

Paula E. Cushing, Ph.D.

Senior Curator of Invertebrate Zoology, Department of Zoology, Denver Museum of Nature & Science, 2001 Denver, Colorado 80205 USA *E-mail*: Paula.Cushing@dmns.org; *Web*: <https://science.dmns.org/museum-scientists/paula-cushing/>, <http://www.solifugae.info>, <http://spiders.dmns.org/default.aspx>; *Office Phone*: (303) 370-6442; *Lab Phone*: (303) 370-7223; *Fax*: (303) 331-6492

CURRICULUM VITAE

EDUCATION

- University of Florida, Gainesville, FL, 1990 - 1995, Ph.D.
- Virginia Tech, Blacksburg, VA, 1985 - 1988, M.Sc.
- Virginia Tech, Blacksburg, VA, 1982 - 1985, B.Sc.

PROFESSIONAL AFFILIATIONS AND POSITIONS

- Denver Museum of Nature & Science, Senior Curator of Invertebrate Zoology, 1998 - present
- Associate Professor Adjoint, Department of Integrative Biology, University of Colorado, Denver, 2013 - present
- Denver Museum of Nature & Science, Department Chair of Zoology, 2006 – 2011
- Adjunct Faculty, Department of Ecology & Evolutionary Biology, University of Colorado, Boulder, 2011 - present
- Affiliate Faculty Member, Department of Biology and Wildlife, University of Alaska, Fairbanks, 2009 – 2012
- Adjunct Faculty, Department of Bioagricultural Sciences and Pest Management, Colorado State University, 1999 – present
- Affiliate Faculty Member, Department of Life, Earth, and Environmental Science, West Texas AMU, 2011 - present
- American Museum of Natural History, Research Collaborator (Co-PI with Lorenzo Prendini), 2007 – 2012
- College of Wooster, Wooster, Ohio, Visiting Assistant Professor, 1996 – 1997
- University of Florida, Gainesville, Florida, Postdoctoral Teaching Associate, 1996
- Division of Plant Industry, Gainesville, Florida, Curatorial Assistant for the Florida Arthropod Collection, 1991
- National Museum of Natural History (Smithsonian), high school intern at the Insect Zoo, 1981; volunteer, 1982

GRANTS AND AWARDS

- 2018 - 2022: NSF Collaborative Research: ARTS: North American camel spiders (Arachnida, Solifugae, Eremobatidae): systematic revision and biogeography of an understudied taxon. \$1,034,240. Joint funding between DMNS (DEB-1754587; Cushing, \$497,011) and Eastern Connecticut State University (DEB-1754030; Matthew Graham, \$537,229).
- 2018: The Kenneth King Foundation discretionary grant for arachnology research at the DMNS (\$5,000)
- 2017: The Kenneth King Foundation discretionary grant for arachnology research at the DMNS (\$5,000)
- 2016: The Kenneth King Foundation discretionary grant for arachnology research at the DMNS (\$5,000)
- 2015: The Kenneth King Foundation discretionary grant for arachnology research at the DMNS (\$5,000)
- 2015: Prairie Biotic Research, Inc. grant for project “Exploring the Biology of a Spider Ant Guest” (\$1,000)
- 2014: The Kenneth King Foundation discretionary grant for arachnology research at the DMNS (\$5,000)
- 2012 – 2015: NSF-ADBC Grant: Digitization TCN: Collaborative Research: Southwest Collections of Arthropods Network (SCAN): a Model for Collections Digitization to Promote Taxonomic and Ecological Research (co-PI with Frank Krell from DMNS. NAU lead institution): (\$118,917 to DMNS)

- 2007 – 2013: NSF Biotic Surveys and Inventories Grant, DEB-0640245 (\$650,000): Collaborative Research: Global Survey and Inventory of Solifugae. Joint funding between DMNS (Cushing) and AMNH (Prendini) (\$320,029 to DMNS)
- 2011: NSF REU supplement to DEB-0640245 (\$7,500)
- 2011: Zocchi Family Foundation Grant to the Department of Zoology (\$1,000)
- 2010: NSF REU supplement to DEB-0640245 (\$7,500)
- 2009: Zocchi Family Foundation Grant to the Department of Zoology (\$7,000)
- 2009: NSF REU supplement to DEB 0640245 (\$7,500)
- 2007 – 2011: Lloyd David and Carlye Cannon Wattis Foundation Grant to the Department of Zoology to establish internship program (\$25,000)
- 2007: NSF DBI Biological Research Collections grant (\$26,133): Supplemental support for Collections Improvement for Arachnology at the Denver Museum of Nature & Science
- 2007: Diversity and Excellence Award for “Death and Dying: Cultural, Spiritual and Professional Perspectives” from University of Colorado, Denver (\$4,000). Collaborative with Joann Brennan (Univ. of Colorado, Denver Health Science Center), Charles Musiba (UCDHSC), Stacy Fischer (UCDHSC), and Jerry Vigil (DMNS)
- 2007: Zocchi Family Foundation Grant to the Department of Zoology (\$3,300)
- 2007: Cushman-Neal Family Donation to Department of Zoology for exhibitry (\$200)
- 2006: Zocchi Family Foundation Grant to the Department of Zoology(\$3,300)
- 2006: Cushman-Neal Family Donation to the Department of Zoology for exhibitry (\$1,500)
- 2005: AMNH collections grant to work with the Solifugae collection in New York (\$1,520)
- 2004: Department of Defense subcontract for Spider Survey of Fort Sill, Oklahoma (Boris Kondratieff, Colorado State University, PI) (\$10,000)
- 2004 – 2007: NSF Biological research Collections Grant for Collections Improvement for Arachnology at the Denver Museum of Nature & Science (\$166,169)
- 2001: Sustainable Ecosystems Incorporated grant to support the Colorado Spider Survey (\$800)
- 2001: Richard C. Goldstein Private Foundation grant to support the Colorado Spider Survey (\$1,000)
- 2001: Graham Foundation grant to support the Colorado Spider Survey (\$8,914)
- 1999: United States Forest Service grant to support the Colorado Spider Survey (\$2,000 with \$2,000 matching from DMNS)
- 1999: Colorado Natural Areas Program grant for the Colorado Spider Survey (\$1,000)
- 1994: University of Florida O’Neil Dissertation Fellowship dissertation award for College of Liberal Arts and Sciences
- 1990 – 1993: Grinter Fellowship, University of Florida to support doctoral research
- 1993: AMNH Theodore Roosevelt Grant to support doctoral research (\$900)
- 1993: Florida Entomological Society grant to support doctoral research (\$100)
- 1987: Sigma Xi Grant-in-Aid of Research for master’s project (\$200)
- 1987: Runner up student presentation award at the American Arachnological Society annual meeting, Blacksburg, Virginia (for master’s research)
- 1987: Tuition Scholarship from Virginia Tech for master’s research
- 1986: Sigma Xi Grant-in-Aid of Research for master’s project (\$300)

