

## Robert Muscarella

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### EDUCATION

- Current* NSF International Postdoctoral Research Fellow  
Aarhus University (Denmark) & Wageningen University (the Netherlands)  
*Mentors: Jens-Christian Svenning and Frans Bongers*
- 2015 Ph.D., Ecology, Evolution and Environmental Biology, Columbia University  
*Major professor: María Uriarte* [Conferred February 11, 2015]  
*Committee: Robin Chazdon, Joel Cracraft, Dustin Rubenstein, Robert P. Anderson*
- 2008 M.S., Biology, University of Miami  
*Advisor: Theodore H. Fleming*
- 2001 B.A., Biology and Environmental Studies, Lewis and Clark College

### PUBLICATIONS

16. Naeem, S, C Prager, B Weeks, A Varga, DFB Flynn, K Griffin, **R Muscarella**, S Wood & W Schuster (*Accepted*) Biodiversity as a multidimensional construct. *Proceedings of the Royal Society B*.
15. **Muscarella, R** and M Uriarte (2016) Do community-mean functional traits reflect optimal strategies? *Proceedings of the Royal Society B*. 283: 20152434.
14. Chazdon, R, Broadbent E, Rozendaal DMA, ... **R Muscarella** & 54 coauthors (2016) Carbon mitigation potential of Neotropical second-growth forest. *Science Advances*. 2(5): e1501639.  
+ *Science News*: [www.sciencemag.org/news/2016/05/even-young-rainforests-can-help-save-climate](http://www.sciencemag.org/news/2016/05/even-young-rainforests-can-help-save-climate)  
+
13. Poorter, L, ... **R Muscarella** & 64 coauthors (2016) Biomass resilience of Neotropical secondary forests. *Nature*. 530(7589): 211-214.  
+ *BBC News*: <http://www.bbc.com/news/science-environment-35492273>  
+
12. **Muscarella, R**, M Uriarte, TM Aide, DL Erickson, J Forero-Montaña, NJ Swenson, WJ Kress & JK Zimmerman (2016) Functional convergence and phylogenetic divergence during secondary succession of subtropical wet forests in Puerto Rico. *Journal Vegetation Science*. 27(2): 283-294.
11. Umaña, MN, J Forero-Montaña, **R Muscarella**, CJ Nytch, J Thompson, M Uriarte, JK Zimmerman & NG Swenson (2016) Inter-specific functional convergence and divergence and intraspecific negative density dependence underlie the seed-to-seedling transition in tropical trees. *The American Naturalist*. 187(1): 99-109.
10. **Muscarella, R**, M Uriarte, NJ Swenson, DL Erickson, JK Zimmerman & WJ Kress (2016). Climate and biodiversity effects on standing biomass in Puerto Rican forests. *Caribbean Naturalist*. S1: 199-217.
9. Letcher, SG, ... **R Muscarella** & 55 coauthors (2015) Environmental gradients and the evolution of successional habitat specialization: a test case with 14 Neotropical forest sites. *Journal of Ecology*. 103(5): 1276-1290.

8. Lasky, JR, B Bachelot, **R Muscarella**, N Schwartz, J Forero-Montaña, NG Swenson, J Thompson, JK Zimmerman & M Uriarte (2015) Ontogenetic shifts in trait-mediated mechanisms of plant community assembly. *Ecology*. 96: 2157-2169.
7. **Muscarella, R**, M Uriarte, NJ Swenson, DL Erickson, JK Zimmerman & WJ Kress (2014). A well-resolved phylogeny of the trees of Puerto Rico based on DNA barcode sequence data. *PLoS ONE*. 9(11): e112843.
6. Réjou-Méchain, M, ... **R Muscarella** & 65 coauthors (2014) Spatial variation in forest biomass and consequences for remote sensing of carbon stocks. *Biogeosciences*. 11: 6827-6840.
5. **Muscarella, R**, PJ Galante, M Soley-Gaurdia, RA Boria, J Kass, M Uriarte & RP Anderson (2014) ENMeval: an R package for conducting spatially independent evaluations and estimating optimal model complexity for Maxent ecological niche models. *Methods in Ecology and Evolution*. 5(11): 1198-1205.
4. **Muscarella, R**, M Uriarte, J Forero-Montaña, L Comita, NJ Swenson, J Thompson, C Nytych, I Jonckheere & JK Zimmerman (2013). Life history trade-offs during the seed-to-seedling transition in a subtropical wet forest community. *Journal of Ecology* 101(1): 171-182.
3. Yakulic, C, ME Fagan, M Jain, A Jina, Y Lim, M Marlier, **R Muscarella**, P Adame, RS DeFries & M Uriarte (2011) Biophysical and socioeconomic factors associated with forest transitions at multiple spatial and temporal scales. *Ecology and Society* 16(3): 15.
2. **Muscarella, R**, KL Murray, A Russell, D Ortt & TH Fleming (2011). Exploring demographic, physical, and historical explanations for the genetic structure of two lineages of Greater Antillean bats *PLoS ONE* 6(3): e17704.
1. **Muscarella, R** & TH Fleming (2007) The role of frugivorous bats in tropical forest succession. *Biological Reviews* 82(4): 573-590.

