculty Initiative Grant, Illinois State University (ISU)**

Salary to conduct summer research at ISU. $3500.

2018-2019 **Dissertation Completion Fellowship, Emory University**

Awarded by the Writing Center at Emory University. Tuition, stipend, and health insurance for last year of doctoral studies at Emory University. Duties included providing feedback on writing to undergraduate and graduate students, during one-to-one consultations, and supervising a group of undergraduate writing tutors.

2018-2019 **"On Recent Discoveries by Emory Researchers" Fellowship**

Funded by an HHMI grant awarded to professors David Lynn, PhD, and Leslie Taylor, MFA. Fellowship covered training and logistic support for teaching a three-week module as part of an interdisciplinary seminar for undergraduates at Emory University. - $4600

2017 **Society for Integrative Biology Travel Award**

Travel expenses for presenting an invited talk at the Annual Meeting for the Society of Integrative Biology.

2013 **Lorus J. & Margery J. Milne Scholarship**

Tuition and housing for the summer course "Neural Systems and Behavior" at the Marine Biology Lab, Woods Hole, MA.

Invited talks

2023 Mechanisms and evolution of Animal Communication. Illinois State University. Normal, Illinois.

2022 Mechanisms and evolution of Animal Communication. Ohio Wesleyan University. Delaware, Ohio.

2021 Interval timing in birdsong. Undergraduate seminar on ornithology at Oregon State University.

2017 Before songbirds are senders, they are receivers. Annual meeting of the Society for Integrative Biology 2017. https://doi.org/10.1093/icb/icx106.

2015 Studying the brains of songbirds. Universidad Yachay Tech. Urcuquí, Ecuador.

2015 Studying the brains of songbirds. Universidad Teconológica Indoamérica. Quito, Ecuador.

Conference presentations

Rodriguez-Saltos, C. A. 2023. Following the beat: time perception in animal displays. *Sensorium 2023*. American Society of Naturalists, Field Museum of Natural History. Chicago, Illinois.

Rodriguez-Saltos, C. A., Duque, F. G., and Lynch, K. S. 2023. Transcriptomic correlates of brood-parasitism in cowbirds. *Annual Meeting of the Society for Integrative Biology 2023*. Austin, Texas.

Duque, F. G., **Rodriguez-Saltos, C. A**., and Lynch, K. S. 2023. Comparative studies using mesotocin in parental and non-parental blackbird species. *Annual Meeting of the Society for Integrative Biology 2023*. Austin, Texas.

Chiaponne, M. A., **Rodriguez-Saltos, C. A**., Legendre, L., Li, Z., and Clarke, J. Duque, F. G. Ostrich syrinx morphology and vocal repertoire: variation across postnatal ontogeny and sex. *Annual Meeting of the Society for Integrative Biology 2023*. Austin, Texas.

Rodriguez-Saltos, C. A. Legendre, L., and Clarke, J. A. 2022. Intrinsic muscles in the syrinx do not correlate with higher trill rates in Strisores. *SICB+ 2022: Virtual Meeting of the Society for Integrative Biology 2022.*

Rodriguez-Saltos, C. A., Bilger, H. T., Eliason, C. M., and Clarke, J. A. 2022. Developing aVOICE: An interactive tool for bioacoustics. *SICB+ 2022: Virtual Meeting of the Society for Integrative Biology 2022.*

Rodriguez-Saltos, C. A., Bilger, H. T., Eliason, C. M., and Clarke, J. A. 2021. Developing aVOICE: An interactive tool for bioacoustics. *American Ornithological Society & Society of Canadian Ornithologists 2021 Meeting*.

Rodriguez-Saltos, C. A., Duque, F. G., and Clarke, J. A. 2021. Natural behavior in a songbird shows accurate interval timing with no increase in error. *American Ornithological Society & Society of Canadian Ornithologists 2021 Meeting*.