PUBLICATIONS – PEER REVIEWED

In Review

Kral, J., A. Sember, K. Jílková, T. Korřinková, A.C. Reyes Lerma, I. M. Ávila Herrera, M. Forman, J. Musilová, J.G. Palacios Vargas, M. Zrzavá, P. Nguyen, M. Daliková, I. Fuková, J. Šobotnik, **P.E. Cushing**, A.V. Gromov, Š. Šebestianová & T.L. Bird. In review. Insights into the karyotype evolution of tetrapulmonate arachnids (Arachnida: Tetrapulmonata): Implications for analysis of arachnid phylogeny. PLOS ONE.

Accepted/In Press

Graham, M.R., M.B.M. Pinto, and P.E. Cushing. Accepted. A test of the light attraction hypothesis in camel spiders of the Mojave Desert (Arachnida: Solifugae). *Journal of Arachnology*.

Ceccarelli, F.S. and P.E. Cushing. Accepted. Myrmecomorphy. In: *Encyclopedia of Social Insects*.

Published

Cushing, P.E. & J.O. Brookhart. 2019. Solifugae. Solifugae of Canada. In: Langor, D.W., Sheffield, C.S. (Eds) *The Biota of Canada – A Biodiversity Assessment. Part 1: The Terrestrial Arthropods*. *ZooKeys* 819: 73-75. <https://doi.org/10.3897/zookeys@@.25166>.

Cushing, P.E., E. Gonzallez-Santillan. 2018. Capturing the elusive camel spider (Arachnida: Solifugae): effective methods for attracting and capturing solifuges. *Journal of Arachnology* 46(2): 384-387.

Cushing, P.E., F. Channiago & J.O. Brookhart. 2018. Revision of the camel spider genus *Eremocosta* Roewer and a description of the female *Eremocosta gigas* Roewer (Arachnida, Solifugae). *Zootaxa* 4402(3): 443-466.

Ubick, D, P. Paquin, P.E. **Cushing**, & V. Roth (eds). 2017. *Spiders of North America: an identification manual* second edition. American Arachnological Society. American Arachnological Society, Keene, New Hampshire, USA. 425 pp.

Cushing, P.E. 2017. Chapter 1. Introduction. Pp. 1-16 In: Ubick, D, P. Paquin, P.E. Cushing, & V. Roth (eds). 2005. *Spiders of North America: an identification manual, second edition*. American Arachnological Society, Keene, New Hampshire, USA. 425 pp.

Graham, M.R., Henault, J.A., Z.J. Valois & **Cushing, P.E.** 2017. Ancient lakes, Pleistocene climates, and river avulsions structure the phylogeography of a large but little-known rock scorpion from the Mojave and Sonoran deserts. *Biological Journal of the Linnean Society* 122(1): 133-146.

Cushing, P.E. & J.O. Brookhart. 2016. Nine new species of the *Eremobates scaber* species group of the North American camel spider genus *Eremobates* (Solifugae, Eremobatidae). *Zootaxa* 4178(4): 503-520.

Cushing, P.E., M.R. Graham, L. Prendini & J.O. Brookhart. 2015. A multilocus molecular phylogeny of the endemic North American camel spider family Eremobatidae (Arachnida: Solifugae). *Molecular Phylogenetics and Evolution* 92:280-293.

Whitman-Zai, J., M. Francis, M. Geick & P.E. Cushing. 2015. Revision and morphological phylogenetic analysis of the funnel web spider genus *Agelenopsis* (Araneae: Agelenidae). *Journal of Arachnology* 43:1-25.

Cushing, P.E., P. Casto, E.D. Knowlton, S. Royer, D. Laudier, D.D. Gaffin, L. Prendini & J.O. Brookhart. 2014. Comparative morphology and functional significance of setae called papillae on the pedipalps of male camel spiders (Arachnida, Solifugae). *Annals of the Entomological Society of America* 107(2):510-520.

