

# Sara Helms Cahan

## Curriculum Vitae

**Current Position :** Associate Professor and Chair,  
Department of Biology, University of Vermont

**University address:** Department of Biology  
Marsh Life Sciences 307A  
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### **Education:**

1999 Ph.D. Zoology, Arizona State University, Tempe, AZ  
Co-advisors: Steven W. Rissing and Jennifer H. Fewell  
Major field: Behavioral Ecology

1992 B.S. Biology, University of Michigan, Ann Arbor, MI

### **Areas of Specialization:**

Social insect biology and evolution, ecological genetics, behavioral ecology

### **Professional Employment:**

2015 - current Chair, Department of Biology, University of Vermont

2010 – current Associate Professor, Department of Biology, University of Vermont

2004-2010 Assistant Professor, Department of Biology, University of Vermont

July 2000 - Postdoctoral Research Associate (with Laurent Keller)

Aug. 2004 University of Lausanne, Switzerland

February- Post-doctoral Research Assistant (with S. Bradleigh Vinson)

June 2000 Department of Entomology, Texas A&M University

1993 – 1999 Teaching Assistant

Department of Biology, Arizona State University

### **Teaching Experience:**

2005 - current BioCore 012 Exploring Biology (4 credits), lecture and lab  
Biology 095 First-year Teacher-Advisor-Program seminar “Natural  
History of the Family” (3 credits)  
Biology 276 Behavioral Ecology (3 credits)  
Biology 277 Sociobiology (3 credits)  
Biology 381 Ecological Genetics (1 credit graduate colloquium)  
Levels of Selection (graduate colloquium)  
Foundational Readings in Social Evolution (graduate  
colloquium)

- Honors 086 First-year Honors seminar: Knowledge in the Age of Big Data (3 credits)
- Honors 196 Sophomore Honors seminar: Natural History of The Family (3 credits)

**Grants:**

- 2018-2022 National Science Foundation/EPSCoR, RII Track-2 FEC: From Genome to Phenome in a Stressful World: Epigenetic regulatory mechanisms mediating thermal plasticity in *Drosophila*. Awarded to S. Helms Cahan (PI), Seth Frieze, James Water, Heather Axen, Nicholas Teets (co-PIs), Brent Lockwood (Faculty Associate) (\$4,771,722).
- 2016 -2018 National Institutes of Health R03: Chagas disease transmission: Genomic studies of the kissing bug *Triatoma infestans* to enhance control strategies for a neglected tropical disease. Awarded to L. Stevens and S. Helms Cahan (\$155,000).
- 2013-2014 National Science Foundation, Broadening Participation Research Experience for Undergraduates (REU) supplement to Dimensions of Diversity Program grant (\$20,000).
- 2012-2017 National Science Foundation, Ecology of Infectious Diseases Program. “Modeling disease transmission using spatial mapping of vector-parasite genetics and vector feeding patterns.” Awarded to L. Stevens, D. Rizzo, L. Morrissey, S. Helms Cahan (\$2,461,995).
- 2012-2015 National Science Foundation, Dimensions of Diversity Program. “Collaborative Research: The Climate Cascade: functional and evolutionary consequences of climate change on species, trait and genetic diversity in a temperate ant community.” Awarded to B. Ballif, R. R. Dunn, A. M. Ellison, N. J. Gotelli, S. Helms Cahan & N.J. Sanders (Total award \$1,997,320; UVM portion \$687,559).
- 2009-2013 National Science Foundation, Evolutionary Processes Program. “Genetic Architecture and Evolution of Reproductive Caste Determination in Harvester Ants.” (\$800,000)
- 2008-2011 National Science Foundation, Population Biology Cluster. “Evolution of Major Geographic Variation in Social Behavior of a Desert Ant.” Awarded to K. R. Helms and S. Helms Cahan (\$506,000).
- 2008-2009 Vermont Genetics Network Proteomics Facilities Award. “Pilot project: Regional variation in the behavior of ant queens as a model system.” Awarded to S. Helms Cahan and K. R. Helms (\$4,991)
- 2006 University of Vermont Faculty Research Award. “Linkage mapping of genes involved in worker development in ants: a pilot study.” (\$15,000)
- 2001-2006 Earthwatch Institute/Durfee Foundation Student Challenge Award Project grants (\$10,000 – \$12,000 awarded per annum)
- 2002 Field Research Grant, Swiss Society of Naturalists (\$3000)
- 1998 Travel Grant, International Union for the Study of Social Insects (\$1,450)  
Travel Grant, Arizona State University Dept. of Biology (\$365)