#### **MANUSCRIPTS IN REVISION / REVIEW**

- Muscarella, R**, M Uriarte, DL Erickson, NG Swenson, WJ Kress, JK Zimmerman (*in review*) Variation of tropical forest assembly mechanisms across regional environmental gradients.
- Galante, P, BA Alade, **R Muscarella**, SA Jansa, SM Goodman & RP Anderson (*in review*). Comparing two approaches for selecting optimal complexity in ecological niche models: information criteria vs. performance on withheld data.
- Lasky, J, M Uriarte & **R Muscarella** (*in review*) Synchrony, compensatory dynamics, and the functional trait basis of phenological diversity in a tropical tree community.
- Kivlin, S, K Treseder, **R Muscarella** and C Hawkes (*in review*) The predictive power of ecological niche modeling for global arbuscular mycorrhizal fungal biogeography.
- Kass, JM, B Vilela, ME Aiello-Lammens, **R Muscarella** and RP Anderson (*near submission*) *Wallace*: a user-friendly web app for advanced spatial modeling of species niches and distributions.
- Gei, MG, ... **R Muscarella** & 54 coauthors (*near submission*) Ecological success of tropical legumes across succession and rainfall gradients.

## **GRANTS AND AWARDS**

<i>Pending</i>	NSF, DEB - (senior personnel with full collaboration on authorship): <i>A neighborhood approach to the biogeography of Puerto Rican trees.</i>
<i>Pending</i>	NSF, DEB - Long-Term Ecological Research (senior personnel): <i>LTER: SEV site - Climate Variability at Dryland Ecotones.</i>
2015	Finalist, GBIF Nielsen Challenge for development of <i>Wallace</i> software (\$1,000)
2015	Outstanding Reviewer, Canadian Journal of Forest Research
2014	NSF International Postdoctoral Research Fellowship (\$175,632)
2013	NSF Doctoral Dissertation Improvement Grant (\$13,000)
2010 - 13	Travel Grant, Institute for Latin American Studies (\$6,000 <i>total</i> )
2010 - 13	The Earth Institute Travel Grant, Columbia University (\$2,000 <i>total</i> )
2010	Highest Scientific Quality presentation, E3B Department, Columbia University
2010	Travel Grant, Columbia University (\$2,500)
2009 - 14	Faculty Fellowship, Columbia University (\$65,000)
2008	The Luis F. Bacardi Bat Conservation Award for Outstanding Oral Presentation, North American Society for Bat Research (\$500)
2007 - 8	The Max & Peggy Kriloff Scholarship, University of Miami (\$1,000 <i>total</i> )
2005	Graduate Activity Fee Allocation Committee, University of Miami (\$250)
2005	William H. Evoy Graduate Research Award, University of Miami (\$500)

## **TEACHING EXPERIENCE AND TRAINING**

2015 - <i>current</i>	<b>EcoInformatics Methods Workshop.</b> Aarhus University, Denmark. Organized monthly seminars on various methodological techniques for research in ecology and evolution.
4/2015	<b>Species Distribution Modeling in R.</b> Uppsala University, Sweden. Collaboratively designed and instructed a 4-day course on distribution modeling.
6/2014	<b>Teagle Summer Institute Teaching Certification.</b> Columbia University, New York. Intensive training on developing innovative teaching methods using new technology.
2010-13	<b>Course Teaching Assistant and Lab Instructor,</b> Columbia University, New York. Courses: Fundamentals of Ecology and Evolution (2 semesters, <i>Supervisors: Maria Uriarte &amp; Joel Cracraft</i> ); Life Systems (1 semester, <i>Supervisor: Shahid Naeem</i> ), Spatial Analysis and Modeling for Sustainable Development ( <i>Supervisor: Giovanni Graziosi</i> ).
2012 - 13	<b>NSF GK-12 Teaching Fellow: Learning through Ecology and Environmental Field Studies,</b> Public School MS-88, New York.
2009	<b>Biology Instructor,</b> Portland Community College, Oregon. Taught biology course covering anatomy, physiology, zoology, botany, and ecology.
2006	<b>Graduate Facilitator,</b> University of Miami and Howard Hughes Medical Institute, Summer Research in Ecology Program.
2005-06	<b>Teaching Assistant,</b> University of Miami, Florida. Courses: Intro lab in Ecology (1 semester), Intro lab in Genetics and Evolution (1 semester, Genetics (1 semester, <i>Supervisor: Alex Wilson</i> ).