Bonaccorso, E., **Rodriguez-Saltos, C. A.**, Freile, J. F., Peñafiel, N., Rosado-Llerena, L., and Oleas, N. H. 2021. Recent history of the Ecuadorian Hillstar: An example of divergence with gene flow? *American Ornithological Society & Society of Canadian Ornithologists 2021 Meeting*.

Rodriguez-Saltos, C. A., F. G. Duque, and J. A. Clarke. 2021. A bird vocalization shows accurate interval timing with no increase in error at longer intervals. *Animal Behavior Society 2021 Virtual Meeting.*

Duque, F. G., Monteros, M. F., **Rodríguez-Saltos, C. A.**, Varghese, B., Wilczynski, W., Carruth, L. L. 2021. Dialects in the high-frequency courtship song of an Andean hummingbird. *Animal Behavior Society 2021 Virtual Meeting.*

Rodriguez-Saltos, C. A., Duque, F. G., and J. A. Clarke. 2021. Highly-accurate interval timing in birdsong. *Numerous Numerosity Focus Workshop*. Sponsored by Maxwell Institute for Mathematical Sciences, Centre for Philosophy of Natural and Social Science from the London School of Economics and Political Science, and Society for Multidisciplinary and Fundamental Research.

Rodriguez-Saltos, C. A., Duque, F. G., and J. A. Clarke. 2021. El Espacio entre las notas (The space between the notes). Lecture on interval timing in birdsong. *La ornitología desde distintas miradas*. Escuela de Biología de la Universidad del Azuay. Cuenca, Ecuador.

Duque, F. G., **Rodriguez-Saltos, C. A.**, Uma, S., Nasir, I., Monteros, M. F., Wilczynski, W., and L. L. Carruth. 2020. High-frequency hearing in an Andean hummingbird. *Animal Behavior Society 2020 Virtual Meeting*.

Rodríguez-Saltos, C. A., G. Ramsay, and D. L. Maney. 2020. An R package to measure the similarity of natural sounds via mutual information. *Annual meeting of the Society for Integrative Biology 2020*.

Duque, F. G., M. Monteros, I. Nasir, S. Uma, **C. A. Rodríguez-Saltos**, L. Carruth, E. Bonaccorso, W. Wilczynski. 2020. Dialects in the high-frequency song of a hummingbird. *Annual meeting of the Society of Integrative Biology 2020*.

Rodriguez-Saltos, C. A. and F. G. Duque. 2019. A tropical bird modulates the tempo of its song with striking precision. *Annual meeting of the Society for Integrative Biology 2019*.

Rodriguez-Saltos, C. A., Ramsay, G., Libecap, T. J., Pan, T., and Maney, D. L. 2018. Do juvenile finches prefer to listen to the songs that they imitate? *Bird Song and Animal Communication Annual Meeting*. The Rockefeller University. Millbrook, NY.

Duque, F. G., **C. A. Rodríguez-Saltos**, L. Carruth, and W. Wilczynski. 2018. High-frequency vocalizations and habitat acoustics in Andean hummingbirds. *Annual meeting of the Society for Integrative Biology 2018*. San Francisco, CA.

Duque-Mendoza, F. G. and **C. A. Rodríguez-Saltos**. 2017. Exceptionally high fundamental frequencies in a bird vocalization. *Annual meeting of the Society for Integrative Biology 2017*. New Orleans, LA.

Rodríguez-Saltos, C. A., S. M. Lyons, K. M. Sockman, and D. L. Maney. 2015. Song-induced dopaminergic activity in the auditory and reward pathways of a seasonally breeding songbird. *Indiana University Animal Behavior Conference*. Bloomington, Indiana.

Fortune, E. S., **C. Rodríguez**, H. Schoenhard, K. Kiani, and M. Coleman. 2014. Duet matching in plain-tailed wrens. *Eleventh International Congress of Neuroethology.* Sapporo, Japan.