Rubio, G.D., M.O. Arbino & P.E. Cushing. 2013. Ant-mimicry in the spider *Myrmecotypus iguazu* (Araneae: Corinnidae), with notes about myrmecomorphy in spiders. *Journal of Arachnology* 41:395-399.

Kerzicnik, L.M., F.B. Peairs, P.E. Cushing, M.L. Draney & S.C. Merrill. 2013. Spider fauna of semiarid eastern Colorado agroecosystems: diversity, abundance, and effects of crop intensification. *Environmental Entomology* 42(1): 131-142.

Stephenson, J.T., P.E. Cushing, J.R. Demboski & F-T. Krell. 2013. Chapter 4. Zoology: exploring the biodiversity of Colorado and the world. In *Denver's Natural History Museum: A History*. Denver Museum of Nature & Science *Annals* 4:137-178.

Cushing, P.E. 2012. Spider-ant associations: an updated review of myrmecomorphy, myrmecophily, and myrmecophagy in spiders. *Psyche* 2012(2012), Article ID 151989, 23pp. Doi:10.1155/2012/151989.

Cushing, P.E. & P. Casto. 2012. Preliminary survey of the setal and sensory structures on the pedipalps of Camel Spiders (Arachnida, Solifugae). *Journal of Arachnology*.40:123-127.

- Kerzicnik, L.M., E.G. Chapman, J.D. Harwood, F.B. Peairs & P.E. Cushing. 2012. Molecular characterization of Russian weat aphid consumption. *Journal of Arachnology*, 40:71-77.
- Conrad, K.R. & P.E. Cushing. 2011. Observations on hunting behavior of juvenile *Chanbria* (Solifugae, Eremobatidae). *Journal of Arachnology* 39(1):183-184.
- Slowik, J., & P.E. Cushing. 2009. Redescription and transfer of *Geolycosa grandis* (Banks 1894) (Araneae, Lycosidae) to the genus *Hogna*. *Journal of Arachnology* 37(3):261-265.
- Catenazzi, A., J.O. Brookhart, P.E. Cushing. 2009. The natural history of coastal Peruvian solifuges with a redescription of *Chinchippus peruvianus* and an additional new species (Arachnida, Solifugae, Ammotrechidae). *Journal of Arachnology* 37(2):151-159.
- Cushing, P.E. 2008. Spiders (Arachnida: Araneae). Pp. 3490 – 3508 In: (Capinera, J.L., ed.) *Encyclopedia of Entomology*, 2nd ed. vol. 4. Springer Science+Business Media B.V.
- Cushing, P.E. & J.A. Slowik. 2007 (published in 2008). Re-curation of alcohol-preserved specimens: comparison of gradual versus direct specimen transfer on specimen condition and assessment of specimen value. *Collection Forum* 22(1-2):1-9.
- Cushing, P.E., V. Pliler & C.S. Ware. 2007 (published in 2008). Potential effect of residual anti-parasitic compound in muscle tissue on a museum dermestid beetle colony. *Collection Forum* 22(1-2):45-52.
- Klann, A.E., A.V. Gromov, P.E. Cushing, A.V. Peretti & G. Alberti. 2008. The anatomy and ultrastructure of the suctorial organ of Solifugae (Arachnida). *Arthropod Structure and Development* 37:3-12.
- Brookhart, J.O. & P.E. Cushing. 2008. The *Hemerotrecha banksi* group (Arachnida, Solifugae), a diurnal group of solifuges from North America. *Journal of Arachnology* 36(1): 49-64.
- Slowik, J. & P.E. Cushing. 2007(2008). A description of the female wolf spider *Captocosa texana* (Araneae, Lycosidae). *Journal of Arachnology* 35(3):543-545.
- Roberts, A.K., D.M. Smith, R.P. Guralnick, P.E. Cushing, J. Krieger. 2008. Outline morphometric approach to identifying fossil spiders: a preliminary examination from the Florissant Formation. Pp. 105-116 In: *Special Paper 435: Paleontology of the Upper Eocene Florissant Formation* (eds. H.W. Meyer & D.M. Smith). Geological Society of America.
- Slowik, J.A. & P.E. Cushing. 2007. A redescription of *Hogna coloradensis* (Banks) (Araneae, Lycosidae). *Journal of Arachnology* 35(1):46-53.
- Nadeau, L., P.E. Cushing, B.C. Kondratief. 2006. Effects of fire disturbance on grasshopper (Orthoptera: Acrididae) assemblages of the Comanche National Grasslands, Colorado. *Journal of the Kansas Entomological Society* 79:2-12.
- Ubick, D, P. Paquin, P.E. Cushing, & V. Roth (eds). 2005. *Spiders of North America: an identification manual*. American Arachnological Society.
- Cushing, P.E. 2005. Chapter 1. Introduction. Pp. 1-17 In: Ubick, D, P. Paquin, P.E. Cushing, & V. Roth (eds). 2005. *Spiders of North America: an identification manual*. American Arachnological Society.
- Cushing, P.E. J.O. Brookhart, H.-J. Kleebe, G. Zito, & P. Payne. 2005. The suctorial organ of the Solifugidae (Arachnida, Solifugae). *Arthropod Structure & Development*, 34(4):397-406.
- Brookhart, J.O., & P.E. Cushing. 2005. Three new species of Solifugae from North America and a description of the female of *Branchia brevis* (Arachnida, Solifugae). *Journal of Arachnology*, 33: 127-133.
- Cushing, P.E. 2004. Spiders. pp. 2067 – 2082 in In (Capinera, J.L., ed): *Encyclopedia of Entomology*, vol. 3. Kluwer Academic Publishers.
- Brookhart, J. O. & P. E. Cushing. 2004. The systematics of the *Eremobates scaber* species-group (Solifugae, Eremobatidae). *Journal of Arachnology*, 32:284-312.

