Department of Biology

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**Nathan Muchhala**

**EDUCATION**

**Ph.D., Biology** (5/07), University of Miami, Coral Gables, FL (with Dr. Theodore Fleming)

**B.A., Biology** (5/98), Earlham College, Richmond, IN (college and departmental honors)

**PROFESSIONAL EXPERIENCE**

Assistant Professor (2013-Present), Department of Biology, University of Missouri – St. Louis, St. Louis, MO

Postdoctoral Research Fellow (2011-2013), School of Biological Sciences, University of Nebraska, Lincoln, NE (with Dr. Stacey Smith)

Postdoctoral Research Fellow (2007-2010), Dept. of Ecology and Evolutionary Biology, University of Toronto, Toronto, ON (with Dr. James Thomson)

**GRANTS & FELLOWSHIPS**

* University of Nebraska Program of Excellence Postdoctoral Fellowship (2012-2013)
* Prometeo Fellowship for Visiting Scholars to Ecuador; **$36,000** (2012; Declined)
* Encyclopedia of Life Rubenstein Fellowship; **$24,000** (2012)
* Fulbright Scholar Grant; **$12,000** (2010)
* National Geographic Society Grant (PI), “Coevolution in an extremely specialized bat-flower mutualism: exploring the geographic mosaic”; **$22,577** (2010)
* University of Toronto Departmental Postdoctoral Fellowship (2007-2009)
* Bat Conservation International Postdoctoral Grant; **$1,000** (2007)
* National Science Foundation Graduate Research Fellowship (2002-2005)
* Curtis Scholarship, University of Miami; **$500** (2004)
* Bat Conservation International Student Grant; **$2,524** (2003)
* Curtis Scholarship, University of Miami; **$500** (2002)
* Organization for Tropical Studies Post-Course Award; **$500** (2002)
* Maytag Fellowship (2005-2007; 2001)
* Fulbright Fellowship (1999-2000)

**PUBLICATIONS**

24. Muchhala, N., S. Johnsen, and S. D. Smith. 2013. Competition for hummingbird pollination and the evolution of flower color diversity in Andean Solanaceae. (In review).

23. Muchhala, N., and J. D. Thomson. 2012. Interspecific competition in pollination systems: costs to male fitness via pollen misplacement. *Functional Ecology* **26**(2):476-482.

22. Jorgensen, P.M., N. Muchhala, and J.M. MacDougal. 2012. *Passiflora unipetala*, a new bat-pollinated species of *Passiflora* supersection *Tacsonia*. *Novon* **22**(2):174-179.

21. Moreno, M.P. and N. Muchhala. 2011. Campanulaceae. In: R. Valencia, N. Pitman, S. León-Yánez, and P.M. Jørgensen (eds.). *Libro rojo de las plantas endémicas del Ecuador, segunda edición.* Herbario QCA, Pontificia U. Católica del Ecuador, Quito.

20. Garibaldi, L.A., N. Muchhala, I. Motzke, L. Bravo-Monroy, R. Olschewski, and A.M. Klein. 2011. Services from plant-pollinator interactions in the Neotropics. Pp. 119-139 in B. Rapidel, F. DeClerck, J.F. Le Coq, J. Beer (eds.), *Ecosystem Services from Agriculture and Agroforestry: Measurement and Payment.* Earthscan, London, UK.

19. Muchhala, N., Z. Brown, W.S. Armbruster, and M.D. Potts. 2010. Competition drives specialization in pollination systems through costs to male fitness. *American Naturalist* **176**(6):732-743.

18. Muchhala, N., and J.D. Thomson. 2010. Fur versus feathers: Pollen delivery by bats and hummingbirds, and consequences for pollen production. *American Naturalist* **175**:717-726

\* Featured in Science Podcast and ScienceNOW

17. Muchhala, N., and J.D. Thomson. 2009. Going to great lengths: selection for long corolla tubes in an extremely specialized bat-flower mutualism. *Proceedings of the Royal Society B* **276**:2147-2152

\* Featured in Nature's Research Highlights, *Nature* **458**:388

16. Muchhala, N., A. Caiza, J.C. Vizuete, and J.D. Thomson. 2009. A generalized pollination system in the tropics: Bats, birds, and *Aphelandra acanthus*. *Annals of Botany* **103**(9):1481-1487

15. Armbruster, W.S. and N. Muchhala. 2009. Associations between floral specialization and species diversity: Cause, effect, or correlation? *Evolutionary Ecology* **23**:159-179

14. Knox, E.B., A.M. Muasya, and N. Muchhala. 2008. The predominantly South American clade of Lobeliaceae. *Systematic Botany* **33**(2):462-468.

13. Muchhala, N. 2008. Functional significance of interspecific variation in *Burmeistera* flower morphology: Evidence from nectar bat captures. *Biotropica* **40**(3): 332–337

12. Fleming, T.H. and N. Muchhala. 2008. Nectar-feeding bird and bat niches in two worlds: pantropical comparisons of vertebrate pollination systems. *Journal of Biogeography* **35**(5): 764–780

11. Muchhala, N. and M.D. Potts. 2007. Character displacement among bat-pollinated flowers of the genus *Burmeistera*: analysis of mechanism, process, and pattern. *Proceedings of the Royal Society B* **274**:2731-2737.