Rodríguez-Saltos, C., S. M. Lyons, K. W. Sockman, and D. L. Maney. 2014. Dopaminergic responses to song in the songbird auditory forebrain. *Eleventh International Congress of Neuroethology.* Sapporo, Japan.

Rodríguez-Saltos, C., S. M. Lyons, K. W. Sockman, and D. L. Maney. 2014. Song-induced dopaminergic responses in the auditory and reward pathways of a seasonally-breeding songbird. *Annual meeting of the Society for Neuroscience*, Washington D. C.

Hupe, G. J., E. Fortune, M. Coleman, and **C. Rodríguez**. 2012. The effect of distance on the song structure of coordinated duets produced by plain-tailed wrens, *Pheugopedius euophrys*. *Tenth International Congress of Neuroethology.* College Park, Maryland, USA.

Rodríguez, C., E. Fortune, F. Angiolani, G. J. Hupe, I. Moore, M. Coleman, and E. Bonaccorso. 2012. Subespecific dialect differences in the Plain-tailed Wren (*Pheugopedius euophrys*), and behavioral implications. *Tenth International Congress of Neuroethology*. College Park, Maryland, USA.

Rodríguez-Saltos, C. A. and E. Bonaccorso. 2011. Phylogeography of the Ecuadorian Hillstar (*Oreotrochilus chimborazo*). *IXth Neotropical Ornithological Congress and VIIIth National Ornithological Congress*. Cusco, Peru.

Graduate student mentoring

2024- Jadyn Scott. Doctoral student in the School of Biological Sciences at Illinois State University.

2023- Rachel Schinzler. Master's student in the School of Biological Sciences at Illinois State University.

2020-2021 Janna Muhammad. Master student advised by Julia Clarke, PhD. University of Texas at Austin. I trained Janna on data collection and analysis and mentored her on writing a proposal for a NSF GRFP fellowship. She achieved honorable mention.

Undergraduate student mentoring

2023 Gurninder Ahluwalia. Research Assistant. Lynch Lab, Hofstra University.

2021 Kristina Montez. Fellow. Undergraduate Research Traineeship Experience, University of Texas at Austin.

2020-2022 Grace Bartunek, Tessa Cayton, Michael Chiappone, Kiley Kellum, Carmen Urban. Research Assistants. ClarkeLab, University of Texas at Austin.

2018 – 2019 Prasanna Karur. Fellow. Scholarly Inquiry and Research Experience, Emory University.

2013 – 2019 Michelle Park, Gulruckh Shaheen, Eric Broner, Muhammad Alhamdan (Computer Science student). Research Assistants. ManeyLab, Emory University.

2009 – 2011 Daniela Bahamonde, Héctor Cadena, Jorge Castillo, Mayra Ninazunta, Francesca Angiolani. Research Assistants. Museum of Vertebrate Zoology. Pontificia Universidad Católica del Ecuador.

Teaching experience

2020 – 2021 *Instructor of statistical programming with R.* Curiosity to question, a seminar for teaching research and writing skills to undergraduate and graduate students, emphasizing interdisciplinary thinking. Instructor of record: Julia Clarke, PhD. University of Texas at Austin. Funded by Howard Hughes Medical Institute and UT Austin Provosts Teaching Fellowship.

2018 – 2019 *Module developer and instructor of bioacoustics.* On Recent Discoveries by Emory Researchers, an interdisciplinary research seminar for freshmen. Instructors of record: David Lynn, PhD, Leslie Taylor, MFA. Emory University. Funded by Howard Hughes Medical Institute.

2014 *Teaching assistant.* Animal Behavior. Instructor of record: Harold Gouzoules, PhD. Emory University.

2014 *Teaching assistant.* Methods in psychological research. Instructor of record: Jessica Barber, PhD. Emory University.

2014 *Teaching assistant.* Introduction to statistical inference. Instructor of record: Shannon McClintock, PhD. Emory University.

Academic service

Editorial service

2022- *Associate editor*. Revista Ornitológica del Ecuador.

