

Rafael Maia

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Environmental Biology
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Education & Appointments

- 2015-present SIMONS FOUNDATION JUNIOR FELLOW, Department of Ecology, Evolution & Environmental Biology
Columbia University, New York NY
Supervisor: Dr. Dustin Rubenstein
- 2014-2015 POSTDOCTORAL FELLOW, Department of Biological Sciences
The University of Idaho, Moscow ID
Supervisor: Dr. Luke Harmon
- 2009-2014 PhD, Integrated Bioscience PhD program
The University of Akron, Akron OH
“Development and evolution of iridescent colors in feathers”
Advisor: Dr. Matthew D. Shawkey
- 2006-2008 MSc, Ecology
Universidade de Brasília, Brasília DF - Brazil
“Iridescent structural coloration of the Blue-black grassquit (*Volatinia jacarina*, Aves:Emberizidae):
mechanisms of production, variation and function” [thesis written in Portuguese]
Advisor: Dr. Regina H. Macedo
- 2001-2007 BSc, Biological Sciences, 2004
BSc, in Science Teaching in Biological Sciences, 2007
Universidade de Brasília, Brasília DF - Brazil

Grants & awards

RESEARCH GRANTS

- 2014 SIMONS FOUNDATION SOCIETY OF FELLOWS • Junior Fellow Award
2012 NSF • Doctoral Dissertation Improvement Grant (DDIG)
AMERICAN MUSEUM OF NATURAL HISTORY • Frank M. Chapman Research Grant
2011 THE UNIVERSITY OF AKRON / CHOOSE OHIO FIRST • Tiered Mentoring Research Program
2010 SIGMA XI • Grant-in-Aid of Research
2006 ANIMAL BEHAVIOR SOCIETY • Developing Nations Research Grant

CONFERENCE & WORKSHOP TRAVEL AWARDS

- 2012 International Society for Behavioral Ecology (ISBE) • Lund, Sweden
2011 Phylogenetic Comparative Methods and Macroevolution in R Workshop • Santa Barbara CA
2011 Evolutionary Quantitative Genetics Workshop • NESCENT, Durham NC
2010 25th International Ornithological Congress (IOC) • São José dos Campos, Brazil
2008 Iridescence: More Than Meets The Eye • ASU Frontiers in Life Science, Tempe AZ

- 2007 Tópicos Avanzados en Ecología del Comportamiento (*Advanced topics in behavioral ecology*) Workshop • IEB-CHILE, Santiago, Chile
- 2006 IV North American Ornithological Conference (NAOC) • Veracruz, Mexico
- 2005 42nd Annual Meeting of the Animal Behavior Society (ABS) • Salt Lake City UT

Publications

JOURNAL ARTICLES

(†equal contribution)

- 2016 D’Alba L†, **Maia R**†, Hauber ME & Shawkey MD. “Evolution of eggshell cuticle in relation to nesting ecology” *Proceedings of the Royal Society of London B: Biological Sciences*, In Press.
- Maia R**, Rubenstein DR & Shawkey MD. “Selection, constraint and the evolution of coloration in African starlings” *Evolution* 70:1064-1079. [\[doi\]](#)
- Rubalcaba JG, Polo V, **Maia R**, Rubenstein DR & Veiga JP. “Sexual and natural selection in the evolution of extended phenotypes: the use of green nesting material in starlings” *Journal of Evolutionary Biology*, In Press. [\[doi\]](#)
- Iskandar JP, Eliason CM, Astrop T, Igic B, **Maia R** & Shawkey MD. “Morphological basis of glossy red colors” *Biological Journal of the Linnean Society*, In Press. [\[doi\]](#)
- 2015 Eliason CM, **Maia R** & Shawkey MD. “Modular color evolution facilitated by a complex nanostructure in birds” *Evolution* 69:357-367. [\[doi\]](#)
- 2014 Simons MJP†, **Maia R**†, Leenknegt B & Verhulst S. “Carotenoid-dependent signals and the evolution of plasma carotenoid levels in birds” *American Naturalist* 184:741-751. [\[doi\]](#)
- Manica LT, **Maia R**, Dias A, Podos J & Macedo RH. “Vocal output predicts territory quality in a Neotropical songbird” *Behavioural Processes*. 109(A):21-26. [\[doi\]](#)
- Pessoa DMA, **Maia R**, Ajuz RCA, Moraes PZPMR, Spyrides MHC & Pessoa VF. “The adaptive value of primate color vision for predator detection” *American Journal of Primatology* 76:721-729. [\[doi\]](#)
- 2013 **Maia R**, Rubenstein DR & Shawkey MD. “Key ornamental innovations facilitate diversification in an avian radiation” *Proceedings of the National Academy of Sciences* 110:10687-10692 [\[doi\]](#)
- Maia R**, Eliason, CM, Bitton, P-P, Doucet, SM & Shawkey MD. “pavo: an R package for the analysis, visualization and organization of spectral data” *Methods in Ecology & Evolution* 4:906-913 [\[doi\]](#) [\[cover image\]](#)
- Sicsú P, Manica LT, **Maia R** & Macedo RH. “Here comes the sun: multimodal displays are associated with sunlight incidence” *Behavioral Ecology & Sociobiology* 67:1633-1642 [\[doi\]](#)
- 2012 **Maia R**, Brasileiro L, Lacava RV & Macedo RH. “Social environment affects acquisition and color of structural nuptial plumage in a sexually dimorphic tropical passerine” *PLOS ONE* 7:e47501 [\[doi\]](#)

