

JEFFREY SOSA-CALVO

Research Entomologist

Department of Entomology
National Museum of Natural History
Smithsonian Institution
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PROFESSIONAL APPOINTMENTS

- Current **National Museum of Natural History, Smithsonian Institution,**
Washington DC.
Research Entomologist (Jan 2020– present)
Supervisor: Dr. Ted R. Schultz.
- 2017 **Arizona State University,** Tempe, Arizona.
Postdoctoral Scholar (Jan 2017– Dec 2019)
Advisors: Dr. Christian Rabeling and Dr. Ted R. Schultz.
Speciation patterns and evolutionary history of leaf-cutting ants and their obligate social parasites.
- 2015 **University of Rochester,** Rochester, New York.
Postdoctoral Fellow Researcher (Jun 2015– Dec 2016)
Advisors: Dr. Christian Rabeling and Dr. Ted R. Schultz.
*Unraveling the evolutionary dynamics of high symbiont diversity in the fungus-farming ant genus *Apterostigma*.*

EDUCATION

- 2015 **University of Maryland at College Park,** College Park, Maryland.
Doctor of Philosophy in Entomology.
Advisors: Drs. Charles Mitter and Ted R. Schultz
Dissertation title: “*Systematics of the cryptic fungus-farming ant genus *Myrmicocrypta* Fr. Smith, with the description of a new genus and species of fungus-farming ants (Hymenoptera: Myrmicinae).*”
- 2007 **University of Maryland at College Park,** College Park, Maryland.
Master of Sciences in Entomology.
Advising committee: Drs. Charles Mitter, Ted R. Schultz, and Maile Neel.
- 2002 **Universidad del Quindío,** Armenia, Quindío, Colombia.
Bachelor of Sciences in Biology and Environmental Education

OTHER TRAINING

- 2014 **National Museum of Natural History, Smithsonian Institution,**
Washington DC.
Research Student (2003–2014)
Advisor: Dr. Ted R. Schultz.
- 2013 **National Museum of Natural History, Smithsonian Institution,**
Washington DC.
Peter Buck Pre-Doctoral Fellow (2011–2013)
Species delimitation and evolution of the fungus-farming ant genus *Myrmicocrypta*
Advisor: Dr. Ted R. Schultz.
- 2011 **University of Maryland, Department of Entomology**
Teaching Assistant
- 2004 **California Academy of Sciences, Ant Course, Costa Rica**
Student
- 2002 **Smithsonian Tropical Research Institute, Gamboa, Panamá.**
Research Assistant (April–July 2002)
Advisor: Dr. Fredric V. Vencl.
- 2001 **Smithsonian Tropical Research Institute, Barro Colorado Island,**
Panamá.
Research Assistant (April 2001–Jan 2002)
Advisor: Dr. William T. Weislo.

PUBLICATIONS

847 citations | h-index: 17, i10-index: 21 | Source: [Google Scholar](#) 13 Dec 2022

Peer-reviewed: (*Co-first author)

31. Gotting, K., DS May, **J Sosa-Calvo**, L Khadempour, CB Francouer, AB Lopez, MW Thairu, S Sandstrom, CM Carlson, M Chevrette, A Rodrigues, MT Pupo, TS Bugni, TR Schultz, JS Johnston, NM Gerardo, CR Currie. (2022) Genomic diversification of the specialized parasite of the fungus-growing ant symbiosis. *Proceedings of the National Academy of Sciences* 119(51): e221309611 www.pnas.org/doi/10.1073/pnas.2213096119
30. *Hanisch, P.E., ***Sosa-Calvo, J.**, TR Schultz. (2022) The last piece of the puzzle? Phylogenetic position and natural history of the monotypic fungus-farming ant genus *Paramyctophylax*. *Insect Systematics and Diversity* 6(1): 11 [Cover.]
<https://doi.org/10.1093/isd/ixab029>
29. Barrera, C., **J Sosa-Calvo**, TR Schultz, C Rabeling, M Bacci. (2022) Phylogenomic reconstruction reveals new insights into the evolution and biogeography of *Atta* leaf-cutting ants (Hymenoptera: Formicidae). *Systematic Entomology* 47(1): 13–35.
<https://doi.org/10.1111/syen.12513>
28. Li, H, C-Y Sun, Y Fang, CM Carlson, H Xu, A Jesovnik, **J Sosa-Calvo**, R Zarnowski, HA Bechtel, JH Fournelle, DR Andes, TR Schultz, PUPA Gilbert, CR Currie. (2020) Bio-mineral armor in leaf-cutter ants. *Nature Communications* 11, 5792.
<https://doi.org/10.1038/s41467-020-19566-3>

