

# Rafael Maia

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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 25<sup>th</sup> 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 42<sup>nd</sup> 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. “The evolution of eggshell cuticle in relation to nesting ecology” *Proceedings of the Royal Society of London B: Biological Sciences* 283:20160687. [\[doi\]](#)
- 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 46<sup>th</sup> Animal Behavior Society Annual Meeting (Pirenópolis, Brazil, 2009), XIX Annual Meeting of the Society for Conservation Biology (Brasília, Brazil, 2005) and 25<sup>th</sup> Brazilian Zoology Conference (Brasília, Brazil, 2004)