Department of Biology

University of Missouri - St. Louis

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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**

Associate Professor (2019-Present), Department of Biology, University of Missouri – St. Louis, St. Louis, MO

Assistant Professor (2013-2019), 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**

* US Department of Agriculture, National Institute of Food and Agriculture (Co-PI), “Maximizing Pollination Services in Urban Orchards”; A. Dunlap, G. Camilo, P. Hoch, K. Krakos, N. Miller-Struttmann, N. Muchhala, E. Spevak; **$633,000** (2021-2024)
* Living Earth Collaborative Grant (Co-PI), “Origin and diversification of the flowering plants of the Gulf of Guinea Archipelago”; P. Barberá, J. Garcia-Porta, N. Muchhala, T. Stévart, M. Landis; **$29,883** (2021-22)
* National Council for Scientific and Technological Development, Brazil (PI), Visiting Professor Fellowship (Call No. 08/2019); **$11,283** (2020; Declined)
* Living Earth Collaborative Grant (Co-PI), “Testing the role that biotic interactions play in shaping elevational-diversity gradients: An ecological metabolomics approach”; J. Myers, J.S. Tello, N. Muchhala, B.E. Sedio; **$29,010** (2020-21)
* Living Earth Collaborative Grant (Co-PI), “Floral scent differentiation as a method for pollinator partitioning in *Anthurium* (Araceae)”; M. Carlsen, N. Muchhala, G. Camilo, E. Spevak; **$28,885** (2019-20)
* NSF Full Proposal (PI), “Quantifying the roles of pollination and post-pollination barriers in angiosperm speciation: a case study of the diverse Neotropical genus *Burmeistera* (Campanulaceae)”; N. Muchhala; DEB–Phylogenetic Systematics Panel; **$731,385** (2018-22)
* UMSL ORA Research Award (PI), “Interspecific pollen transfer and gene flow during the rapid diversification of bat‐pollinated *Burmeistera* (Campanulaceae)”; **$10,900** (2018-19)
* UMSL ORA Research Award (PI), “Is speciation faster in the tropics? Effects of seasonality and mutualists on plant genetic structure”; **$9,174** (2016-17)
* St. Louis Zoo Field Research for Conservation Grant (Co-PI), “From bat to bird: Investigating a potential case of sympatric speciation via pollinator shift in the Andes”; **$10,000** (2016)
* UM Research Board Grant (PI), “Speciation in *Burmeistera*”; **$50,000** (2015)
* University of Nebraska Program of Excellence Postdoctoral Fellowship (2012-13)
* 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 (2007-09)
* Bat Conservation International Postdoctoral Grant; **$1,000** (2007)
* National Science Foundation Graduate Research Fellowship (2002-05)
* 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 (2005-07; 2001)
* Fulbright Fellowship (1999-2000)

**PUBLICATIONS**

60. Muchhala, N., R. Maguiña, A. Caiza, and D. Proaño. (In review). Bat-flower trait matching: Extreme phenotypic specialization affects diet choices but not diet breadth. *Ecology*

59. Mashburn, B. A. Trigueros, C. Ulloa Ulloa, and N. Muchhala. (In review). Morphometrics, species limits, and a new species in the recurved corolla clade of *Burmeistera* (Campanulaceae). *Systematic Botany*

58. Opedal, O. H., R. Pérez-Barrales, V. L. G. Brito, N. Muchhala and A. Dellinger. (In press). Pollen as the link between floral phenotype and fitness. *American Journal of Botany*

57. Muchhala, N., J. Moreira, and A. Zuluaga. (In review). Putting yourself out there: Why well-exposed flowers are an adaptation for bat pollination. *American Naturalist*

56. Gamba, D. and N. Muchhala. (In review). A review of fine-scale genetic structure in plants shows the importance of growth form, pollinators, and latitudinal region. *New Phytologist*

55. Yu, R., and N. Muchhala. (In press). Diverse pollen loads improve female reproductive success but not progeny vigor in *Allium stellatum*. *American Journal of Botany*

54. Moreira-Hernández, J., H. Ghai, N. Terzich, R. Zambrano-Cevallos, N. Oleas and N. Muchhala. (In press). Pollen transfer dynamics explain asymmetric responses to heterospecific pollen deposition among co-occurring bat-pollinated *Burmeistera*. *American Journal of Botany*.