Snyder HK, **Maia R**, D'Alba L, Shultz AJ, Rowe KMC, Rowe KC & Shawkey MD. "Iridescent colour production in hairs of blind golden moles (Chrysochloridae)" *Biology Letters* 8:393-396 [doi]

Maia R, Macedo RH & Shawkey MD. "Nanostructural self-assembly of iridescent feather barbules through depletion attraction of melanosomes during keratinization" *Journal of the Royal Society Interface* 9:734-743 [doi]

2011 Shawkey MD, **Maia R** & D'Alba L. "Proximate bases of silver color in Anhinga (*Anhinga anhinga*) feathers" *Journal of Morphology* 272:1399-1407 [doi]

Maia R, D'Alba L & Shawkey MD. "What makes a feather shine? A nanostructural basis for glossy black colors in feathers" *Proceedings of the Royal Society of London B: Biological Sciences* 278:1973-1980 [doi]

Maia R & Macedo RH. "Achieving luster: prenuptial molt pattern predicts iridescent structural coloration in blue-black grassquits" *Journal of Ornithology* 152:243-252 [doi]

2010 Lacava RV, Brasileiro L, **Maia R**, Oliveira RF & Macedo RH. "Social environment affects testosterone in captive male blue-black grassquits" *Hormones & Behavior* 59:51-55 [doi]

2009 Santos ESA, **Maia R** & Macedo RH. "Condition dependent resource-value affects male-male competition in the blue-black grassquit" *Behavioral Ecology* 20:553-559 [doi]

Maia R, Caetano JVO, Bão SN & Macedo RH. "Iridescent structural colour production in male blue-black grassquit feather barbules: the role of keratin and melanin" *Journal of the Royal Society Interface* 6:S203-S211 [doi]

2008 Aguilar TM, **Maia R**, Santos ESA & Macedo RH. "Parasite levels in blue-black grassquits correlate with male displays but not female mate preference" *Behavioral Ecology* 19:292-301 [doi]

2006 Dacier A, **Maia R**, Agostinho DP & Barros M. "Rapid habituation of scan behavior in captive marmosets following brief predator encounters" *Behavioural Processes* 71:66-69 [doi]

INVITED CHAPTERS

2008 **Maia R** & Santos ESA. "Tropical Bird Communities" in: *Tropical Bird Communities* edited by RH Macedo & M Morris, in: Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK [HTML]

Dias A, **Maia R** & Dias RI. "Breeding Strategies of Tropical Birds" in: *Tropical Bird Communities* edited by RH Macedo & M Morris, in: Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK [HTML]

Software development

pavo • R package for the organization, analysis and visualization of color data. [GITHUB] [CRAN]

reBird • R interface to the eBird API. [GITHUB] [CRAN]

R scripts for thin-film optical modeling (Supplemental material for Maia *et al.* 2009 [doi])

Talks & presentations

INVITED TALKS

- 2015 December 16. "Integrating development, constraints and selection in the study of avian color diversification." *New York University Evening Evolution Group*

December 04. "Integrating development, constraints and selection in the study of avian color diversification." *Stephen F. Austin State University Biology Department Seminar*

- 2014 October 10. "The development, mechanisms and diversification of iridescent feather colors." *University of Idaho Biology Department Seminar Series*

- 2013 November 14. "The optics of diversity: using physics to illuminate the evolution of bird feather colors." *Oberlin College Biology Department Seminar Series*

August 15. "From nano(structure) to macro(evolution): what the development and mechanisms of iridescence can tell us about plumage color diversification." *Physiological and functional advances in avian coloration symposium (American Ornithologists' Union Meeting)*

March 25. "Development and evolution of iridescent plumage colors." *Cornell Lab of Ornithology*

- 2012 August 18. "Key innovations and the evolution of iridescent ornamental colors." *The Role of Behavior in Non-Ecological and Non-Adaptive Speciation (ISBE post-congress symposium)*