Travel Grant, Arizona State University Graduate College (\$300)  
 1996 Dissertation Improvement Grant, National Science Foundation (\$9,980)  
 1994, 1995 Research Grants, Arizona State University Dept. of Zoology (\$360, \$300)

**Refereed, Peer-Reviewed Publications:**

1. Lecheta, M. C. Awde, D. N., O'Leary, T., Unfried, L. N., Jacobs, N. A., Whitlock, M. H., McCabe, E., Powers, B., Bora, K., Waters, J. S., Axen, H. J., Fietze, S., Lockwood, B. L., Teets, N. M., Helms Cahan, S. in press. GWAS and transcriptomics to identify the molecular underpinnings of thermal stress responses in *Drosophila melanogaster*. *Frontiers in Genetics*.
2. Hanley, J., Rizzo, D., Stevens, L., Helms Cahan, S., Dorn, P., Morrissey, L., Rodas, A., Orantes, L., Monroy, M. C. in press. Novel Evolutionary Algorithm Identifies Interactions Driving Infestation of *Triatoma dimidiata*, a Chagas Disease Vector. *Amer. J. Trop. Med. Hygiene*.
3. Helms Cahan, S., Orantes, L.C., Wallin, K., Rizzo, D. M., Stevens, L., Dorn, P. L., Rodas, A. G., Monroy, C. 2019. Residual survival and local dispersal drive reinfestation by *Triatoma dimidiata* following insecticide application in Guatemala. *Infection, Genetics and Evolution* 74:104000.
4. Nguyen, A. D., Brown, M., Zitnay, J., Helms Cahan, S., Gotelli, N. J., Arnett, A., Ellison, A. A. 2019. Trade-offs in cold physiology at the northern range edge of the common woodland ant *Aphaenogaster picea*. *The American Naturalist* 194:E151-163.
5. Lau, M. K., Ellison, A. A., Nguyen, A. D., Penick, C., DeMarco, B. B., Gotelli, N. J., Sanders, N. J., Dunn, R., Helms Cahan, S. 2019. Draft *Aphaenogaster* genomes expand our view of ant variation across climate gradients. *PeerJ* 7:e6447.
6. Orantes, L., C. Monroy, P. L. Dorn, L. Stevens, D. Rizzo, L. Morissey, J. P. Hanley, B. Richards, A. G. Rodas, K. F. Wallin and S. Helms Cahan 2018. Uncovering vector, parasite, blood meal and microbiome patterns from mixed-DNA specimens of the Chagas Disease vector *Triatoma dimidiata*. *PLoS Neglected Tropical Diseases* 12:e0006730.
7. Justi, S. A., L. Stevens, S. Helms Cahan, C. Monroy, R. Lima, P. L. Dorn 2018. Vectors of Diversity: Genome wide diversity across the geographic range of the Chagas disease vector *Triatoma dimidiata* (Hemiptera: Reduviidae). *Molecular Phylogenetics and Evolution* 120:144-150.
8. Waldron, A. L., S. Helms Cahan, C. S. Francklyn, A. M. Ebert 2017. A single *Danio rerio hars* gene encodes both cytoplasmic and mitochondrial Histidyl tRNA Synthetases. *PLoS One* 12:e0185317.
9. Nguyen, A. D., K. Pinder, S. Resendez, J. D. Pustilnik, N. J. Gotelli, J. D. Parker and S. Helms Cahan 2017. Effects of desiccation and starvation on thermal tolerance and the cellular stress response in forest ants. *Journal of Comparative Physiology part B* 187:1107-1116.
10. Diamond, S. E., L. Chick, C. A. Penick, L. M. Nichols, S. Helms Cahan, R. R., Dunn, A. A. Ellison, N. J. Sanders, N. J. Gotelli 2017. Heat tolerance predicts the