## **OTHER SELECTED EXPERIENCE**

- 2009      **Botanic Specialist II**, City of Portland, OR. Planned, developed, and managed programs and projects in support of the urban forestry policies.
- 2008      **Bird Point Count Surveyor**, Rocky Mountain Bird Observatory/USFS, Kaibab National Forest, Arizona. Conducted point counts and recorded vegetation data.
- 2007      **Botany Research Assistant**, Lambir Forest National Park, Malaysia. Collected plant physiological data, trained an assistant in field techniques (*Supervisor: Sabrina Russo*).
- 2007      **Field Biologist**, Krakatau Islands World Heritage Site, Indonesia. Surveyed and initiated permanent forest plots, and conducted a seed bank study (*Supervisor: Richard Field*).

## **PROFESSIONAL WORKSHOPS**

- 2015      Tropical Plant Collections: legacies from the past, essential tools for the future. Royal Danish Academy, Copenhagen, Denmark.
- 2015      Applications of Species Distributions Models for Biodiversity Studies in Northeast Puerto Rico. International Institute of Tropical Forestry, Puerto Rico.
- 2015      Integral Projection Models. British Ecological Society, Sheffield, UK.
- 2013      Monitoring biodiversity in a changing world: estimating occupancy dynamics in diverse ecosystems through single and multi-species Bayesian hierarchical models. Association for Tropical Biology and Conservation, Costa Rica.
- 2013      Macrosystems Training Workshop: Integrating Evidence on Forest Response to Climate Change: Physiology to Regional Abundance. Duke University, NC.
- 2013      Center for Tropical Forest Science, NSF Dimensions of Biodiversity workshop. University of Washington, WA.

## **PRESENTATIONS (\* by invitation)**

- 2016\*      Integrating species traits and distributions: improving prediction for managing invasions. *USGS Fort Collins Science Center, USA.*
- 2015\*      Demographic drivers of functional diversity shifts during tropical forest succession. *Forest Ecology & Management, Wageningen University, the Netherlands.*
- 2015\*      How do abiotic gradients influence community assembly mechanisms? Insights from traits and tropical forests. *University of New Mexico, USA.*
- 2015\*      Do community-mean trait values reflect optimal strategies? *Ecology Society of America, 100<sup>th</sup> Annual Meeting, Baltimore, MD.*
- 2015\*      Species distribution models for the trees of Puerto Rico: methods and applications. *International Institute of Tropical Forestry, Puerto Rico.*
- 2015      Do community-mean trait values reflect optimal strategies? *Demography Beyond the Population, British Ecological Society, Sheffield, UK.*
- 2015      Linking geographic distributions and functional traits. *Aarhus University, Denmark.*
- 2015\*      Linking geographic distributions and functional traits. *Forest Ecology & Management, Wageningen University, the Netherlands.*
- 2015      Linking geographic distributions and functional traits: insights from Puerto Rican forests. *International Biogeography Society, Bayreuth, Germany.*

- 2014 Functional and phylogenetic variation of Puerto Rican Forests. *Columbia University, NY.*
- 2013 Spatial turnover of taxonomic and functional tree diversity across broad environmental gradients in Puerto Rico. *ESA, Minneapolis, MN.*
- 2013 Functional and phylogenetic variation of Puerto Rican Forests. *Association for Tropical Biology and Conservation, San José, Costa Rica.*
- 2012 Do plants think globally and act locally? Exploring forest community composition across broad environmental gradients. *El Verde, Puerto Rico.*
- 2011 Do plants think globally and act locally? An integrated view of community assembly. *Princeton University, NJ.*
- 2010 Secondary forest succession in Puerto Rico. *Columbia University, NY.*
- 2009 The role of frugivorous bats in tropical succession. *North American Society for Bat Research, PA.*
- 2008 Does wind affect genetic structure and gene flow in two lineages of Greater Antillean bats? *North American Society for Bat Research, PA.*

#### **PEER REVIEW**

*Journal of Ecology, Ecology, Methods in Ecology and Evolution, Global Ecology and Biogeography, New Phytologist, Ecography, Molecular Ecology, Biotropica, PLoS One, Canadian Journal of Forest Research, International Journal of Tropical Biology and Conservation, Forest Ecology and Management, Canadian Journal of Zoology, Oecologica, Oikos, Plant Ecology, Journal of Forest Research, Trees - Structure and Function*