- Vetter, R.S., P.E. Cushing, R.L. Crawford, L.A. Royce. 2003. Diagnoses of brown recluse spider bites (loxoscelism) greatly outnumber actual verifications of the spider in four western American states. *Toxicon*, 42:413-418.
- Vetter, R. S., A. H. Roe, R. G. Bennett, C. R. Baird, L. A. Royce, W. T. Lanier, A. L. Antonelli and P.E. Cushing. 2003. Distribution of the medically-implicated hobo spider (Araneae: Agelenidae) and its harmless congener, *Tegenaria duellica* in the United States and Canada. *Journal of Medical Entomology*, 40(2):159-164.
- Brookhart, J.O. and P.E. Cushing. 2002. New species of Eremobatidae (Arachnida, Solifugae) from North America. *Journal of Arachnology* 30:84-97.
- Cushing, P.E. and R.G. Santangelo. 2002. Natural History of *Zodarion rubidum* (Araneae, Zodariidae). *Journal of Arachnology* 30:618-621.
- Cushing, P.E. 1998. Population structure of the ant nest symbiont, *Masoncus pogonophilus* (Araneae: Linyphiidae). *Annals of the Entomological Society of America*, 91(5):626-631.
- Cushing, P.E. 1997. Myrmecomorphy and myrmecophily in spiders: a review. *Florida Entomologist*, 80(2):165-193.
- Reiskind, J. and P.E. Cushing. 1996. Study of a narrow hybrid zone between two wolf spiders, *Lycosa ammophila* and *Lycosa ericeticola* in North Florida (Araneae, Lycosidae). *Revue Suisse de Zoologia*, 1(12):543-554.
- Cushing, P.E. 1995. Description of the spider *Masoncus pogonophilus* (Araneae, Linyphiidae), a harvester ant myrmecophile. *Journal of Arachnology*, 23:55-59.
- Cushing, P.E. and B.D. Opell. 1990. Disturbance behaviors in the spider *Uloborus glomus* (Araneae, Uloboridae): possible predator avoidance strategies. *Canadian Journal of Zoology*, 68:1090-1097.
- Cushing, P.E., and B.D. Opell. 1990. The effect of time and temperature on disturbance behaviors shown by the orb-weaving spider *Uloborus glomus* (Uloboridae). *Journal of Arachnology*, 18:87-93.
- Opell, B.D., G. Roth, and P.E. Cushing. 1990. The effect of *Hyptiotes cavatus* (Uloboridae) web-manipulation on the dimensions and stickiness of cribellar silk puffs. *Journal of Arachnology*, 18:238-240.
- Cushing, P.E. 1989. Eggsac defense in the spider *Uloborus glomus* (Uloboridae). *Psyche*, 96:269-277.
- Opell, B.D. and P.E. Cushing. 1986. Visual fields of orb web and single line web spiders of the family Uloboridae (Arachnida, Araneida). *Zoomorphology*, 106:199-204.

POPULAR AND NON-PEER REVIEWED PUBLICATIONS

- Cushing, P.E. June 2018. Colorado Mountain Club Foundation – Fellowship Awards. Mile High Mountaineer: The newsletter of the Denver Group of the Colorado Mountain Club 51(6): 2.
- Cushing, P.E. 2018. Twenty Years of Arachnology. *Catalyst*, Summer 2018 pp. 8-9
- Cushing, P.E. & M.L. Draney. 2015. Book Review *Common Spiders of North America*. *American Entomologist* 61(1):62.
- Cushing, P.E. 2014. Colorado Spider Survey. *Wings: Essays on Invertebrate Conservation*, the Xerces Society. Spring, 2014.
- Cushing, P.E., J.O. Brookhart & J. Rowsell. 2014. Hairy, Scary, Haarskeeders. *Wings: Essays on Invertebrate Conservation*, the Xerces Society. Spring, 2014.
- Cushing, P.E. & M. Draney. Accepted. Review of *Common Spiders of North America* by Richard Bradley.
- Cushing, P.E. & S. Countryman. 2013. Jumping Weightless. *Catalyst*, June/July: 12.
- Cushing, P.E., C. Cochran & P. Sharp. 2012. Shells of Pompeii. *Catalyst*, October/November: 8-9.