53. R. Yu and N. Muchhala. (In press). Foraging dependent ecosystem services. Chp 15 in B. Fenton and D. Russo (eds), *A Natural History of Bat Foraging.* Academic Press, Elsevier.

52. Gamba, D. and N. Muchhala. 2023. Pollinator type strongly impacts gene flow within and among plant populations for six Neotropical species. *Ecology*. 104 (1), e3845

51. Lagomarsino, L., L. Frankel, S. Uribe-Convers, A. Antonelli and N. Muchhala. 2022. Increased resolution in the face of conflict: phylogenomics of the Neotropical bellflowers (Campanulaceae: Lobelioideae), a rapid plant radiation. *Annals of Botany* 129 (6), 723-736

50. Calderón-Acevedo, C., J. Bagley, and N. Muchhala. 2022. Genome-wide ultraconserved elements resolve phylogenetic relationships and biogeographic history among Neotropical leaf-nosed bats in the genus *Anoura* (Phyllostomidae). *Molecular Phylogenetics and Evolution* **167** (2022) 107356.

49. Moreira-Hernández, J., C. Calderón-Acevedo, and N. Muchhala. 2021. Fur, wings, and flowers: development and progress on nectarivorous bat research in the last 50 years. Chp 9 (pp. 135-149) in Lim B.K. et al. (eds), *50 Years of Bat Research.* Springer, Cham.

48. Muchhala, N., and B. Mashburn. 2021. Three new species of *Burmeistera* (Campanulaceae) endemic to Ecuador. *Phytotaxa* **490**(3):253-262.

47. Mashburn, B., C. Ulloa Ulloa, and N. Muchhala. 2021. Six new species of *Burmeistera* (Campanulaceae) endemic to Ecuador. *Novon* **29**:51-69.

46. Calderón-Acevedo, C., M. E. Rodríguez-Posada and N. Muchhala. 2021. Morphology and genetics concur that *Anoura carishina* is a synonym of *Anoura latidens* (Chiroptera, Glossophaginae). *Mammalia* **85**(5): 471–481.

45. Calderón-Acevedo, C., and N. Muchhala. 2020. First record of the Broad-toothed Tailless Bat, *Anoura latidens* Handley 1984 (Chiroptera, Phyllostomidae) in Bolivia. *Checklist* **16** (6): 1545–1550.

44. Gamba, D., and N. Muchhala. 2020. Global patterns of population genetic differentiation in seed plants. *Molecular Ecology* **29**:3413-3428.

43. Mashburn, B., A. J. Pérez, C. Persson, C. Zapata, D. Cevallos, and N. Muchhala. 2020. *Burmeistera quimiensis* (Lobelioideae, Campanulaceae): A new species from the Cordillera del Cóndor range in southeast Ecuador. *Phytotaxa* **433**(1), 67-74.

42. Armbruster, S., and N. Muchhala. 2020. Floral reorientation: the restoration of pollination accuracy after accidents. *New Phytologist* **227**: 232–243

41. Muchhala, N. and M. Tschapka. 2020. The ecology and evolution of nectar-feeding phyllostomids. Chp. 16 in T. H. Fleming, L. Davalos, and M. Mello (eds.) *Phyllostomid Bats, a Unique Mammalian Radiation*. University of Chicago Press.

40. Bagley, J.C., S. Uribe-Convers, M. M. Carlsen, and N. Muchhala. 2020. Utility of targeted sequence capture for phylogenomics in rapid, recent angiosperm radiations: Neotropical *Burmeistera* bellflowers as a case study. *Molecular Phylogenetics and Evolution*, 106769.