- importance of species interaction effects as the climate changes. *Integrative and Comparative Biology* 57:112-120.
11. Helms Cahan, S. A. D. Nguyen, J. Stanton-Geddes, C. Penick, Y. Hernáiz-Hernández, B. DeMarco and N. J. Gotelli, 2017. Modulation of the heat shock response is associated with acclimation to novel temperatures but not adaptation to climatic variation in the ants *Aphaenogaster picea* and *A. rudis*. *Comparative Biochemistry and Physiology - part A* 204:113-120.
  12. Diamond, S.E., L. M. Nichols, S. L. Peline, C. Penick, S. Helms Cahan, G. Barber, R. R. Dunn, Aaron M. Ellison, N. J. Sanders, and N. J. Gotelli, 2016. Climate warming destabilizes forest ant communities. *Science Advances* 2:e1600842.
  13. Stanton-Geddes, J., A. D. Nguyen, L. Chick, J. Vincent, M. Vangala, R. R. Dunn, A. M. Ellison, N. J. Sanders, N. J. Gotelli, and S. Helms Cahan 2016. Thermal reactionomes reveal divergent responses to thermal extremes in warm and cool-climate ant species. *BMC Genomics* DOI: 10.1186/s12864-016-2466-z.
  14. Nguyen, A., N. Gotelli and S. Helms Cahan, 2016. Sequence, cis-regulatory evolution and expression profile of ant heat shock proteins. *BMC Evolutionary Biology* DOI: 10.1186/s12862-015-0573-0.
  15. Muscedere, M., S Helms Cahan, K. R. Helms, and J. F. Traniello, 2016. Geographic and life-history variation in ant queen colony founding correlate with brain amine levels. *Behavioral Ecology* 27:271-278.
  16. Smith, C. R., S. Helms Cahan, C. Kemena, S. G. Brady, W. Yang, E. Bornberg-Bauer, T. Eriksson, J. Gadau, M. Helmkampf, D. Gotzek, M. O. Miyakawa, A. Suarez, and A. Mikheyev, 2015. How do genomes create novel phenotypes? Insights from the loss of the worker caste in ant social parasites. *Molecular Biology and Evolution* 32:2919-2931.
  17. Gotzek, D., H. J. Axen, A. Suarez, S. Helms Cahan, and D. Shoemaker, 2015. Global invasion history of the Tropical Fire Ant, *Solenopsis geminata*: A stowaway on the first global trade routes. *Molecular Ecology* 24:374-388.
  18. Herrmann, M. and S. Helms Cahan 2014. Inter-genomic sexual conflict drives antagonistic coevolution in harvester ants. *Proceedings of the Royal Society of London B* 281:20141771.
  19. Helms Cahan, S and K. R. Helms 2014. Variation in social structure alters queen body mass and productivity in the desert seed-harvester ant *Messor pergandei*. *Insectes Sociaux* 61:153-161.
  20. Axen, H. J., A. Wildermuth and S. Helms Cahan 2014. Environmental filtering of foraging strategies mediates patterns of coexistence in the fire ants *Solenopsis geminata*, *Solenopsis xyloni*, and their interspecific hybrids. *Ecological Entomology* 39:290-299.
  21. Helms, K.R., N. J. Newman and S. Helms Cahan 2013. Regional variation in queen and worker aggression in incipient colonies of the desert ant *Messor pergandei*. *Behavioral Ecology and Sociobiology* 67:1563-1573.
  22. Helms Cahan, S. and E. Gardner-Morse 2013. Emergence of reproductive division of labor in forced queen groups of the ant *Pogonomyrmex barbatus*. *Journal of Zoology* 291:12-22.