27. Mera-Rodríguez, D., F Serna, **J Sosa-Calvo**, JE Lattke, C Rabeling. (2020) A checklist of the non-leaf-cutting fungus-growing ants (Hymenoptera: Formicidae) from Colombia, with new biogeographic records. *CheckList* 16(5): 1205–1227. <https://doi.org/10.15560/16.5.1205>
26. Solomon, SE, C Rabeling, **J Sosa-Calvo**, CT Lopes, UG Mueller, HL Vasconcelos, M Bacci, TR Schultz. (2019) Molecular phylogenetics of *Trachymyrmex* (Hymenoptera, Formicidae) ants and their fungal cultivars provide insights into the evolution of higher attine agriculture. *Systematic Entomology* 44: 939–956. <https://doi.org/10.1111/syen.12370>
25. **Sosa-Calvo, J**, F Fernández, TR Schultz. (2019) Phylogeny and evolution of the cryptic fungus-farming ant genus *Myrmicocrypta* F. Smith (Hymenoptera: Formicidae) inferred from multilocus data. *Systematic Entomology* 44: 139–162. <https://doi.org/10.1111/syen.12313>
24. Li, H, **J Sosa-Calvo**, H Horn, C Rabeling, MT Pupo, J Clardy, TR Schultz, CR Currie. (2018) Convergent evolution of complex structures for ant-bacterial defensive symbiosis in fungus-farming ants. *Proceedings of the National Academy of Sciences* 115(42): 10720–10725. <https://doi.org/10.1073/pnas.1809332115> [Cover.]
23. Guerrero, RJ, F Fernandez, ME Escarraga, LF Perez-Pedraza, F Serna, WP Mackay, V Sandoval, V Vergara, D Suarez, EI Garcia, A Sanchez, AD Meneses, MC Tocora, **J Sosa-Calvo**. (2018) New records of myrmicine ants (Hymenoptera: Formicidae) for Colombia. *Revista Colombiana de Entomologia* 44(2): 238–259.
22. **Sosa-Calvo, J**, TR Schultz, A Jesovnik, R Dahan, C Rabeling. (2018) Evolution, systematics, and natural history of a new genus of cryptobiotic fungus-growing ants. *Systematic Entomology* 43: 549–567. <https://doi.org/10.1111/syen.12289> [Cover]
21. Mueller, UG, HD Ishak, SM Brushi, JJ Herman, CC Smith, SE Solomon, AS Mikheyev, C Rabeling, JJ Scott, M Cooper, A Rodriguez, A Ortiz, CRF Brandão, JE Lattke, FC Pagnocca, SA Rehner, TR Schultz, HL Vasconcelos, RMM Adams, M Bollazzi, RM Clark, AG Himler, JS LaPolla, IR Leal, RA Johnson, F Roces, **J Sosa-Calvo**, R Wirth, M Bacci Jr. (2017) Biogeography of mutualistic fungi cultivated by leafcutter ants. *Molecular Ecology* 26(24): 6921–6937. <https://doi.org/10.1111/mec.14431>
20. **Sosa-Calvo, J**, A Jesovnik, HL Vasconcelos, M Bacci Jr, TR Schultz. (2017) Rediscovery of the enigmatic fungus-farming ant "*Mycetosoritis*" *asper* Mayr (Hymenoptera: Formicidae): Implications for taxonomy, phylogeny, and the evolution of agriculture in ants. *PLoS ONE* 12(5): e0176498 <https://doi.org/10.1371/journal.pone.0176498>
19. Branstetter, MG, A Jesovnik, **J Sosa-Calvo**, MW Lloyd, BC Faircloth, SG Brady, TR Schultz. (2017) Dry habitats were crucibles of domestication in the evolution of agriculture in ants. *Proceedings of the Royal Society B* 284: 20170095. <http://dx.doi.org/10.1098/rspb.2017.0095>
18. **Sosa-Calvo, J**, A Jesovnik, CT Lopes, A Rodrigues, C Rabeling, M Bacci Jr., HL Vasconcelos, TR Schultz. (2017) Biology of the relict fungus-farming ant *Apterostigma megacephala* Lattke, including descriptions of the male, gyne, and larva. *Insectes Sociaux* 79 (3770): 18. <https://doi.org/10.1007/s00040-017-0550-2>
17. Jesovnik, A, **J Sosa-Calvo**, M Lloyd, M Branstetter, F Fernández, TR Schultz. (2017) Phylogenomic species delimitation and host-symbiont coevolution in the fungus-farming

- ant genus *Sericomyrmex* Mayr (Hymenoptera: Formicidae): Ultraconserved elements (UCEs) resolve a recent radiation. *Systematic Entomology* 42(3): 523–542. <https://doi.org/10.1111/syen.12228>
16. Hogan, CT, TH Jones, M Zhukova, **J Sosa-Calvo**, RMM Adams. (2017) Novel mandibular gland volatiles in the *Apterostigma pilosum* species group. *Biochemical Systematics and Ecology* 72: 56–62.
 15. Rabeling, C, **J Sosa-Calvo**, LA O’Connell, LA Coloma, F Fernández. (2016) *Lenomyrmex hoelldobleri*: a new ant species discovered in the stomach of the dendrobatid poison frog, *Oophaga sylvatica* (Funkhouser). *Zookeys* 618: 79–95.
 14. Schultz, TR, **J Sosa-Calvo**, SG Brady, CT Lopes, UG Mueller, M Bacci Jr., HL Vasconcelos. (2015) The most relictual fungus-farming ant species cultivates the most recently evolved and most highly domesticated fungal symbiont species. *The American Naturalist* 185: 693–703. <https://doi.org/10.1086/680501>
 13. **Sosa-Calvo, J**, A Jesovnik, E Okonski, TR Schultz. (2015) Locating, collecting, and maintaining colonies of fungus-farming ants (Hymenoptera: Myrmicinae: Attini). *Sociobiology* 62: 300–320.
 12. **Sosa-Calvo, J**, TR Schultz, CRF Brandão, C Klingenberg, RM Feitosa, C Rabeling, M Bacci, CT Lopes, HL Vasconcelos. (2013) *Cyatta abscondita*: Taxonomy, evolution, and natural history of a new fungus-farming ant genus from Brazil. *PLoS ONE* 8(11): e80498 <https://doi.org/10.1371/journal.pone.0080498>
 11. Jesovnik, A, **J Sosa-Calvo**, CT Lopes, HL Vasconcelos, TR Schultz. (2013) Nest architecture, fungus gardens, reproductive castes, and larvae of the fungus-growing ant *Mycetagroicus inflatus* Brandão & Mayhé-Nunes. *Insectes Sociaux* 60: 531–542.
 10. Solomon, SE, UG Mueller, CT Lopes, A Rodrigues, **J Sosa-Calvo**, TR Schultz. (2011) Nesting biology and fungiculture of *Mycetagroicus cerradensis* shed light on the origins of higher attine agriculture. *Journal of Insect Research* 11: 1–14.
 9. **Sosa-Calvo, J**, TR Schultz. (2010) Three remarkable new fungus-growing ant species of the genus *Myrmicocrypta*, with a reassessment of the characters that define the genus and its position within Attini. *Annals of the Entomological Society of America* 103(2): 181–195 [Cover].
 8. **Sosa-Calvo, J**, TR Schultz, JS LaPolla. (2010) Review of the dacetine ants of Guyana (Formicidae: Myrmicinae). *Journal of Hymenoptera Research* 19(1): 12–43.
 7. **Sosa-Calvo, J**, SG Brady, TR Schultz. (2009) The gyne of the enigmatic fungus-farming ant species *Mycetosoritis explicata*. *Journal of Hymenoptera Research*, 18: 113–120.
 6. Azorsa, F & **J Sosa-Calvo**. (2008) Description of a remarkable new species of ant in the genus *Daceton* Perty (Formicidae: Dacetini) from South America. *Zootaxa* 1749: 27–38.
 5. Bolton, B, **J Sosa-Calvo**, F Fernandez, JE Lattke. (2008) New synonyms in Neotropical Myrmicine ants (Hymenoptera: Formicidae). *Zootaxa* 1732: 61–64.
 4. LaPolla, JS, T Suman, **J Sosa-Calvo**, TR Schultz. (2007) Leaf litter ant diversity in Guyana. *Biodiversity and Conservation* 16: 491–510.
 3. LaPolla, JS, & **J. Sosa-Calvo**. (2006) Review of the ant genus *Rogeria* (Hymenoptera: Formicidae) in Guyana. *Zootaxa* 1330: 59–68.