39. Moreira-Hernández, J. and N. Muchhala. 2019. Importance of pollinator-mediated interspecific pollen transfer for angiosperm evolution. *Annual Review of Ecology, Evolution, and Systematics* **50**:191-217

38. Muchhala, N.. 2019. Quantum dots shed light on angiosperm speciation. *New Phytologist* **224** (3), 1005-1008

37. Moreira- Hernández, J., N. Terzich, R. Zambrano-Cevallos, N. H. Oleas, and N. Muchhala. 2019. Differential tolerance to heterospecific pollen deposition in two sympatric species of *Burmeistera* (Campanulaceae: Lobelioideae). *International Journal of Plant Systematics* **180** (9), 987-995

36. Lagomarsino, L. and N. Muchhala. 2019. A gradient of pollination specialization in three species of Bolivian *Centropogon*. *American Journal of Botany* **106**(5):1-10

35. Vallejo, A. F., A. J. Pérez, D. Cevallos, and N. Muchhala. 2018. New species of *Burmeistera* (Campanulaceae: Lobelioideae) from Ecuador. *Phytotaxa* **362**(3):263-270

34. Calderón-Acevedo, C., and N. Muchhala. 2018. Identification and diagnosis of *Anoura* *fistulata* with remarks on its presumed presence in Bolivia. *Journal of Mammalogy* **99**(1):131-137

33. Lagomarsino, L., B. Forrestel, N. Muchhala, and C. C. Davis. 2017. Repeated evolution of vertebrate pollination syndromes in a recently diverged Andean plant clade. *Evolution* **71**(8):1970-1985

32. Maguiña, R., and N. Muchhala. 2017. Do artificial nectar feeders affect bat-plant interactions in an Ecuadorian cloud forest? *Biotropica* **49**(5):586–592

31. Gamba, D., R. Maguiña, C. Calderón-Acevedo, K. Torres, and N. Muchhala. 2017. Seed dispersal for the unusual inflated berries of *Burmeistera* (Campanulaceae). *Neotropical Biodiversity* **3**(1):10-17.

30. Uribe-Convers, S., M. M. Carlsen, L. P. Lagomarsino, and N. Muchhala. 2017. Phylogenetic relationships of *Burmeistera* (Campanulaceae: Lobelioideae): Combining whole plastome with targeted loci data in a recent radiation. *Molecular Phylogenetics and Evolution* **107**(2017):551-563

29. Lagomarsino, L. P., D. Santamaría Aguilar, and N. Muchhala. 2015. Two new species of *Burmeistera* (Campanulaceae: Lobelioideae) from the Cordillera de Talamanca of Costa Rica and Panama, with a key to the Central American species. *Systematic Botany* **40**(3):914-921.

28. Muchhala, N., and D. Serrano. 2015. The complexity of background clutter affects nectar bat use of flower odor and shape cues. *PlosONE* **10**(10):e0136657.

27. Muchhala, N., and A. Pérez. 2015. *Burmeistera zamorensis* (Campanulaceae: Lobelioideae), a new species from southern Ecuador. *Novon* **24**(1), 36-38.

26. Clark J. L., L. Clavijo, and Muchhala, N. 2015. Convergence of anti-bee pollination mechanisms in the Neotropical plant genus *Drymonia* (Gesneriaceae). *Evolutionary Ecology* **29**(3), 355-377.

25. Lagomarsino, L. P., A. Antonelli, N. Muchhala, S. Mathews, and C. C. Davis. 2014. Phylogeny, classification, and fruit evolution of the species-rich Neotropical bellflowers (Campanulaceae: Lobelioideae). *American Journal of Botany* **101**(12): 2097-2112.

24. Muchhala, N., S. Johnsen, and S. D. Smith. 2014. Competition for hummingbird pollination shapes flower color variation in Andean Solanaceae. *Evolution* **68**(8): 2275–2286.