- Casto, P. & P.E. Cushing. 2011. Arachnids up Close. *Catalyst*, October/November: 12
- Cushing, P.E. 2010. Spider Myths Answered. *Catalyst*, October/November: 12.
- Peairs, F.B., W.S. Cranshaw and P.E. Cushing. 2008. Spiders in the Home. Insect Series: Home & Garden. no. 5.512 Colorado Cooperative Extension. <http://www.ext.colostate.edu/pubs/insect/05512.html>.
- Cushing, P.E. 2007. There's a Beetle in My Bread. *Skipping Stones Magazine* (for children). Nov. – Dec.: 14-15.
- Cushing, P.E. and M. Francis. 2005. Chapter 1. Survey of spiders (Arachnida, Araneae) of Fort Sill, Comanche Co., Oklahoma. Pp. 10 – 69 In: *Survey of Selected Arthropod Taxa of Fort Sill, Comanche County, Oklahoma, III*. C.P. Gillette Museum of Arthropod Diversity, Department of Bioagricultural Sciences and Pest Management, Colorado State University.
- Cushing, P.E. 2004. Hypothesis or theory? Letter to the Editor. *American Scientist*, Sept/Oct 2004:
- Cushing, P.E. 2004. Spinning a web of wonder. *Museum Monthly*, June/July 2004: 4-5.
- Cushing, P.E. 2003. Real-life spider men and women come to the museum. *Museum Monthly*, DMNS, July 2003: 18-19.
- Cushing, P.E. 2002. India: a Traveler's Diary. *Museum Monthly*, DMNS, 3(5):18-20.
- Cushing, P.E. 1999. Spinning the Web: the Past, Present, and Future of Arachnology at the Denver Museum of Natural History. *Museum Quarterly*, DMNH, 8(2):2-7.
- Cushing, P.E. 1999. Vials and Vials of Spiders. *Museum Quarterly*, DMNH, 8(2):16-17.
- Cushing, P.E. 1999. The Big World of Small Creatures. *Mountain, Plain and Garden: the Magazine of Denver Botanic Gardens*, 56(1):49-58.
- Cushing, P.E. 1999. In Leaps and Bounds. *Wild Outdoor World*. Sept./Oct. 1999.
- Cushing, P.E. 1998. Insect farmers. *Highlights for Children*. March: 12-13.
- Cushing, P.E. 1997. Book review of *Biology of Spiders* by R.F. Foelix. *Quarterly Review of Biology*, 72(4):481.

INVITED TALKS

- Cushing, P.E. 2019. Arachnology at the Denver Museum of Nature & Science: Foundations of biodiversity studies using volunteers and paraprofessionals (invited presentation during Arachnological Outreach Symposium, 21st International Congress of Arachnology, Canterbury, New Zealand, Feb. 14, 2019).
- Cushing, P.E., J.O. Brookhart, M.R. Graham. 2018. The Truth About Camel Spiders. Entomological Society of America meeting, Vancouver, BC Canada (Member's Symposium: Crossing Taxonomic Borders: Challenging Arachnological Traditions in North America).
- Cushing, P.E. 2018. Spiders of Medical Health Importance. Parker Sanitation District, Parker, Colorado.
- Cushing, P.E. 2015. Fangs and Venom: Spiders of Public Health Importance. 40th Annual Zoonoses Conference, Aurora, Colorado.
- Cushing, P.E. 2014. Phylogenetic Analysis of the Eremobatide (Arachnida, Solifugae) and an Overview of Their Biology, University of Colorado, Denver.
- Cushing, P.E. 2013. Biology of a Spider Myrmecophile, Systematics and Evolutionary Biology Symposium, Entomological Society of American meeting, Austin, TX
- Cushing, P.E. 2011. Spider Control and Identification, Wyoming Weed Management Association Conference, Caspar, WY
- Cushing, P.E. 2010. Colorado Spider Survey: a citizen science project and how it works. Colorado Biology Teachers Association, Denver, CO

- Cushing, P.E. 2005. On a Silken Thread, Master Gardener Conference, Casper, Wyoming.
- Cushing, P.E. 2004. Spiders of Medical Importance, Zoonoses Conference, Denver, Colorado.
- Cushing, P.E. 2000. Colorado Spider Survey. Colorado State University, Department of Biology.
- Cushing, P.E. 1999. Myrmecophily in spiders. Colorado State University, Department of Bioagricultural Sciences and Pest Management.
- Cushing, P.E. 1996. Adaptations of ant associates and ant mimics. Florida Entomological Society, Gainesville, Florida.