2. **Sosa-Calvo, J**, SO Shattuck, and TR Schultz. (2006) Dacetine ants of Panama: New records and description of a new species (Formicidae: Myrmicinae: Dacetini). *Proceeding of the Entomological Society of Washington*, 108(4): 814–821.
1. **Sosa-Calvo, J** & DF Campos. (2005) First record of the family Heloridae (Hymenoptera: Proctotrupeoidea) for Colombia. *Revista de la Sociedad Colombiana de Entomología SOCOLEN* 31: 233–234 (In Spanish).

Submitted

1. Robles Lopez, K., **J. Sosa-Calvo**, JM Calixto, EZ de Albuquerque, KM Baudier. One ant's trash is another ant's treasure: Army ant middens are ephemeral resources for diverse assemblages of Neotropical ants. (In review.) Submitted to: *Biotropica*.

In preparation (available upon request):

4. **Sosa-Calvo, J.**, TR Schultz, A Rodrigues, BL Sanchez, CT Lopes, YA Mera, HL Vasconcelos, J Billen, C Rabeling. A social insect cultivates a dense coat of symbiotic fungus on its body.
3. **Sosa-Calvo, J.**, TR Schultz, C Rabeling. The *Apterostigma auriculatum* species group: Phylogenomic species delimitation and taxonomy.
2. **Sosa-Calvo, J.**, TR Schultz. Taxonomic revision of the Neotropical fungus-farming ant genus *Myrmicocrypta* Fr. Smith (Hymenoptera, Formicidae, Myrmicinae).
1. **Sosa-Calvo, J.** Natural history of a newly discovered fungus-farming ant in the genus *Apterostigma* (Formicidae: Attini) uniquely associated with black yeasts.

Other publications (book chapters, book reviews, non-peer reviewed):

5. Escarraga, ME, JT Longino, & **J Sosa-Calvo**. (2019) Chapter 23. Subfamily Proceratiinae. In: Fernández, F, RJ Guerrero, & T Delsinne, eds., *Hormigas de Colombia*, Universidad Nacional de Colombia, Bogotá D. C., 1200 pp. (In Spanish)
4. **Sosa-Calvo, J.** (2012) Adventures Among Ants: A Global Safari with a Cast of Trillions. *Proceedings of the Entomological Society of Washington*, 114(3): 430–431.
3. **Sosa-Calvo, J** & JT Longino. (2008) Chapter 7. Subfamily Proceratiinae. In: Jiménez, T. M. Arias, F. Fernández y F. H. Lozano, eds., *Sistemática, biogeografía y conservación de las hormigas cazadoras de Colombia*, Instituto de Investigación de Recursos Biológicos “Alexander von Humboldt”, Bogotá D. C., 622 pp. (In Spanish)
2. Schultz, TR & **Sosa-Calvo, J.** (2008) Chapter 2. Ants of Southern Guyana: a preliminary report. 31–32. In: Alonso, LE et al. (Eds.) RAP Bulletin of Biological Assessment, 51. Conservation International.
1. **Sosa-Calvo, J.** (2007) Chapter 5. Ants of the leaf-litter of two plateaus in Eastern Suriname. 92–98. In: Alonso, L.E. and Mol, J.H. (Eds.) RAP Bulletin of Biological Assessment, 43. Conservation International.

FUNDING AWARDS

-
- 2018 Western North American Naturalist Grant, “*Identity and function of black yeasts in the nest architecture of velvety tree ants (Liometopum spp.)*.” C. Kwapich and J. Sosa-Calvo [\$2,000]