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, *Immense World (Graduate Seminar)*, UMSL, St. Louis, MO (2023)

Instructor, *Tangled Tree (Graduate Seminar)*, UMSL, St. Louis, MO (2022)

Instructor, *Theory of Systematics*, UMSL, St. Louis, MO (2020 & 2022)

Instructor, *Advanced Evolution*, UMSL, St. Louis, MO (2015-23, biennially)

Instructor, *General Ecology*, UMSL, St. Louis, MO (2013-23)

Instructor, *Genetics & Archaeology (Senior Seminar)*, UMSL, St. Louis, MO (2019 & 2021)

Instructor, *Pollination in Agricultural & Urban Settings (Graduate Seminar)*, UMSL, St. Louis, MO (2021)

Instructor, *Introduction to Graduate Research*, UMSL, St. Louis, MO (2019 & 2021)

Instructor, *Introgression (Graduate Seminar)*, UMSL, St. Louis, MO (2020)

Instructor, *Speciation (Graduate Seminar)*, UMSL, St. Louis, MO (2018)

Instructor, *Ethical Issues in Biology*, UMSL, St. Louis, MO (2018)

Faculty Resource Person, *Tropical Biology*, Organization for Tropical Studies, Las Cruces, Costa Rica (June 22-29, 2017)

Faculty Resource Person, *Tropical Biology*, Organization for Tropical Studies, Cabo Blanco, Costa Rica (June 16-22, 2015)

Instructor, *Senior Seminar on Plant-Animal Interactions*, UMSL, St. Louis, MO (2015)

Guest Lecturer, *Introductory Biology* (BIOL1821), UMSL, St. Louis, MO (2015)

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:**

* Sebastian Forward (UMSL), PhD (2022-Present)
* Raj Prasai (UMSL), PhD (2022-Present)
* Ajith Ashokan (UMSL), Postdoctoral Researcher (2022-Present)
* Jordan Hathaway (UMSL), MS (2022-Present)
* Binoshi Hettihawa (UMSL; co-advised with Christy Edwards, MOBOT), MS (2021-Present)
* Belén Alvestegui (UMSL; co-advised with Sebastian Tello, MOBOT), PhD (2021-Present); MS 2021: “Zygomorphic flowers may reduce extinction rates by allowing angiosperms to occur in low abundances”
* Giulia De Gennaro (UMSL; co-advised with Monica Carlsen, MOBOT), PhD (2020-Present)
* Rieka Yu (UMSL), PhD (2018-Present)
* Daniel Tarazona-Ocana (UMSL; co-advised with Monica Carlsen, MOBOT), MS 2022: “Taxonomic revision and morphometric analysis of selected *Anthurium* species from Bolivia and Peru”
* Shawn Kelley (UMSL; co-advised with James Miller, MOBOT), MS 2022: “*Trilepisium* (Moraceae): Four new species from Madagascar”
* Juan Moreira-Hernández (UMSL), PhD 2022: Interspecific pollen transfer, gene flow, and speciation in bat-pollinated *Burmeistera* (Campanulaceae: Lobelioideae)”
* Alexander Lascher-Posner (UMSL), MS 2021: “The influence of pollinator behavior on patterns of pollen dispersal and its implications for floral evolution”
* Justin Bagley (UMSL), Postdoctoral Researcher (2018-2020)
* Diana Gamba (UMSL), PhD 2020: “Investigating drivers of genetic structure in plants: Global, regional and local scales”
* Brock Mashburn (UMSL), MS 2019: “A taxonomic revision of the genus *Burmeistera* in Ecuador”
* Serena Achá (UMSL), PhD 2019: “Vines in the Neotropics: Phylogenomics, biogeography and systematics in passion flowers (*Passiflora* subgenus *Decaloba* section *Decaloba*)”
* Camilo Andrés Calderón-Acevedo (UMSL), PhD 2019: “Taxonomy, species limits, and phylogenetic relationships of *Anoura* Gray 1838 (Chiroptera: Phyllostomidae)”
* Simon Uribe-Convers (UMSL), Postdoctoral Researcher (2015-2017)
* Laura Lagomarsino (UMSL), Postdoctoral Researcher (2015-2017)
* Mayra Ninazunta (UMSL), non-thesis MS (2017)
* Rossana Maguiña (UMSL), MS 2016: “Nectar bats and their flowers across cloud forests of Ecuador and the effect of artificial nectar feeders”
* Mónica Carlsen (UMSL), Postdoctoral Researcher (2014-2015)
* 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:**