TALKS, POSTERS, AND PUBLISHED ABSTRACTS

- Cushing, P.E., J.O. Brookhart, M. R. Graham. 2019. Camel spider (Solifugae: Eremobatidae) research past and future. Presented at the 21st International Congress of Arachnology in Canterbury, New Zealand (Feb 10 – 15, 2019).
- Garcia, E.L., P.E. Cushing, D. Laudier. 2019. Investigating the poly-paraphyly of North American camel spiders (Solifugae: Eremobatidae: Therobatinae) and their unique moveable palpal spines. Poster Presentation at the 21st International Congress of Arachnology meeting, Canterbury, New Zealand (won 1st prize in student poster competition).
- Horner, N., M. Ramirez, D. Ubick, N. Platnick, P. Cushing. 2019. A new myrmecophilic spider from the Chihuahuan Desert of West Texas. Presented at the 21st International Congress of Arachnology in Canterbury, New Zealand (Feb 10 – 15, 2019).
- Jones, R., P.E. Cushing. 2019. Morphology of male abdominal ctenidia in North American camel spiders. Poster Presentation at the 21st International Congress of Arachnology meeting, Canterbury, New Zealand.
- Zschokke, S., S. Countryman, & P.E. Cushing. 2018. Spiders in space – orb web related behaviour in a zero-gravity environment. Presented by Zschokke at the European Congress of Arachnology in Vác, Hungary.
- Cushing, P.E. 2017. Foundations of biodiversity studies using volunteers and paraprofessionals: arachnology at the Denver Museum of Nature & Science. American Arachnological Society annual meeting, Juriquilla, Querétaro, Mexico.
- Sampognaro, A., P.E. Cushing, B.E. Hendrixson & M.R. Graham. 2015. Elucidating cryptic species in the southern unstriped scorpion, *Vaejovis carolinianus* (Scorpiones: Vaejovidae). American Arachnological Society annual meeting, Mitchell, South Dakota, USA & European Congress of Arachnology in Brno, Czech Republic.
- Cushing, P.E. & N. Horner. 2015. A new species of myrmecophilic spider from Big Bend, Texas. American Arachnological Society annual meeting, Mitchell, South Dakota
- Cushing, P.E. 2015. The Myth of the Camel Spider. Adult Education evening lecture. Denver Museum of Nature & Science, Denver, Colorado
- Graham, M.R., Z.J. Valois, J.A. Henault, B.W. Chatfield, T.L. Holm & P.E. Cushing. 2014. Phylogeography of a large but little known scorpion from the Mojave and Sonoran Deserts, *Smeringurus vachoni* (Scorpiones: Vaejovidae). Annual meeting of the American Arachnological Society, Ohio State University, Newark, OH.
- Cushing, P.E., M.R. Graham, L. Prendini & J.O. Brookhart. 2014. Phylogenetic analysis of the North American camel spider family Eremobatidae (Arachnida, Solifugae). European Congress of Arachnology, Torino, Italy.
- Cushing, P.E., J.O. Brookhart, M.R. Graham, L. Prendini & P. Casto. 2013. Phylogenetic analysis of the camel spider family Eremobatidae (Arachnida, Solifugae): towards a better understanding of the Spawn of Satan. Annual meeting of the American Arachnological Society, Johnson City, TN.
- Cushing, P.E., R. Stucky, L. Petrie, J. Demboski, N. Garneau, S. Holen, F. Krell, I. Miller, & S. Nash. 2012. Teen Science Scholars at the Denver Museum of Nature & Science: Nurturing the next generation of

- scientific leaders. Joint Congress on Evolutionary Biology, Ottawa, Canada and at the Society of Vertebrate Paleontology.
- Casto, P. & P.E. Cushing. 2012. Ultrastructure and functional significance of papillae on the pedipalps of camel spiders (Arachnida, Solifugae). Annual meeting of the American Arachnological Society, University of Wisconsin, Green Bay and at the European Congress of Arachnology, Ljubljana, Slovenia.
- Cushing, P.E., T. Bird, R. Wharton, J.O. Brookhart, W. Savary & L. Prendini. 2011. Solifugae: Exploring the systematic and biology of a little known order of arachnids. Annual meeting of the American Arachnological Society, Lewis and Clark College, Portland, OR and at the European Congress of Arachnology, Sde Boker, Israel.
- Cushing, P.E. & P. Casto. 2011. Setal and sensory structures on the pedipalps of Solifugae. Annual meeting of the American Arachnological Society, Lewis and Clark College, Portland, OR and at the European Congress of Arachnology, Sde Boker, Israel.
- Cushing, P.E. & K. Prestwich. 2010. Respiration in locomotion and recovery from locomotion in *Eremobates* sp. (Solifugae). International Congress of Arachnology, Siedlce, Poland.
- Cushing, P.E., R. Delph & A. Ladigo. 2009. Early instar development in camel spiders (Arachnida, Solifugae). Annual meeting of the American Arachnological Society, Arkansas Tech University.
- Stowe, M.K. & P.E. Cushing. 2009. Spiders in space: launching orb weaving spiders to the International Space Station. Annual meeting of the American Arachnological Society, Arkansas Tech University.
- Cushing, P.E., J.O. Brookhart & L. Prendini. 2008. Structure of papillae on the pedipalps of solifuges – revisited. Annual meeting of the American Arachnological Society, University of California at Berkeley.
- Cushing, P.E. & A. Spriggs. 2008. Colorado Spider Survey and Denver Museum of Nature & Science arachnology collection – ten years later. Annual meeting of the American Arachnological Society, University of California at Berkeley.
- Cushing, P.E., L. Prendini, W.E. Savary, J.O. Brookhart, R.A. Wharton, T. Bird & A.V. Gromov. 2007. Global Survey and Inventory of Solifugae. Annual meeting of the American Arachnological Society, Susquehanna University, Pennsylvania.
- Cushing, P.E., L. Prendini, W.E. Savary, J.O. Brookhart, R.A. Wharton, T. Bird & A.V. Gromov. 2007. Global Survey and Inventory of Solifugae. International Congress of Arachnology, São Pedro, Brazil.
- Cushing, P.E. & J. Slowik. 2006. Colorado Spider Survey Update. Annual meeting of the American Arachnological Society, Baltimore, Maryland.
- Cushing, P.E., J.O. Brookhart, L. Prendini, G.W. Mierau, L. Goin, H. Kleebe & P. Payne. 2006. Structure of papillae on the pedipalps of Solifugae (Arachnida, Solifugae). Annual meeting of the American Arachnological Society, Baltimore, Maryland.
- Stephenson, J., P.E. Cushing, V. Pliker, C.S. Ware. 2006. Effect of residual anti-parasitic compound in meat on museum dermestid beetle colony. Society for the Preservation of Natural History Collections, New Mexico.
- Cushing, P.E. & J. Slowik. 2005. Re-curation of specimens preserved in degraded alcohol: testing alternative techniques. Society for the Preservation of Natural History Collections, London, England.
- Cushing, P.E. & J.O. Brookhart. 2005. The suctorial organ of the Solifugae. Annual meeting of the American Arachnological Society, Akron, Ohio.
- Cushing, P.E., D. Ubick & P. Paquin. 2004. Spiders of North America: an identification manual. Annual meeting of the American Arachnological Society, Norman, Oklahoma.
- Cushing, P.E., D. Ubick & P. Paquin. 2004. Spiders of North America: an identification manual. Congress of the International Society of Arachnology, Ghent, Belgium.