- 2017 ASU Fostering Postdoctoral Research in the Life Sciences Grant, “*Identity and function of black yeasts in the nest architecture of velvety tree ants (Liometopum spp).*” C. Kwapich and J. Sosa-Calvo [**\$5,712**]
- 2017 National Science Foundation (NSF), DEB-1654829, “*Speciation patterns and evolutionary history of leaf-cutting ants and their obligate parasites: an integrative phylogenomic approach.*” Awarded to PIs Christian Rabeling and Ted R. Schultz [**\$878,885** total] [***I contributed to the writing of the pre- and full- proposals and was funded as a postdoctoral researcher, designated by name in the proposal, for three years***].
- 2016 Global Genome Initiative Rolling Award, Smithsonian Institution, August 2016, “*The insect diversity of a Brazilian “hotspot of discovery:” A survey of the last Amazonian Forest frontier*” PI: J. Sosa-Calvo; Co-PIs: TR Schultz, D Gotzek, M Buffington, R Kula, M Gates [**\$9,430**]
- 2016 Global Genome Initiative Rolling Award, Smithsonian Institution, August 2016, “*Biodiversity Survey of the Cambodian Entomofauna*” PI: D. Gotzek; Co-PIs: TR Schultz, M Buffington, R Kula, M Gates, J Sosa-Calvo [**\$9,970**]
- 2014 National Science Foundation (NSF), DEB-1456964, “*Unraveling the evolutionary dynamics of high symbiont diversity in the fungus-farming ant genus Apterostigma: A phylogenomic approach.*” Awarded to PIs Christian Rabeling and Ted R. Schultz [**\$755,300** total] [***I co-authored the pre- and full- proposals and was funded as a post-doctoral researcher, designated by name in the proposal, for three years***].
- 2011 Peter Buck Pre-doctoral Fellowship, Smithsonian Institution-National Museum of Natural History, 2011 [**\$30,000**/year. For 2 years].
- 2011 National Museum of Natural History, Research Program Grant. “*Biological Diversity of the Guiana Shield.*” PI: Vicki Funk; Co-PIs: K. Wurdack, R.P. Anderson, S.G. Brady, M. Buffington, T.R. Schultz, J.S. LaPolla, J. Ware, J. Armbruster, R.P. Vari, R.D. MacCulloch, B.P. Noonan, B. Lim, J. Sosa-Calvo. Requested: \$141,555; awarded: **\$210,000** (\$70,000/year. For 3 years).
- 2010 International Union for the Study of Social Insects- North American Section Travel Grant. [**\$1,000**]
- 2010 Max and Vera Britton Environmental Science Award, Cosmos Club Foundation, Washington DC. [**\$3,000**]
- 2010 Smithsonian Institution-National Museum of Natural History, Small Grants Program. Co-PI. [**\$5,000**]
- 2007 Ernst Mayr Travel Award in Animal Systematics- Museum of Comparative Zoology, Harvard University. [**\$1,500**]
- 2007 Jacob K. Goldhaber Travel Award, University of Maryland. [\$450, matched by Entomology Department, total **\$900**]
- 2006 Smithsonian Institution- National Museum of Natural History, Collection Care Grant. Co-PI. [**\$20,000**]

- 2005 Amazon Conservation Association, Graduate Research Grant. Los Amigos Research Center and Conservation, Madre de Dios, Peru. [**\$1,500**]
- 2005 Conservation International Rapid Assessment Program (RAP) Fieldwork and curatorial Fellowship. [**\$4,500**] [Included funds for contractor.]
- 2004 Smithsonian Institution- Trust Endowment Award (Wolcott Fund). Co- PI. [**\$5,000**]
- 2003 Andrew W. Mellon Research Exploration Awards in Tropical Biology. Smithsonian Tropical Research Institute- Organization for Tropical Studies. [**\$1,500**]
- 2002 Andrew W. Mellon Foundation Award. Smithsonian Tropical Research Institute, Panama. [**\$3,000**]
- 2001 Barro Colorado Island (BCI) Latino Scholarship. Smithsonian Tropical Research Institute, Panama. [**\$1,000**]

ABSTRACTS AND PRESENTATIONS

- 2022 Oral Presentation- “*Phylogenomic reconstruction, evolution, and biogeography of Atta leaf-cutting ants (Hymenoptera: Formicidae).*” CA Barrera, M. Bacci, J. Sosa-Calvo, TR Schultz, C. Rabeling. 26th International Congress of Entomology, Helsinki 2022. 17–22 July, Helsinki, Finland.
- 2022 Poster- “*Detecting the invisible: using UCEs to delimit cryptic species in the Cyphomyrmex rimosus group (Formicidae: Myrmicinae).*” E. Zoppas de Albuquerque, J. Sosa-Calvo, C. Rabeling, T.R. Schultz. XIV International Union for the Study of Social Insects. 3–7 July 2022. San Diego, CA, U.S.A.
- 2022 Poster- “*Hidden treasures in ants’ trash: Army ant middens as temporary resources for other ants’ species.*” K. Robles Lopez, J. Sosa-Calvo, E. Zoppas de Albuquerque, J.M. Calixto, K.M Baudier. XIV International Union for the Study of Social Insects. 3–7 July 2022. San Diego, CA, U.S.A.
- 2022 Oral Presentation- “*The mystery of the samba wasp.*” M. Buffington and J. Sosa-Calvo. Lightning Talks. #Hymathon2022- A 24-hour virtual symposium from the International Society of Hymenopterists. 31 March – 1 April, 2022.
- 2021 Oral Presentation- “*Phylogenetic position and natural history of the monotypic fungus-farming ant genus Paramycetophylax (Formicidae: Attini).*” P.E. Hanisch, J. Sosa-Calvo, T.R. Schultz. Round Table: Genetics and Population Genetics. Insetos Sociais em Rede [V Workshop sobre Insetos Sociais – VI Simposio de Termitologia – XXV Simposio de Mirmecologia]. 11–15 October 2021. Virtual meeting.
- 2021 Oral Presentation- “*Ultraconserved elements reconstruct the phylogenetic relationships and the evolutionary history of the leaf-cutting ant genus Atta Fabricius, 1804 (Formicidae: Attini).*” C.A Barrera, J. Sosa-Calvo, TR Schultz, C. Rabeling, M. Bacci Jr. Round Table: Genomics and other “Omics.” Insetos Sociais em Rede [V Workshop sobre Insetos Sociais – VI Simposio de Termitologia – XXV Simposio de Mirmecologia]. 11–15 October 2021. Virtual meeting.
- 2021 Invited Oral Presentation- “*Phylogenomics and coevolution in the fungus-farming ants’ symbiosis.*” (In Spanish). Instituto de Biología, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile. 29 Sept 2021.
- 2021 Invited Oral Presentation- “*Fungus-farming ants and phylogenomics.*” Lightning Talks