* Kristen Rosamond (Parker Lab, UMSL), PhD (2023-Present)
* John Bender (Parker Lab, UMSL), PhD (2023-Present)
* George Todd (Dunlap Lab, UMSL), MS (2023-Present)
* Binoshi Hettihawa (Edwards Lab, MOBOT), MS (2022-Present)
* Becky Hansis-O’Neill (Dunlap Lab, UMSL), PhD (2022-Present)
* Taiwo Iromini (Inglis Lab, UMSL), MS (2022-Present)
* Jeremy Howard (Dunlap Lab, UMSL), PhD (2022-Present)
* Emily Beahm (Dunlap Lab, UMSL), MS (2022-Present)
* Pedro Juárez (Kay Lab, UC Santa Cruz), PhD (2022-Present)
* Andrea Trigueros (Parker Lab, UMSL), PhD (2021-Present)
* Emma Young (Ricklefs Lab, UMSL), PhD (2014-Present)
* Avery Baker (Dunlap Lab, UMSL), MS (2022): “The effects of floral and social information on bumblebee forager learning and memory”
* Eva Colberg (Marquis Lab, UMSL), PhD (2022): “The effects of prescribed fire on ant-mediated seed dispersal in Missouri”
* Yingtong (Amanda) Wu (Ricklefs Lab, UMSL), PhD (2022): “The ecology and evolution of species rarity in oaks (*Quercus* spp.)”
* Patrick Ross (Parker Lab, UMSL), MS 2022: “Survey of the threatened rainforest corridor protected area COMATSA and Marojejy National Park, Madagascar”
* Rachel Brant (Dunlap Lab, UMSL), PhD 2022: “Bee brains: Dissecting pollinator behavior and the importance of plasticity in the face of changing environments”
* Estefania Fernandez (Marquis Lab, UMSL), PhD 2022: “Effects of forest restoration on the recovery of dead wood, associated arthropods, and insect-mediated wood decomposition”
* Andreia Figueiredo (Dunlap Lab, UMSL), PhD 2021: “Cognitive Ecology of Color Vision in Orchid Bees”
* Matthew Austin (Dunlap Lab, UMSL), PhD 2020: “The role of plasticity in bumble bee responses to environmental variability”
* Isabel Loza (Ricklefs Lab, UMSL), PhD 2019: “Regional and historical influences on the spatial distribution of Neotropical trees”
* Meghann Humphries (Ricklefs Lab, UMSL), PhD 2019: “Phylogeographic relationships of *Coereba flaveola* and their malaria parasites”
* Rani Asmarayani (Stevens Lab, UMSL), PhD 2018: “Systematics of Malesian-Pacific *Piper* (Piperaceae)”
* Samoa Asigua (Parker Lab, UMSL), PhD 2018: “The ecology and feeding behavior of mosquitoes in the Galapagos Islands”
* Galen Priest (Marquis Lab, UMSL), PhD 2018: “The ecology of nest cavity use by arboreal ants in the Brazilian Cerrado: resource availability, nest modification, and trophic interactions”
* Justen Zweck (Bernhardt Lab, Saint Louis U.), PhD 2017: “The evolutionary ecology of pollination systems in papilinoid vs non-papilinoid legumes (Fabaceae)”
* Priya Maharaj (Bourne Lab, UMSL), PhD 2016: “Color-mediated foraging by pollinators: A comparative study of two passionflower butterflies at *Lantana camara*”
* Ben Abts (Dunlap Lab, UMSL), MS 2016: “Forgetting and the value of social information”
* Leticia Soares (Ricklefs Lab, UMSL), PhD 2016: “Historical biogeography, spatial distribution, and within-host interactions of avian haemosporidian parasites (Apicomplexa, Haemosporida)”
* Haydee Hernandez (Marquis Lab, UMSL), MS 2015: “The role of herbivores and soils as limiting factors in *Piper*’s distribution in a tropical rain forest”
* Cassandra Lynn Coleman (Clark Lab, U. of Alabama), MS 2012: “A phylogeny and study of pollinator shifts and floral traits in the Neotropical genus *Gasteranthus* (Gesneriaceae)”