Peer review for scientific journals

Neotropical Biodiversity, Revista Ecuatoriana de Ornitología, PLOS ONE, Behavioral Neuroscience, Hormones and Behavior, Scientific Reports

Guest lectures in the classroom

2022 Neuroscientific research on songbirds. Animal Physiology course taught by Ramón Zambrano, PhD candidate. Universidad de Guayaquil.

2021, 2023,

2024 Social reward and song learning in birds. UGS 303 signature course taught by David Quinto-Pozos, PhD. The University of Texas at Austin.

2015, 2017 Neuroscience and behavior of songbirds. Oglethorpe University. Undergraduate course on animal behavior, taught by Charles Baube, PhD. Oglethorpe University.

2005 – 2012 Bird diversity of Ecuador. Biology II, Botany I, and Zoology III. Pontificia Universidad Católica del Ecuador

Administration

2008 – 2009 President of the Biological Sciences Student Association. Pontificia Universidad Católica del Ecuador.

Outreach

Public talks

2015, 2018 Visualizing bird sounds. Aves Quito. Quito, Ecuador. Atlanta Audubon Society. Atlanta, Georgia.

2015 – 2017 Evolution of the brain. Brain Awareness Month. Rivertrail Middle School. Johnscreek, GA.

2013 Animal communication. Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

2011 Who designed the designer?, a summary of Stephen Hawking's "The Grand Design". Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

2009 Biology of love. Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

2008 Life in the Universe. Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

Writing

2013 Editor and contributing author. *Antorcha Verde*. Online magazine of science outreach. Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

Administration

2008 Main organizer. Celebration of World Space Week by Quinto Pilar. Sociedad de Divulgación Científica Quinto Pilar, Secretaria Pro Tempore de la V Conferencia Espacial de las Américas (now Ecuadorian Space Agency), and Ecuadorian Air Force. Quito, Ecuador.

2008 – 2013 Co-founder. Sociedad de Divulgación Científica Quinto Pilar. Quito, Ecuador.

Other

2007 – 2008 Course instructor. Birds of Ecuador. Weekend course for elementary school students. Aves & Conservación. Pedro Vicente Maldonado, Ecuador.

1997 – 1999 Tour leader and instructor. Dinosaurios Interactivo Museo. Ecuador.

Other service

Consulting

2022 Supervisor. Analysis of the suitability of a set of rainforest vocalizations for training a deep neural network for passive acoustic monitoring. Fundación Futuro. Ecuador

2011 – 2012 Ornithologist. Proposals for the Antisana-Cayambe-Coca-Napo-Galeras and Yacuambi-Podocarpus biological corridors in Ecuador. Fundación Ecociencia. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

2010 Ornithologist. Bird and mammal diversity in two localities of Zuleta, Imbabura province. Fundación Zoológica del Ecuador and Pontificia Universidad Católica del Ecuador.

2009 Assistant ornithologist. Rapid Assessment Project of the Nangaritza River Tepuis, Ecuador.

Volunteering

2003-2004 Revision of maps for establishing conservation areas. Project “Important Bird Areas in the Tropical Andes”. BirdLife International: The Americas division. Quito, Ecuador.

Administration

2012 – 2014 Vicepresident of the Board of Directors. Fundación Aves & Conservación, BirdLife partner in Ecuador.

Professional references

Donna L. Maney, Ph.D., Emory University, dmaney@emory.edu

Kathleen Lynch, Ph.D., Hofstra University, Kathleen.S.Lynch@hofstra.edu

Julia Clarke, Ph.D., The University of Texas at Austin, julia_clarke@jsg.utexas.edu

Gordon Ramsay, Ph.D., Marcus Autism Center, Emory University, gordon.ramsay@emory.edu
Eric S. Fortune, Ph.D., New Jersey Institute of Technology, eric.fortune@njit.edu
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Laura Carruth, Ph.D., Georgia State University, lcarruth@gsu.edu