23. Abbott, R. *et al.* (I am one of 40 co-authors), 2013. Hybridization and Speciation. *Journal of Evolutionary Biology* 26:229-246.
24. Zhou, Y. and S. Helms Cahan 2012. A novel family of terminal-repeat retrotransposon in miniature (TRIM) in the genome of the red harvester ant, *Pogonomyrmex barbatus*. *PLoS One* 7:e53401.
25. Helms Cahan, S. and K. R. Helms 2012. Relatedness does not explain geographic variation in queen cooperation in the seed-harvester ant *Messor pergandei*. *Insectes Sociaux* 59:579-585.
26. Helms, K. R. & S. Helms Cahan 2012. Large scale regional variation in cooperation, conflict, group size, and cooperative breeding among queens of the desert ant *Messor pergandei*. *Animal Behaviour* 84:499-507.
27. Helms Cahan, S., Graves, C. J., Brent, C. S., 2011. Intergenerational effect of maternal juvenile hormone on offspring in *Pogonomyrmex* harvester ants. *Journal of Comparative Physiology B*.181:991-999.
28. Helms Cahan, S., Daly, A. M., Schwander, T., Woods, H. A. 2010. Genetic caste determination does not reduce colony growth rates in *Pogonomyrmex* harvester ants. *Functional Ecology* 24:301-309.
29. Helms Cahan, S., Julian, G. E. 2010. Shift in frequency-dependent selection across the life-cycle in obligately interbreeding harvester ant lineages. *Evolutionary Ecology* 24:359-374.
30. Helms, K. R. and S. Helms Cahan, 2009. Divergence in mating flight patterns of the seed-harvester ant *Pogonomyrmex rugosus* Emery, (1895) in the western Mojave Desert. *Myrmecological News* 13:15-17.
31. Schwander, T., Helms Cahan, S., S. Suni, Keller, L. 2008. Mechanisms of reproductive isolation between an ant species of hybrid origin and its parents. *Evolution* 62:1635-1643.
32. Schwander, T., Humbert, J.-Y., Brent, C. S., Helms Cahan, S., Chapuis, L., Renai, E., Keller, L. 2008. Maternal effect on female caste determination in a social insect. *Current Biology* 18:265-269.
33. Schwander, T., Keller, L., Helms Cahan, S. 2007. Two alternate mechanisms contribute to the persistence of interdependent lineages in *Pogonomyrmex* harvester ants. *Molecular Ecology* 16:3533-3543.
34. Schwander, T., Helms Cahan, S., Keller, L. 2007. Characterization and distribution of *Pogonomyrmex* harvester ant lineages with genetic caste determination. *Molecular Ecology* 16:367-387.
35. Helms Cahan, S. Julian, G. E., Schwander, T., Keller, L. 2006. Reproductive isolation between the harvester ant *Pogonomyrmex rugosus* and two lineages with genetic caste determination. *Ecology* 87:2160-2170.
36. Julian, G. E., Helms Cahan, S. 2006. Behavioral differences between *Pogonomyrmex rugosus* and two dependent lineages (H1/H2). *Ecology* 87:2207-2214.
37. Schwander, T., Helms Cahan, S., Keller, L. 2005. Genetic caste determination in *Pogonomyrmex* harvester ants imposes costs during colony founding. *Journal of Evolutionary Biology* 19:402-409.
38. Helms Cahan, S., Rissing, S.W. 2005. Variation in queen size across a behavioral transition zone in the ant *Messor pergandei*. *Insectes Sociaux* 52:84-88.

39. Helms Cahan, S., Julian, G. E., Rissing, S. W., Schwander, T., Parker, J. D., Keller, L. 2004. Loss of phenotypic plasticity explains genotype-caste association in harvester ants. *Current Biology* 14: 2277-2282.
40. Parker, J. D., Ziemba, R. E., Helms Cahan, S., Rissing, S. W. 2004. An hypothesis-driven molecular phylogenetics exercise for college biology students. *Biomedical and Molecular Biology Education* 32:108-114.
41. Helms Cahan, S., Fewell, J. H. 2004. Division of labor and the evolution of task sharing in queen associations of the harvester ant *Pogonomyrmex californicus*. *Behavioral Ecology and Sociobiology* 56:9-17.
42. Helms Cahan, S., Keller, L. 2003. Complex hybrid origin of genetic caste determination in harvester ants. *Nature* 424:306-309.
43. Helms Cahan, S., Vinson, S. B. 2003. Reproductive division of labor between hybrid and non-hybrid offspring in a fire ant hybrid zone. *Evolution* 57:1562-1570.
44. Helms Cahan, S., Parker, J. D., Rissing, S. W., Johnson, R. A., Polony, T. S., Weiser, M.D., Smith, D.R. 2002. Extreme genetic differences between queens and workers in hybridizing *Pogonomyrmex* harvester ants. *Proceedings of the Royal Society of London, Series B* 269:1871-1877.
45. Helms Cahan, S., Blumstein, D.T., Sundström, L., Liebig, J. and Griffin, A. 2002. Social trajectories and the evolution of social behavior. *Oikos* 96:206-216.
46. Helms Cahan, S., 2001. Ecological variation across a behavioral transition zone in the ant *Messor pergandei*. *Oecologia* 129:629-635.
47. Helms Cahan, S. 2001. Co-operation and conflict in ant foundress associations: insights from geographical variation. *Animal Behaviour* 61:819-825.
48. Cahan, S. and Julian, G. E. 1999. Fitness consequences of cooperative colony founding in the leaf-cutter ant *Acromyrmex versicolor*. *Behavioral Ecology* 10:585-591.
49. Julian, G.E. and Cahan, S. 1999. Undertaking specialization in the desert leaf-cutter ant, *Acromyrmex versicolor*. *Animal Behaviour* 58:437-442.
50. Cahan, S., Carloni, E., Liebig, J., Pen, I. and Wimmer, B. 1999. Causes and consequences of sociality. *Ethology Ecology and Evolution* 11: 85-87.
51. Cahan, S., Helms, K. R. and Rissing, S. W. 1998. An abrupt transition in colony founding behaviour in the ant *Messor pergandei*. *Animal Behaviour* 55:1583-1594.