- Series, Laboratory of Analytical Biology, National Museum of Natural History, Smithsonian Institution. 28 Jun 2021. Washington DC.
- 2020 Oral Presentation- “*Beauty and the yeast: A social insect cultivates a dense coat of symbiotic fungus on its body.*” 10-minute paper: SysEB, Symbionts and Microbes. Entomological Society of America, Entomology 2020: Virtual Annual Meeting, 11–25 Nov 2020.
- 2020 Invited Oral Presentation- “*Beauty and the yeast: A social insect nurtures a fungal coat on its body.*” Lightning Talks Series, The Senate of Scientist, National Museum of Natural History, Smithsonian Institution. 20 Nov 2020. Washington DC.
- 2020 Invited Oral Presentation- “*La historia natural y la filogenómica ayudan a comprender la simbiosis de las hormigas que cultivan hongos.*” Grupo de Estudio de Hormigas Neotropicales. 9 Oct 2020. Virtual Talk, Colombia.
- 2019 Co-organizer Round Table- “*Advances in studying ant evolution: From amber inclusions to complex symbiotic relationships.*” J Sosa-Calvo & EZ Albuquerque. XXIV Simpósio de Mirmecologia: An International Meeting. 30 Sep–04 October 2019. Belo Horizonte, Minas Gerais, Brazil.
- 2019 Oral Presentation- “*Evolutionary history of yeast agriculture in fungus-growing ants: A phylogenomic approach*” EZ Albuquerque, J Sosa-Calvo, TR Schultz, C Rabeling. XXIV Simpósio de Mirmecologia: An International Meeting. 30 Sep–04 October 2019. Belo Horizonte, Minas Gerais, Brazil.
- 2019 Poster- “*Revealing the phylogenetic and phylogeographic history of the leaf-cutting ant genus *Atta Fabricius, 1804 (Formicidae: Attini)* using ultra-conserved elements (UCEs).*” CA Barrera, C Rabeling, J Sosa-Calvo, M Bacci Jr. XXIV Simpósio de Mirmecologia: An International Meeting. 30 Sep–04 October 2019. Belo Horizonte, Minas Gerais, Brazil.
- 2018 Oral Presentation- “*Species delimitation in the fungus-farming ant genera *Cyphomyrmex* and *Mycetophylax* and their fungal cultivars: A phylogenomic test of the evolution of symbiont fidelity.*” Sosa-Calvo, J, TR Schultz, C Rabeling. XVIII International Union for the Study of Social Insects. 5-10 August 2018. Guarujá, São Paulo, Brasil.
- 2018 Oral Presentation- “*Molecular systematics *Trachymyrmex* ants and their fungal cultivars.*” Solomon, SE, C Rabeling, J Sosa-Calvo, CT Lopes, UG Mueller, HL Vasconcelos, M Bacci, TR Schultz. XVIII International Union for the Study of Social Insects. 5-10 August 2018. Guarujá, São Paulo, Brasil.
- 2018 Oral presentation- “*Biogeography of leafcutter ants and their fungal cultivars.*” Mueller, UG, HD Ishak, SM Bruschi, MR Kardish, AM Wright, AL Carlson, CC Smith, JJ Herman, SE Solomon, AS Mikheyev, C Rabeling, JJ Scott, M Cooper, A Rodrigues, A Ortiz, CRF Brandão, JE Lattke, FC Pagnocca, SA Rehner, TR Schultz, HL Vasconcelos, RMM Adams, M Bollazzi, RM Clark, AG Himler, JS LaPolla, IR Leal, RA Johnson, F Roces, J Sosa-Calvo, R Wirth, M Bacci Jr. XVIII International Union for the Study of Social Insects. 5-10 August 2018. Guarujá, São Paulo, Brasil.
- 2017 Oral Presentation- “*Species delimitation in the fungus-farming ant genera *Cyphomyrmex* and *Mycetophylax* and their fungal cultivars: A phylogenomic test of the evolution of symbiont fidelity.*” Sosa-Calvo, J, TR Schultz, C Rabeling. XXIII Simposio de Mirmecologia. An International Meeting. 23-27 October 2017. Curitiba, Parana, Brasil.
- 2017 Poster- “*Phylogenomic species delimitation and host-symbiont coevolution in the fungus-farming ant genus *Sericomyrmex* Mayr (Hymenoptera: Formicidae): Ultraconserved elements (UCEs) resolve a recent radiation.*” Jesovnik, A, J Sosa-Calvo, M