April 21. "The evolution of iridescent colors in African starlings." *The University of Akron Brown Bag Seminar Series*

- 2011 September 25. "Fragments of the rainbow: the development and evolution of iridescence in feathers." *The University of Pittsburgh Ecology & Evolution Seminar Series*

CONTRIBUTED PRESENTATIONS (5 MOST RECENT OF 31 TOTAL SHOWN; †ORAL PRESENTATION)

- 2016 †Maia R, Rubenstein DR & Shawkey MD. "Selection, constraint and the evolution of coloration in African starlings." Evolution Meeting, TX

- 2015 †Uyeda, JC, Pennell MW, Miller ET, Maia R, Harmon LJ, McClain CR. "The evolution of energetic scaling relationships across the vertebrate tree of life." Evolution Meeting, São Paulo, Brazil

- 2013 Maia R, Parra, JL & Shawkey MD. "Form and function in the evolution of iridescent hummingbird colors." Evolution Meeting, UT

†Eliason CM, Maia R, Bitton, P-P & Shawkey MD. "Linking form and function to elucidate the evolution of iridescent colors in birds." American Ornithologists' Union Conference (AOU) meeting, IL

†Eliason CM, Maia R & Shawkey MD. "Optics and evolution of iridescence in the wings of ducks." Society for Integrative and Comparative Biology (SICB) meeting, CA

Teaching

TEACHING ASSISTANT

The University of Akron

- 2013 Principles of Biology
- 2011 Ornithology
- 2009-2012 Natural Science: Biology (Fall 2009/2010, Spring 2010/2012)

Universidade de Brasília

- 2006 Applied Statistics for Ecology (graduate-level course)
- 2005-2006 Animal Behavior
- 2004-2005 Vertebrate Zoology

VISITING LECTURER

Universidade Católica de Brasília

- 2008 Methods in Field Biology (two-week field course)

WORKSHOPS

- 2013 "Programming and applied statistics using R" • 12 hours
The University of Akron
- 2010 "Applied spectrophotometry for animal coloration studies" • 10 hours
Museu Nacional, Universidade Federal do Rio de Janeiro
- 2008 "Statistics for ecology: experimental design and data analysis" • 10 hours
Universidade Católica de Brasília
- 2006 "Behavioral ecology and sociobiology" • 10 hours
Annual biology student meeting, Universidade de Brasília

Reviewer

The Auk • American Naturalist (3) • Behavioral Ecology (4) • Behavioral Ecology and Sociobiology (4) • Biological Journal of the Linnean Society • Biota Neotropica • BMC Evolutionary Biology (2) • Current Opinion in Behavioral Sciences • Evolution (3) • Evolutionary Biology • Integrative Zoology (2) • Journal of Animal Ecology • Journal of Avian Biology • Journal of Ornithology (2) • Methods in Ecology and Evolution (2) • PLOS ONE • Ornitología Colombiana • Proceedings of the Royal Society of London B: Biological Sciences (4) • Scientific Reports • Systematic Biology

panelist for the Division of Environmental Biology at the National Science Foundation (NSF) for the 2016 fiscal year.

ad hoc reviewer for the book "*Modern Phylogenetic Comparative Methods and Their Application in Evolutionary Biology: Concepts and Practice*" (L. Z. Garamszegi, ed.)

Associate Faculty Member for [F1000Prime](#)

Peer member for [Peerage of Science](#)

Service to the discipline

- 2012-2014 *Member (chair 2013-2014)* of the Graduate Council to the Executive Committee, American Society of Naturalists
- 2012-2013 *Creator and organizer* of the Evolutionary Biology Online Journal Club [\[HTML\]](#)
- 2012 *Interviewer* for the University of Akron Honors College scholarship selection process
- 2011-2012 *Judge and peer reviewer* for The University of Akron Biology Undergraduate Research Symposium (BURS) undergraduate authored publication award (2011) and best poster presentation award (2012)
- 2008 *Supervisor of educational activities* for the DARWIN itinerant exhibit in Brasília, DF, Brazil (INSTITUTO SANGARI/AMERICAN MUSEUM OF NATURAL HISTORY, 2008). Activities included: preparation, monitoring and execution of guided tours; tour guide training; elaboration and presentation of “*Meeting with Educators*” talks, focusing on Darwin’s life as a tool in teaching evolution, and the major misconceptions of evolutionary theory (audience: middle and high school teachers)
- Volunteer organizer and support team member* for the 46th Animal Behavior Society Annual Meeting (Pirenópolis, Brazil, 2009), XIX Annual Meeting of the Society for Conservation Biology (Brasília, Brazil, 2005) and 25th Brazilian Zoology Conference (Brasília, Brazil, 2004)