### **Work in progress:**

#### Manuscripts submitted:

- Justi, S. A., Dorn, P., Helms Cahan, S., Dale, C., Galvao, C., Stevens, L. The genome of *Triatoma infestans* (Hemiptera: Reduviidae). To *Parasites and Vectors*.
- Helms Cahan, S., A. D. Nguyen, and Y. Zhou. Population genomics supports multiple hybrid zone origins of Social Hybridogenesis in *Pogonomyrmex* harvester ants. To *Evolution*.

#### Manuscripts in preparation:

- Chick, L. D., A. D. Nguyen, C. A. Penick, L. M. Nichols, B. B. DeMarco, S. E. Diamond, R. R. Dunn, A. M. Ellison, N. J. Gotelli, S. Helms Cahan, N. J. Sanders. *Ecology*

and evolutionary history shape the thermal niche in common woodland ants.  
Draft in progress, for *Molecular Ecology*.

Herrmann, M. and S. Helms Cahan. Contact during mating reduces cues for mate discrimination in the socially hybridogenetic “J” lineages of the ant *Pogonomyrmex barbatus*. Draft in progress, for *Insectes Sociaux*.

**Invited Seminars/Papers:**

- 2018 International Union for the Study of Social Insects International Congress (invited symposium speaker)  
University of New Hampshire
- 2017 Entomological Society of America Annual meeting, invited symposium speaker
- 2014 Entomological Society of America Annual meeting, invited symposium speaker
- 2010 International Congress of the International Union for the Study of Social Insects, Copenhagen, Denmark (invited talk)
- 2009 Boston University
- 2008 University of Nevada, Las Vegas
- 2007 University of Massachusetts, Amherst
- 2006 Entomological Society of America Annual Meeting, Invited Symposium
- 2005 University of New Hampshire, Durham, NH
- 2004 University of Illinois, Champaign-Urbana, IL
- 2003 Entomological Society of America Annual Meeting, Invited Symposium  
(G.E. Julian and S. Helms Cahan)  
SUNY StonyBrook, NY  
Vanderbilt University, Nashville, TN
- 2002 University of Copenhagen, Copenhagen, Denmark
- 2001 Animal Behavior Society Annual Meeting, Invited Symposium (J.H. Fewell and S. Helms Cahan)
- 2000 University of Würzburg, Germany  
University of Lausanne, Switzerland  
University of Houston, TX

**Contributed papers:**

- 2020 Society for Integrative and Comparative Biology annual meeting, Austin, TX (contributed talk)
- 2015 Conference on Biological Stoichiometry, Peterborough, Canada (poster)  
Ecological Society of America annual meeting (poster)
- 2014 Entomological Society of America Annual meeting, Baltimore, MD (1 student oral presentation, 1 student poster)  
Society of the Study of Evolution annual conference, Raleigh, NC (two contributed talks, two posters)
- 2013 Arthropod Genomics annual conference, South Bend, IN (poster)
- 2012 International Union for the Study of Social Insects North American section meeting, Greensboro, NC (1 talk: M. Herrmann & S. Helms Cahan; 3 posters: Y. Hernáiz-Hernández & S. Helms Cahan; A. Nguyen, S. Helms Cahan & N. Gotelli; S. Helms Cahan & E. Gardner-Morse)