- Lloyd, M Branstetter, F Fernandez, TR Schultz. Global Biodiversity Genomics Conference, Smithsonian National Museum of Natural History, in Washington DC (Feb. 21–23, 2017)
- 2016 Poster- “*Variation of mandibular gland volatiles in the Apterostigma pilosum species group.*” Hogan CT, Jones TH, Zhukova M, Sosa-Calvo J, Adams RMM. Eastern Branch Meeting of the Entomological Society of America in Philadelphia PA, Talk #209 (Jan. 4–7, 2016)
- 2015 Invited Oral Presentation- “*Systematics of the cryptic fungus-farming ant genus Myrmicocrypta Fr. Smith (Hymenoptera: Formicidae: Attini).*” J. Sosa-Calvo and T.R. Schultz. XXII Simpósio de Mirmecologia: An International Meeting. 18-22 October 2015. Ilheus, Bahia, Brasil. 22 October 2015
- 2015 “*Phylogenomic data fully resolve fungus-farming ant phylogeny but create challenges for taxonomy.*” T.R. Schultz, M.G. Branstetter, A. Jesovnik, J. Sosa-Calvo, M. Lloyd, B.C. Faircloth, and S.G. Brady. XXII Simpósio de Mirmecologia: An International Meeting. 18-22 October 2015. Ilheus, Bahia, Brasil. 22 October 2015.
- 2015 Oral Presentation- “*Evolutionary dynamics of high symbiont diversity in the fungus-growing ant genus Apterostigma: a phylogenomic approach.*” J. Sosa-Calvo, T.R. Schultz, and C. Rabeling. XXII Simpósio de Mirmecologia: An International Meeting. 18-22 October 2015. Ilheus, Bahia, Brasil. 22 October 2015.
- 2015 Oral Presentation- “*Systematics of the cryptic fungus-farming ant genus Myrmicocrypta Fr. Smith, with the description of a new genus and species of fungus-farming ants.*” University of Maryland
- 2011 Invited Oral Presentation- “*Synthesis of taxonomy, symbiosis, and phylogenetics in fungus-growing ants.*” J. Sosa-Calvo and T.R. Schultz. XX Simpósio de Mirmecologia: An International Meeting. October 2011. Petrópolis, Rio de Janeiro, Brasil.
- 2010 Poster- “*Phylogenetic analyses of early evolutionary transitions in fungus-farming ants.*” J. Sosa-Calvo, T.R. Schultz, C.R.F. Brandão, C.T. Lopes, and H.L. Vasconcelos. Poster. XVI Congress of the International Union for the Study of Social Insects, Copenhagen, Denmark, 8-13 August 2010.
- 2007 Oral Presentation- “*Leaf-litter ant diversity patterns in Guyana.*” J Sosa-Calvo, JS LaPolla, T Suman, TR Schultz. XVIII Simpósio de Mirmecologia: An International Meeting. September 2007. São Paulo, São Paulo, Brasil.
- 2006 Poster- “*Leaf-litter ant diversity patterns in Guyana.*” J. Sosa-Calvo, J.S. LaPolla, T. Suman, and T.R. Schultz. XVth International Congress of the International Union for the Study of Social Insects. Omni Shoreham Hotel, Washington, DC. 01 August 2006.

TEACHING EXPERIENCE

- 2021 Guest Lecturer- University of Massachusetts at Lowell, Entomology
Topic- Sampling and collecting methods for the study of insects
- 2016 Guest Lecturer- University of Rochester, Introduction to Organismal Biology
Topic- Species Interactions
Topic- Co-evolution
Topic- Evolution of Agriculture in Ants
- 2012 Instructor- Latin American Ant Course

- Sashavacayoc Center, Puerto Maldonado, Peru. Taxonomy and systematics of ants.
- 2011 Teaching Assistant, University of Maryland
BSCI120- Insects. Lab Lecturer and grader.
- 2008 Teaching Assistant. The Hymenopteran Course
Punta Cana Ecological Foundation, Biodiversity Center, Dominican Republic.

PROFESSIONAL SERVICE, SYNERGISTIC ACTIVITIES, AND OTHER SKILLS

INSTITUTIONAL SERVICE

Laboratories of Analytical Biology (LAB) Advisory Committee member, Department of Entomology representative, National Museum of Natural History, Smithsonian Institution. (Jan 2022– present)

EDITORIAL SERVICE

Subject Editor, Formicidae, Journal ZooKeys, 2022– Present.

Subject Editor, Formicidae, Biodiversity Data Journal, 2022– Present

Associate Editor, Brazilian Journal of Entomology [Revista Brasileira de Entomologia, in Portuguese.], 2017–2021

Guest Editor, Journal of Insect Systematic and Diversity, Entomological Society of America, 2021–2022.

Special Collection: *Ant Systematics in the 21st Century: A Phylogenomic Perspective.*

REVIEWER

a- Scientific journals:

Acta Biológica Colombiana, Insect Systematics and Diversity, Insectes Sociaux, Journal of Fungi, Journal of Hymenoptera Research, Molecular Ecology, Molecular Phylogenetics and Evolution, Myrmecological News, Neotropical Entomology, PeerJ, Plos ONE, Proceedings of the Entomological Society of Washington, Psyche, Revista Brasileira de Entomologia, Sociedad Colombiana de Entomología SOCOLEN, Sociobiology, Systematic Entomology, Zookeys, Zootaxa.

b- Funding agencies:

Peter Buck Fellowship, Smithsonian Institution. Reviewer of Postdoctoral proposals.

PROFESSIONAL MEMBERSHIPS

Entomological Society of America
International Society of Hymenopterists
International Union for the Study of Social Insects North American Section
Society of Systematic Biology