\* Featured in Science Daily News

10. Muchhala, N. 2007. Adaptive tradeoff in floral morphology mediates specialization for flowers pollinated by bats and hummingbirds. *American Naturalist* **169**:494-504.

\* Featured in Science Daily News and LiveScience

9. Muchhala, N. 2006. Nectar bat stows huge tongue in its rib cage. *Nature* **444**:701-702.

\* Featured in The New York Times, Quirks & Quarks, New Scientist, Scientific American, and various other news outlets

8. Muchhala, N. 2006. The pollination biology of *Burmeistera* (Campanulaceae): Specialization and syndromes. *American Journal of Botany* **93**(8):1081-1089.

7. Muchhala, N., P. Mena V., and L. Albuja V. 2005. A new species of *Anoura* (Chiroptera: Phyllostomidae) from the Ecuadorian Andes. *Journal of Mammalogy* **86**:457-461.

6. Fleming, T.H., N. Muchhala, and P. Ornelas. 2005. New world nectar-feeding vertebrates: Community patterns and processes. Pp. 161-182 in V. Sanchez-Cordero and R. A. Medellín (eds.) *Contribuciones Mastozoológicos en Homenaje a Bernardo Villa-R. Instituto de Biología e Instituto de Ecología*, UNAM, Mexico City.

5. Muchhala, N. and T. G. Lammers. 2005. A new species of *Burmeistera* (Campanulaceae) from Ecuador. *Novon* **15**(1):176-179.

4. Muchhala, N. and T.A. Munroe. 2004. A new species of *Soleichthys* (Soleidae: Pleuronectiformes) from tropical seas off northern Australia. *Ichthyological Research* **51**:57-62.

3. Muchhala, N. 2003. Exploring the boundary between pollination syndromes: Bats and hummingbirds as pollinators of *Burmeistera cyclostigmata* and *B. tenuiflora*. *Oecologia* **134**:373-380.

2. Cramer, J. M., M. L. Cloud, N. Muchhala, A. E. Ware, B. H. Smith, and G. B. Williamson. 2003. A test of the bicolored fruit display hypothesis: Berry removal with artificial fruit flags. *Journal of the Torrey Botanical Society* **130**(1):30–33.

1. Muchhala, N. and P.J. Jarrin-V. 2002. Flower visitation by bats in cloud forests of western Ecuador. *Biotropica* **34**:387-395.

**TEACHING EXPERIENCE**

Instructor, *General Ecology*, University of Missouri – St. Louis, St. Louis, MO (2013)

Guest Lecturer, *Phylogenetic Biology*, University of Nebraska, Lincoln, NE (2013)

Instructor, *Scientific Writing*, University of Nebraska, Lincoln, NE (2012)

Guest Lecturer, *Phylogenetics*, University of Nebraska, Lincoln, NE (2012)

Instructor, *Speciation*, University of Nebraska, Lincoln, NE (2011)

Guest Lecturer, *Ecology and Evolution*, University of Nebraska, Lincoln, NE (2011)

Guest Lecturer, *Tropical Field Research*, Truman State University, Kirksville, MO (2010)

Guest Lecturer, *Animal Behavior*, Pontificia Univ. Catolica del Ecuador, Quito (2010)

Guest Lecturer, *Introductory Biology*, University of Miami, Miami, Fl (2005)

Teaching Assistant, *Biodiversity*, University of Miami, Miami, FL (2000-01)

Teaching Assistant, *Evolution*, Earlham College, Richmond, IN (1997-98)

Teaching Assistant, *Ecological Biology*, Earlham College, Richmond, IN (1996-97)

**MENTORING EXPERIENCE**

**Advisor:**

* Camilo Andrés Calderón-Acevedo (U. Missouri – St. Louis), PhD
* Juan Carlos Vizuete (U. Central, Ecuador), MS 2011: “Influence of aspects of bat ecology on the richness and abundance of ectoparasites (*Diptera*) in Wisui, Ecuador”
* Guillermo Javier Gilbert (U. de Guayaquil, Ecuador), Licenciatura 2011: “Learning, identification, and discrimination by nectar bats”
* Diana Serrano (Pontificia U. de Ecuador), Licenciatura 2011: “Use of vision and scent in flower foraging by nectar bats”
* Juan Carlos Vizuete (U. Central, Ecuador), Licenciatura 2008: “Seed dispersal by fruits bats of the genus *Sturnira*”
* Angelica Caiza (U. Central, Ecuador), Licenciatura 2007: “Feeding ecology of *Anoura* and their role as pollinators in cloud forests in eastern and western Ecuador”

**Committee Member:**

* Priya Maharaj (U. Missouri – St. Louis), PhD
* Justin Zweck (Saint Louis U.), PhD
* Cassandra Lynn Coleman (U. of Alabama), MS 2012: “A phylogeny and study of pollinator shifts and floral traits in the Neotropical genus *Gasteranthus* (Gesneriaceae)”