- Cushing, P.E., P. Paquin & N. Dupérré. 2003. Spider Genera of North America revision project update. Annual meeting of the American Arachnological Society, Denver, Colorado.
- Montoya, L., C. Tuell, & P.E. Cushing. 2003. A comparison of the femoral gland of *Zodarion rubidium* (Araneae, Zodariidae) with that of other species of Zodariidae. Annual meeting of the American Arachnological Society, Denver, Colorado.
- Betzen, N. & P.E. Cushing. 2003. Tarantulas of Colorado. Annual meeting of the American Arachnological Society, Denver, Colorado.
- Cushing, P.E. 2002. Spider Genera of North America revision project. Annual meeting of the American Arachnological Society, Riverside, California.
- Cushing, P.E. 2001. Colorado Spider Survey update. Annual meeting of the American Arachnological Society, Keene, New Hampshire.
- Cushing, P.E. 1994. Details of the natural history and ecology of a spider ant-guest. Annual meeting of the American Arachnological Society, Gainesville, Florida.
- Cushing, P.E. 1994. Using molecular techniques to study a spider ant-guest. Society for the Study of Evolution, Georgia Center for Continuing Education, Athens, Georgia.
- Cushing, P.E. 1989. Eggsac defense in the spider *Uloborus glomosus* (Uloboridae). Annual meeting of the American Arachnological Society, Cushing, P.E. 1987. A study of disturbance behaviors in *Uloborus glomosus* as possible predator avoidance strategies. Annual meeting of the American Arachnological Society, Indianapolis, Indiana.
- Opell, B.D. & P.E. Cushing. 1984. Visual field of orb-web and single-line-web spiders of the family Uloboridae. Annual meeting of the American Arachnological Society, New Orleans, Louisiana.

VIDEO PROJECTS

- 2017. Camel Spiders. Neither Camels nor Spiders. Brain Scoop episode (out of Field Museum): <https://www.youtube.com/watch?v=4a9o6j0S570>
- 2017. My Science Story. Podcast for science class (Brandon Timms teacher) in Illinois: <https://itunes.apple.com/us/podcast/my-science-story/id1271735993?mt=2>
- 2014. Spiders in Space Without Ziggy Stardust (production from Skirts in Science DMNS women in group): <http://www.youtube.com/channel/UCYuMNeajnVoe0kMyAZCOJTQ>
- 2014. Searching for Life on Earth and Life Out There (production from Skirts in Science DMNS women in science group): <http://www.youtube.com/channel/UCYuMNeajnVoe0kMyAZCOJTQ>
- 2014. Field Studies with Elephants and Hyenas (production from Skirts in Science DMNS women in science group): <http://www.youtube.com/channel/UCYuMNeajnVoe0kMyAZCOJTQ>
- 2011. What's it like to be a curator?: <http://vimeo.com/26736152>
- 2011. What's the most rewarding part of your job?: <http://vimeo.com/26736156>
- 2010. Scientists in Action video about research: <http://vimeo.com/11558298>
- 2010. The Truth About Spiders, Science Bites (3 minute online DMNS product): <http://www.dmns.org/science/science-bites/the-truth-about-spiders>
- 2009: Mortal Lessons (70 minute film addressing end-of-life issues). Produced by David Liban; Associate Producer, Paula E. Cushing.
- 2006: Perspectives on Death & Dying video (1/2 hour video presenting different religious and cultural perspectives about end-of-life issues) produced by Paula E. Cushing

TEACHING EXPERIENCE

Workshops, Classes, and Outreach Lectures (1998 – present)