UNDERGRADUATE AND GRADUATE TRAINING

- Jessica Brandwein, graduate student, University of Florida, Laboratory procedures for extracting DNA from alcohol-preserved, cultured, or lyophilized fungal tissue.
- Molecular Workshop, ASU 2019. Trained three Latin American women (two graduate students and one postdoctoral researcher) in molecular techniques, including pipetting techniques, DNA extraction of destructive and non-destructive preserved specimens (both alcohol and pin-mounted specimens), quantification and shearing of DNA, library preparation for gathering genomic data, enrichment of ultraconserved regions of the genome (UCEs), qPCR, bioinformatics pipeline. (28 Jan- 1 April).
- Laura Daniela Mera, undergraduate student, Universidad Nacional de Colombia, taxonomy, identification, and collection curation of fungus-farming ants (2018). Currently a graduate student at Arizona State University, AZ, USA.
- Maria Camila Tocora, undergraduate student, Universidad Nacional de Colombia, taxonomy of fungus-farming ants, especially the genus *Myrmicocrypta* of Colombia. (2017).
- Juliana Calixto, graduate student Arizona State University, taxonomy of fungus-farming ants, especially the genus *Apterostigma*. (2017-2018).
- Steven J. Messer, graduate student Arizona State University, extraction and generation of Ultraconserved Elements (UCEs), for *Nylanderia* ant project. (2018).
- Ti Ericksson, graduate student Arizona State University, generation of Ultraconserved Elements (UCEs) for *Myrmecocystus* ant project. (2017-2018).
- Allie Born, undergraduate student University of Rochester, generation of molecular data and curation of insect collection. (2015-2016).
- Benjamin Gerstner, undergraduate University of Rochester, generation of molecular data including UltraConserved Elements (UCEs) and curation of insect collection. (2015-2016).
- Chris Patrick, undergraduate student at Allegheny College, Meadville, PA, sorting and identification of leaf-litter ants of the Guiana Shield. (2014-2015).
- Claudia Ortiz, master student Universidad Nacional de Colombia, generation of molecular data for her thesis on the ant genus *Brachymyrmex*. (2012-2014).
- Niko Schultz, high school student at Eleanor Roosevelt High, generation of molecular data for ants and fungi, a paper with her results is in progress.
- Amalia Gomez-Rexrode, high school student at Sidwell Friends School, Youth Engagement through Science (YES!) Program. Sorting and identification of ants from leaf-litter samples across the Guiana Shield and Brazil.
- Miguel Portillo, high school student at Capital City Public Charter School, Youth Engagement through Science (YES!) Program. Morphology of fungus-farming ants, especially in the genus *Cyphomyrmex*.
- Dominique Majano, Parkdale High School, Youth Engagement through Science (YES!) Program. Sorting leaf-litter samples, preparation of specimens, capture and creation of digital images of ants, caring for live ant colonies.
- Laura Victoria Florez, undergraduate student, Universidad de Los Andes, Colombia, Research Training Program (RTP), morphology and DNA barcoding of ants in the genus *Pheidole*.
- Phil Barden, undergraduate student, Arizona State University, Research Training Program (RTP) intern, Diversity of leaf-litter *Pheidole* ants in Guyana. DNA barcoding and autotomontage imaging. Currently Associate Professor at New Jersey Institute of Technology, NJ, USA.
- Trained four Surinamese undergraduate students in field collection methods, including Winkler (leaf-litter) sampling, hand collecting, and malaise trapping as part of Conservation International- TEAM Project.

Trained one Surinamese undergraduate student in field collection methods, including Winkler (leaf-litter) sampling, hand and Malaise collecting, as part of Conservation International RAP Program.

COMMUNITY OUTREACH

Bug Fest, National Museum of Natural History (2009, 2010); a museum wide-open house.

Contributed to generate the William L. Brown, Jr., Digital Library of Ant Taxonomic Literature, an online database of PDF versions of papers from the 19th through 21st centuries, and for the NMNH Ant Type Specimen Image Database.

http://entomology.si.edu/SIAntLab_WLB-Library.html

COMPUTING SKILLS

Software Variety of tools for sequence processing, alignment, and phylogenetic inference: Sequencher, mafft, muscle, PartitionFinder, RAxML, IQ-TREE, MrBayes, BEAST, ASTRAL, BioGeoBEARS, Phyluce pipeline, Genious, species delimitation methods. Python and R programming languages. Adobe Photoshop and Illustrator, standard office suite software.

Other skills Working on remote computers

LABORATORY TECHNICAL SKILLS

DNA extraction and amplification
Next-generation DNA and RNA library preparation
Target enrichment
Optical and Scanning Electron Microscopy
Curation of natural history collections

LANGUAGE SKILLS

Spanish (Native language)
English (fluent)
Portuguese (good knowledge)

FIELD WORK EXPERIENCE

Colombia: Agroecosystems in Colombian Andes, Jun-Sep 2000
Panama: Barro Colorado Island, April 2001- Jan 2002
Costa Rica: Manuel Antonio National Park, July 2001 (1 week)
Costa Rica: La Selva Biological Station, August 2003 (4 weeks)
Panama: Barro Colorado Island, July 2003 (4 weeks)
Peru: Andean Cloud Forest, Kosñipata- La Esperanza Biological Station, Sept 2004 (2.5 weeks).
Los Amigos Research Center, Basin Amazonian Forest, Oct 2004 (4 weeks).
Suriname: Raleighvallen Rainforest, Copenname River, Feb 2005 (2 weeks); Lely and Nassau Mountains, Sept-Oct 2005 (3 weeks)
Peru: Los Amigos Research Center, Basin Amazonian Forest, Oct-Nov 2005 (4 weeks); Tambopata River, Puerto Maldonado, Dec 2005 (1 week)
Suriname: Bakhuis Mountains, March 2006 (2.5 weeks)
Guyana: Acarai Mountains, Sept-Nov 2006 (5 weeks); Rupununi region, Nov 2006 (1 week)

Colombia: Llanos Orientales, Sept-Oct 2007 (1.5 weeks); Amacayacu National Park, Amazonas, Oct 2007 (2 weeks)

Dominican Republic: Punta Cana, Sept 2008 (2 weeks)

Brasil: São Paulo, Minas Gerais, Goiás, Mato Grosso, Rondonia, Brasília/Distrito Federal, Tocantins, Piauí, Maranhão, Pernambuco, Bahia: 16 Sept to 16 Nov 2008

Brasil: Amazonas, Pará, Brasília/Distrito Federal, Minas Gerais, São Paulo, Santa Catarina, Rio Grande do Sul, Bahia, Espírito Santo, Paraná: 9 Jan to 15 April 2009

Brasil: Pará (particularly Carajás), Tocantins, Brasília/Distrito Federal, Minas Gerais, São Paulo: 25 March to 24 April 2010.

Brasil: Brasília-DF, Minas Gerais, São Paulo, Santa Catarina, Rio de Janeiro: 13 Sept to 02 Oct 2011

Guyana: Conservation International Concession, Essequibo River: Oct 2011 [Organized and lead expedition]

Peru: Madre de Dios, Tambopata National Reserve, Sachavacayoc Center: 06 July to 04 August 2012.

Brasil: Tocantins and Para, Araguacema; Rio Claro; Uberlandia: 02-17 October 2012.