**External Reviewer:**

* Ethan Newman (U. of Stellenbosch, South Africa), PhD 2017: “The convergence and divergence of floral traits are driven by the heterogeneity of pollinator and plant communities”
* 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**

* UMSL Co-Investigator of the Year Award (2022, with Dr. Aimee Dunlap)
* Named honorary member of the UMSL Chapter of the Golden Key International Honor Society (2017)
* 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**

* Scandinavian Association for Pollination Ecology (SCAPE) Meeting, (2022, 2020)
  + Invited as Keynote Speaker (2022)
* Botany Meeting (2022, 2020, 2019)
  + Co-organized symposium: "Ecological factors that drive patterns of population genetic structure in plants" D. Gamba and N. Muchhala (2019)
* American Society of Naturalists Conference, Pacific Grove, CA (2018)
* International Botanical Conference, Shenzhen, China (2017)
* North American Symposium on Bat Research, Annual Meetings (2019, 2015, 2014, 2013, 2012, 2008, 2006, 2000)
* Society for the Study of Evolution, Annual Meetings (2015, 2012, 2011, 2008, 2006)
* Congreso Latinoamericano de Murcielagos (2014)
* International Bat Research Conference (2016, 2013)
  + Co-organized symposium: "The ecology and evolution of the mutualism between nectar bats and bat-pollinated flowers" N. Muchhala and M. Holderied (2013)
* Congreso Ecuatoriano de Mastozoología, Puyo, Ecuador (2013)
* Association for Tropical Biology & Conservation, Annual Meetings (2013, 2007, 2004, 2002)
  + Co-organized symposium: “Bats and hummingbirds as pollinators: from ecological differences to evolutionary consequences” L. Lopes, N. Muchhala, S. Buzato (2013)
* Ecological Society of America, Annual Meetings (2009, 2008, 2006)
* 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**

* Maryville University, St. Louis, MO (3/23)
* University of Uppsala, Sweden (10/22)
* University of Akron, OH (3/22)
* University of Connecticut, CT (virtual talk; 2/22)
* University of Tennessee – Knoxville, TN (virtual talk; 9/21)
* Universidad Federal de Pernambuco, Recife, Brazil (virtual talk; 8/21)
* Universidad Yachay Tech, San Miguel de Urcuquí, Ecuador (virtual talk; 6/21)
* Universidad Tecnológica Indoamérica, Quito, Ecuador (virtual talk; 12/20)
* Ministerio del Ambiente, Quito, Ecuador (virtual talk; 10/20)
* Master Gardener Series, Missouri Botanical Garden, St. Louis, MO (virtual talk; 5/20)
* Southern Illinois University – Edwardsville, IL (2/20)
* Washington University of St. Louis, MO (1/20)
* Universidad del Valle, Cali, Colombia (7/19)
* University of São Paolo, São Paolo, Brazil (3/19)
* Universidad Nacional de Colombia, Bogota, Colombia (1/19)
* Universidad del Valle, Cali, Colombia (1/19)
* Columbia University, New York, NY (11/18)
* Keynote Speaker, Congreso Latinoamericano de Mastozoologia (Latin American Mammalogy Conference), La Paz, Bolivia (7/18)
* Rancho Santa Ana Botanic Garden, Claremont, CA (2/18)
* Plenary Speaker, Annual Student Research Symposium, SIU Carbondale, IL (11/17)
* St. Louis Ecology, Evolution, and Conservation (SLEEC) Retreat, St. Louis, MO (9/17)
* University of Miami, Coral Gables, FL (9/17)
* Tyson Biological Station, Washington University of St. Louis, St. Louis, MO (6/17)
* Purdue University, Purdue, IN (11/16)
* Murray State University, Murray, KY (11/16)
* University of KwaZulu-Natal, Pietermaritzburg, South Africa (8/16)
* PGAV Design Firm, St. Louis, MO (5/16)
* Smithsonian Botanical Symposium, “Bat, Birds, Bees, and Bouquets: New Research in Pollination Biology”, Washington, DC (5/16)
* Universidad Mayor de San Andres, La Paz, Bolivia (3/16)
* University of Pittsburgh, Pittsburgh, PA (11/15)
* Missouri University of Science & Technology, Rolla, MO (9/15)
* Sigma Xi Seminar, UMSL Chapter, St. Louis, MO (4/15)
* Simposio de Biodiversidad Neotropical, Quito, Ecuador (2/15)
* Washington University of St. Louis, MO (11/14)
* Saint Louis University, St. Louis, MO (2/14)
* 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:** Science Friday, 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, 2013); 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*