- 2011 EU FRoSPECTS workshop: Hybridization and Speciation, Newtown, UK  
(contributed topic proposal, selected for inclusion in published manuscript).
- 2010 International Congress of the International Union for the Study of Social Insects, Copenhagen, Denmark (1 talk, with K. R. Helms, 1 poster, with H. J. Axen and L. Keller)
- 2009 Entomological Society of America Annual Meeting, Indianapolis, IN (S. Helms Cahan & K. R. Helms)  
Ant Genomics Consortium Workshop, Tempe, Arizona (oral presentation)
- 2008 International Union for the Study of Social Insects North American section meeting (2 talks: S. Helms Cahan, A. M. Daly, & T. Schwander; and H. J. Axen, C. Mallon & S. Helms Cahan)  
Society for the Study of Evolution Annual Meeting (H. Axen, C. Mallon, & S. Helms Cahan)  
Society for Mathematical Biology Annual Meeting (2 posters: P. S. Goodman, S. Helms Cahan & C. Danforth; and J. Glenister, C. Danforth & S. Helms Cahan)
- 2007 Society for Mathematical Biology Annual Meeting (P. S. Goodman, S. Helms Cahan & R. Rajbhandari)
- 2006 International Union for the Study of Social Insects International Congress (2 posters: K. P. O'Connor, S. Helms Cahan & K. R. Helms; Julian, G. E. & S. Helms Cahan)  
Society for the Study of Evolution Annual Meeting (T. Schwander, L. Keller & S. Helms Cahan)
- 2005 Entomological Society of America Annual Meeting
- 2003 Society for the Study of Evolution Annual Meeting  
INSECTS European Union Network Midterm Meeting, Germany
- 2002 International Union for the Study of Social Insects International Congress, Sapporo, Japan (with J. H. Fewell)
- 2000 International Society for Behavioral Ecology  
Social Systems and Population Genetics Conference, La Sage, Switzerland
- 1999 Animal Behavior Society Annual Meeting.  
Animal Behavior Society Annual Meeting (G.E. Julian and S. Cahan)  
Murray J. Littlejohn Symposium (with J.H. Fewell)

### **University Service**

- Chair, Department of Biology (2016 – current)
- Member of the University Incentive-based Budgeting Steering committee (2018 – 2019)
- Member of the College of Arts and Sciences Diversity Taskforce (2017-current)
- Member of the College of Arts and Sciences Academic Planning and Budget Committee (Spring 2016)
- Member of the College of Arts and Sciences Faculty Standards committee, 2012 - 2015 (elected position)
- Interim Chair, Department of Biology (Fall 2015)
- Co-director of the Integrated Biological Sciences program, 2010 – 2016
- Member of University Committee on Teacher Education, 2009-2011
- Member of College of Arts and Sciences Honors Committee, 2008-2011 (elected position)

Member of Faculty Research Awards committee, 2007-2008  
Member of Faculty Development Awards committee, 2006-2008  
Member of John Dewey Honors Program Advisory Council, 2005-2008  
Member of Biology Department Advisory Committee, 2005-2006  
Member of Biology Department Graduate Affairs Committee, 2005-2006  
Faculty Advisor, Zoology, Environmental Sciences and Biology Network, 2005-2006  
Faculty Advisor, tri-Beta National Biology Honors Society, 2006-2012  
Post-doctoral advisor for:

Yihong Zhou (2010-2013)

John Stanton-Geddes (co-mentored with N. Gotelli, 2013-2014)

Ph.D. Advisor for:

Heather Axen (graduated August 2011)

Fernando Gelin (graduated May 2014)

Michael Herrmann (graduated May 2016)

Andrew Nguyen (co-advised with N. Gotelli, graduated May 2017)

Lucia Orantes (co-advised with K. Wallin, graduated October 2017)

Jessica Cole (co-advised with A. Brody, current)

Ben Camber

Lindsey Cathcart

M.S. Advisor for:

Trevor Manendo (graduated May 2008)

Yainna Hernáiz-Hernández (graduated May 2015)

Katie Miller (NSF GRFP Fellow 2014-2016, graduated May 2018)

Current Ph.D. Committee Member for:

Lisa Chamberland, Biology

Raquel Lima, Biology

Emily Mikucki, Biology

Matt Futia, Biology

Current MS Committee member for:

Laura Caicedo-Quiroga, Biology

Julie Raiguel, Plant Biology

### **Service to Scientific Community:**

President, North American Section of the International Union for the Study of Social Insects (IUSSI; 2018-2019)

Associate editor, *Evolutionary Ecology* (2006-current)

Member of Advisory Council of AMNH Southwestern Research Station (2005-2007)

Journal Referee for: *American Naturalist*, *Animal Behaviour*, *Behavioral Ecology and Sociobiology*, *Biology Letters*, *Current Biology*, *Ethology*, *Evolution*, *Insectes Sociaux*, *Journal of Theoretical Biology*, *Molecular Ecology*, *Molecular Phylogeny and Evolution*, *Naturwissenschaften*

Member of NSF Evolutionary Ecology grant proposal review panel, spring 2010

Member of NSF Animal Behavior grant proposal review panel, fall 2010

Member of NSF Dimensions of Biodiversity grant proposal review panel, summer 2013

Member of NSF Evolutionary Processes pre-proposal review panel, spring 2014

**Professional Memberships:**

Animal Behavior Society

American Society of Naturalists

Entomological Society of America

International Society for Behavioral Ecology

International Union for the Study of Social Insects