Brasil: Pará, Mato Grosso, Mato Grosso do Sul, Parana, Santa Catarina, São Paulo: 01 Oct- 04 Nov 2014.

Brasil: Mato Grosso, Bahia: 02-25 Oct 2015.

Brasil: Pará and Mato Grosso: 17 Sept to 30 Oct, 2017.

Paraguay: Boqueron, Parque Nacional Teniente Enciso, Oct-Nov 2015 (2 weeks)

RESEARCH COVERED BY POPULAR MEDIA

EONS, PBS (May, 2022), "When ants domesticated fungi." <https://www.youtube.com/watch?v=XuPtW8lBCM&t=2s> (feature of *Proc. Royal Soc. B*, 2017)

Gernis, N (Nov, 2020), "Scientists find first known case of biomineral armor in insects." KJZZ, <https://kjzz.org/content/1638892/scientists-find-first-known-case-biomineral-armor-insects> (coverage of *Nature Communications*, 2020)

St Fleur, N (Oct, 2018), "Trilobites: An ancient ant-bacteria partnership to protect fungus." *The New York Times*, <https://www.nytimes.com/2018/10/06/science/ants-fungus-amber.html> (coverage of *PNAS*, 2018)

St Fleur, N et al., (Oct, 2018), "Science news in brief: Ants were millions of years ahead of us in producing antibiotics." *The Independent*, <https://www.independent.co.uk/news/science/science-news-brief-ants-shed-skin-planet-nine-drugs-a8576941.html> (coverage of *PNAS*, 2018)

University of Wisconsin (Oct, 2018), "Set in amber, fossil ants help reconstruct evolution of fungus farming." *Science Daily*, <https://www.sciencedaily.com/releases/2018/10/181001154044.htm> (coverage of *PNAS*, 2018)

Caspermeyer, J (Oct, 2018), "Ants invented agriculture long before humans started watching 'ant farms'." *ASU Now*, <https://asunow.asu.edu/20181009-ants-invented-agriculture-long-humans-started-watching-ant-farms> (coverage of *PNAS*, 2018)

Hamilton, E (Oct, 2018), "Set in amber, fossil ants help reconstruct evolution of fungus farming." *Wisconsin State Farmer*, <https://www.wisfarmer.com/story/news/2018/10/02/set-amber-fossil-ants-help-reconstruct-evolution-fungus-farming/1503528002/> (coverage of *PNAS*, 2018)

Main, D (May, 2017), "Tech & Science: Rare ants rediscovered that grow fungus with insect poo" *Newsweek*, <http://www.newsweek.com/long-lost-fungus-farming-ants-rediscovered-en-masse-611990> (coverage of *PlosOne*, 2017)

Handwerk, B (April, 2017), "How Ants Became the World's Best Fungus Farmers" *Smithsonian Magazine*, <http://www.smithsonianmag.com/science-nature/how-ants-became-worlds-best-fungus-farmers-180962871/> (coverage of *Proc. Royal Soc. B*, 2017)

AFP (April, 2017), "Science: Ants mastered agriculture 30 million years before we did" *The Guardian*, <https://guardian.ng/features/science/ants-mastered-agriculture-30-million-years-before-we-did/> (coverage of *Proc. Royal Soc. B*, 2017)

Guarino, B (April, 2017), "Speaking of Science: How humble fungus-farming ants turned into agricultural titans." *The Washington Post*, https://www.washingtonpost.com/news/speaking-of-science/wp/2017/04/11/how-humble-fungus-farming-ants-turned-into-agricultural-titans/?utm_term=.ed91d2afc944 (coverage of *Proc. Royal Soc. B*, 2017)

Klein, J (April, 2017), "Trilobites: How Ants Figured Out Farming Millions of Years Before Humans." *The New York Times*, <https://www.nytimes.com/2017/04/11/science/ant-fungus-farmers-evolution.html> (coverage of *Proc. Royal Soc. B*, 2017)

Smithsonian (April, 2017), "Science News: Ant agricultural revolution began 30 million years ago in dry, desert-like climate." *Science Daily*, <https://www.sciencedaily.com/releases/2017/04/170412091130.htm> (coverage of *Proc. Royal Soc. B*, 2017)

Verger, R (Sept, 2016), "Science: A frog's vomit reveals a new species of ant." *Fox News*, <https://www.foxnews.com/science/a-frogs-vomit-reveals-a-new-species-of-ant> (coverage of *ZooKeys*, 2016)

Bittel, J (Sept, 2016), "Devil Frog Vomits Up a New Ant Species." *National Geographic*, <https://news.nationalgeographic.com/2016/09/frogs-ants-vomits-new-species/> (coverage of *ZooKeys*, 2016)

Bhanoo, SN (Mar, 2015), "A Farmer Ant's Unique Fungal Crop." *The New York Times*, <https://www.nytimes.com/2015/03/31/science/a-farmer-ants-unique-fungal-crop.html> (coverage of *The American Naturalist*, 2015)

Lavery, R & K Carnes (Dec, 2013), "Scientists find new ghost ant genus and species: Discovery sheds light on origins of agriculture." *Phys.org*, <https://phys.org/news/2013-12-scientists-ghost-ant-genus-species.html> (coverage of *PlosOne*, 2013)

Foley, JA (Dec, 2013), "The Ghost Ant: New Species is a Living Fossil of Ancient Fungus-Farming Ants." *Nature World News*, <https://www.natureworldnews.com/articles/5408/20131223/ghost-ant-new-species-living-fossil-ancient-fungus-farming-ants.htm> (coverage of *PlosOne*, 2013)

Anderson, N (Dec, 2013), "Top 20 New Species Discovered in 2013 – Part 2." *Sci-News*, <http://www.sci-news.com/biology/science-2013-top-new-species-part2-01653.html> (coverage of *PlosOne*, 2013)