**External Reviewer:**

* Marinus de Jager (U. of Stellenbosch, South Africa), PhD 2013: “The role of pollinators in generating and maintaining floral polymorphism: phylogeographic and behavioral aspects”

**HONORS & AWARDS**

* SSE Student Travel Award, Evolution Meeting (2007)
* Best Graduate Student Paper, University of Miami (2007)
* Best Student Talk (Lubee Prize), North American Symposium on Bat Research (2006)
* SBDN Student Travel Award, North American Symposium on Bat Research (2006)
* Best Student Talk (Gentry Award), Association for Tropical Biology (2004)
* Best Student Talk (Lubee Prize), North American Symposium on Bat Research (2000)
* National Merit Scholar (1994-1998)

**PRESENTATIONS**

**Scientific Meetings**

* Congreso Ecuatoriano de Mastozoología, Puyo, Ecuador (2013)
* International Bat Research Conference (2013)
* Society for the Study of Evolution, Annual Meetings (2012, 2011, 2008, 2006)
* Ecological Society of America, Annual Meetings (2009, 2008, 2006)
* Association for Tropical Biology & Conservation, Annual Meetings (2013, 2007, 2004, 2002)
* North American Symposium on Bat Research, Annual Meetings (2012, 2008, 2006, 2000)
* American Society of Mammalogists Meeting, Amherst, Mass. (2006)
* Jornadas Ecuatorianas de Biología, Annual Meetings, Ecuador (2004, 2003)
* Congreso Ecuatoriano de Botánica, Loja, Ecuador (2003)

**Invited Lectures**

* University of Missouri, Columbia, MO (10/13)
* St. Louis Ecology, Evolution, and Conservation (SLEEC) Retreat, St. Louis, MO (9/13)
* Ohio State University, Columbus, OH (1/13)
* University of Missouri – St. Louis, St. Louis, MO (10/12)
* University of California -Davis, Davis, CA (5/12)
* Chicago Plant Science Symposium, Field Museum, Chicago, IL (4/12)
* Universidad de Antioquia, Medellin, Colombia (4/12)
* University of Denver, Denver, CO (2/12)
* Harvard University, Cambridge, MA (10/11)
* Humboldt State University, Arcata, CA (2/11)
* Pontificia Universidad Catolica de Ecuador, Quito, Ecuador (4/10)
* Universidad de San Francisco, Quito, Ecuador (3/10)
* University of Wisconsin-Milwaukee, Milwaukee, WI, USA (1/10)
* University of Guelph, Guelph, ON, Canada (3/09)
* Texas Tech University, TX, USA (1/09)
* Queens University, Kingston, ON, Canada (12/08)
* Trent University, Peterborough, ON, Canada (11/08)
* University of Calgary, Calgary, AB, Canada (11/08)
* Sea & Learn, Saba, Netherlands Antilles (10/08)
* University of Toronto, Toronto, ON, Canada (4/08)
* Fulbright Commission, Quito, Ecuador (8/05)

**MEDIA COVERAGE**

**Press Interviews:** The New York Times, ABC, CNN, Reuters, FOX, BBC Wildlife Magazine, The Telegraph, New Scientist, Scientific American, Science News, and various other print and on-line media

**Radio Interviews:** Crash Davis (KFAB Radio, Omaha, NE), Quirks and Quarks (Canadian Broadcasting Corporation), Good Dirt Radio (Grassroots Educational News), Nature Podcast (Nature), pollinators.info

**Interviews for Books:** Bats: Biggest! Littlest! (S. Markle, In Press); Plant and Animal Systems (R. Johnson, 2011); Why the Lion Grew its Mane (L. Smith, 2009); Dry Storeroom No. 1 (R. Fortey, 2008)

**SERVICE & OTHER EXPERIENCE**

* Reviewer for *American Naturalist, American J. of Botany, Annals of Botany, Biotropica, Biological J. of the Linnean Society, Brittonia, Caldasia, Check List, Ecology, Ecography, Evolution, Functional Ecology, J. of Evolutionary Biology, J. of Ornithology, J. of Pollination Ecology, Mammalian Species, Naturwissenschaften, Oecologia, Oikos, Plant Biology, Plant Systematics and Evolution, PNAS, PLoS One, Science,* and a National Geographic Society grant application.
* Volunteer presenter for ‘Sunday with a Scientist’, Nebraska State Museum (2011)
* Judge for elementary school science fair (Sheridan Elementary, 2011),
* Judge for Biology Graduate Student Association poster session (U. Nebraska, 2011 and 2013)
* Judge for SSE Hamilton Award, Evolution Meeting (2008)
* Student Representative, Graduate Admission Committee (2006-07 and 2001-02)
* Student Representative, Faculty Search Committee (2005-06 and 2000-01)
* Biology Representative, Graduate Student Association, (2000-01)

**REFERENCES**

**Dr. Theodore H. Fleming Dr. W. Scott Armbruster**

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**Dr. Stacey D. Smith Dr. James D. Thomson**

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