*Biol. J. Linnean Soc.*

*Biology Letters*

*Biotropica*

*Brittonia*

*Caldasia*

*Check List*

*Ecology*

*Ecography*

*Ecology and Evolution*

*Evolution*

*Evolutionary Ecology*

*Functional Ecology*

*Int’l J. of Plant Sciences*

*J. of Evolutionary Biology*

*J. of Ornithology*

*J. of Plant Ecology*

*J. of Pollination Ecology*

*J. of Tropical Ecology*

*Mammalian Species*

*Nature Communications*

*Naturwissenschaften*

*Neotropical Biodiversity*

*New Phytologist*

*Oecologia*

*Oikos*

*Plant Biology*

*Plant Syst. and Evolution*

*PLoS One*

*PNAS*

*Proc. of the Royal Society B*

*Science*

*Selbyana*

* Outreach event at the Orchard on Virginia’s Blossom Festival (4/23); ran a pollination-themed activity and staffed a table to discuss our urban orchard work (with K. Krakos)
* Co-presented talk “Supporting pollinators in community gardens & orchards” at Seed St. Louis’s Community Agriculture Conference (2/23) and helped staff a table to present information on local pollinators and our urban orchard project (with A. Dunlap. G. Camilo, and N. Miller-Struttman)
* Co-Director, Whitney R. Harris World Ecology Center (UMSL, 2022-Present)
* Chair, Harris Grants Committee (UMSL, 2022-Present)
* Biology Physical Facilities and Space Committee Member (UMSL, 2021-Present)
* Biology Executive Council Member (UMSL, 2022-Present)
* Biology Graduate Committee Member (UMSL, 2022-Present)
* Member of the Board of Directors for the Organization for Tropical Studies (San Jose, Costa Rica, 2019-Present)
* Faculty Senate Research Grants Committee, Fall Panel Member (UMSL, 2022)
* Mentor for orchard pollination research project with high school students for Collaborative Laboratory Internships and Mentoring Blueprint (CLIMB) program (UMSL, 2021)
* Biology Graduate Program Director (UMSL, 2019-2022)
* Associate Editor for *Neotropical Biodiversity* (2015-2022)
* Reviewer for three NSF proposals, two National Geographic Society grant proposals, two South African National Research Foundation researcher evaluations, a U. of Missouri Research Board proposal, and a US-Israel Binational Science Foundation grant proposal
* Judge for the OTS Outstanding Student Paper Award (Apr. 2019)
* Sciences Representative for the ‘Saturday Academy Event’ of the UMSL Bridge Program, designed to introduce local high school students to UMSL (Sept. 2018)
* Biology Graduate Committee Member (UMSL, 2015-2019)
* Representative for the Organization for Tropical Studies (UMSL, 2014-Present)
* Presenter for the Science in STL Seminar Series, St. Louis County Library (Weber Branch), St. Louis, MO (Oct. 17)
* Presenter at the Missouri Bat Festival (June 2017)
* Presenter at the 10th Annual Indiana Bat Festival (Terra Haute, IN); three lab members also attended and presented their research (Sept. 2016)
* Judge for UMSL Graduate Research Fair (2016)
* Volunteer for bat survey at Queeny Park, MO; part of a restoration project with the Missouri Department of Conservation (2014)
* Advisor for undergraduate research project with Missouri Botanical Garden’s summer REU program (2014)
* Scientific advisor for National Geographic Magazine article “Call of the Bloom” (2014)
* Executive Council Member (UMSL, 2016-2017)
* Student Awards Committee Member (UMSL, 2014-2017)
* Harris Scholarship Committee Member (UMSL, 2013 - Present)
* 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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