- Data Curation and Data Portals (workshop presentation at the International Congress of Arachnology, Canterbury, New Zealand, Feb 10, 2019).
- Spiders of Medical Importance (Children’s Hospital, Denver – 2018)
- The Truth Behind camel Spiders (DMNS, area universities)
- Aliens: homage to a parasite (DMNS as part of a collaborative event between DMNS and the Denver Film Society).
- Diversity: a Unifying Idea for Museum Science (DMNS)
- Spiders of human Health Importance, Mesa Community College, Grand Junction, St. Mary’s Hospital, Grand Junction, Montrose Hospital, Montrose, CO (taught most years at various venues).
- Spider Identification and Control, University of Wyoming re-certification program for State Extension personnel
- Spider fact and fancy: identification, biology, and management (DMNS, area universities, University of Wyoming, Buffalo Bill Museum various public groups)
- Spider Biology and Identification (DMNS, area universities and schools, University of Wyoming, University of Northern Colorado, various public groups)
- General Arachnology, Adult Programs short course (DMNS)
- Spider Biology, Adult Programs short course (DMNS)
- Colorado Spider Survey: a Citizen Science Project and How it Works (DMNS)
- Spider Fact and Fancy (DMNS, CSU, Butterfly Pavilion)
- Travels Through Poland (DMNS for Volunteer Enrichment Committee)
- Spider in Space and Update on Spider in Space lectures (DMNS)
- Birders, Bigfoot and Bond, James Bond (DMNS, co-presenter with Aaron Spriggs)
- Science in Action live broadcasts to school groups (DMNS)
- Camel Spiders: the Weirdest Spiders Ever? (DMNS, CSU)
- Insects in the Diet (Fort Collins main public library for school children)
- An ant by any other name – could be a spider! (DMNS)
- Spiderman Demystified, adult programs evening program (DMNS, with three other arachnologists)
- Spider biology short course (University of Wyoming)
- Colorado Spider Survey training workshops (DMNS, area State Parks, area universities, Butterfly Pavilion, etc. Taught every year at multiple places.)
- Teacher training workshops on various subjects (DMNS)
- Presentation about Perspectives on Death and Dying Video for Children’s Hospital “Good Grief at Noon” lecture series for hospice workers and palliative care professionals
- Spiders of Medical Importance (DMNS, Wyoming for the public and medical professionals, CSU, University of Wyoming, El Paso County Extension, Parker County Water and Sanitation District)
- Spider lectures for various elementary schools regionally
- Presentations with school groups on entomology, arachnology, and museum curation (primarily in DMNS but also offsite at schools)
- Schoolyard Bugs and Creek Critters Teacher’s Workshop (DMNS)
- Halloween Spider Discovery program at the Butterfly Pavilion
- Arthropod Identification Class (DMNS)
- Animal Architects, Adult Education short course (DMNS)
- Introduction to Evolutionary Biology, Adult Education short course (DMNS)

College and University Teaching Experience

- Population and Community Ecology (College of Wooster, 1996-1997)
- Natural History of the Invertebrates (College of Wooster, 1996-1997)

- General Biology: ½ semester biology of plants and non-animals unit (College of Wooster, team taught, 1996-1997)
- General Biology: ½ semester of biology of populations unit (College of Wooster, team taught, 1996-1997)
- Integrated Principles of Biology I: ½ semester biology of animals unit (postdoctoral teaching associate, University of Florida, team taught, 1995-1996)
- Invertebrate Zoology (postdoctoral teaching associate, University of Florida, team taught, 1995-1996)
- General Biology labs for majors (postdoctoral teaching associate, University of Florida, team taught, 1995-1996)
- Evolution, Ecology, and Behavior, non-majors biology (University of Florida, 1995)
- Guest lectures on osmoregulation, thermoregulation, and the endocrine system for Cells, Organisms, and Genetics (University of Florida, 1994)
- Teaching Assistant for Evolution, Ecology, and Behavior (University of Florida, 1992)
- Teaching Assistant for Invertebrate Zoology (University of Florida, 1991)
- Teaching Assistant for General Biology labs for majors (University of Florida, 1990-1995)
- Teaching Assistant for General Biology labs for majors and non-majors (Virginia Tech, 1985-1987)

ACADEMIC SERVICES

Student Advisement

- Advisor for doctoral candidate, Erika L. Garcia (University of Colorado, Denver) (2019 onward)
- Advisor for Master of Science candidate, Richard Ryan Jones (University of Colorado, Denver) (2018 – present)
- Mentor for multiple high school interns through DMNS Teen Science Scholars program (1999 – 2015)
- Mentor for summer NSF-funded REU students (2009 – 2011)
- Committee member for doctoral candidate, Eric Knutson (Colorado State University, 2013 - present)
- Co-advisor for doctoral candidate, Tharina Bird (Colorado State University, 2007 – 2015)
- Co-advisor for M.Sc. candidate, Jozef Slowik (University of Alaska, Fairbanks, 2008 – 2011)
- Co-advisor for Laurie Kerzicnik, Ph.D. (CSU, 2005-2010)
- Co-advisor for Carol O'Meara, M.Sc. (CSU, 2001-2003); Dan Kipervaser, M.Sc. (CSU, 2001-2003); April Kinchloe, M.Sc. (University of Colorado, Boulder, 2002 – 2004)
- Committee member for Danielle Forte (University of Colorado, Boulder, 2012 – 2013)
- Committee member for Jen Rowsell and David Footle (Texas A&M University, 2011 – present)
- Committee member for Steve Armstead, M.Sc. (CU-Boulder, 2001 – 2003)
- Advisor for 10 undergraduate students, College of Wooster, doing independent research projects (1996 – 1997)

Other Service

- Council Member, International Society of Arachnology (2019 – 2022)
- President, International Society of Arachnology (2016 - 2019)
- Board Member, Colorado Mountain Club Foundation (appointed 2015)
- Editorial Board Member, ZooKeys (appointed 2014)
- Teen Science Scholar Advisory Committee Chair (appointed 2015 - 2018)
- One of the founders of a women in science group called Skirts in Science (group initiated 2013)
- Secretary, American Arachnological Society (elected 2014)
- Press Officer, American Arachnological Society (appointed 2014)
- Member of Colorado Mountaineering Club grant selection committee (2013 – present)
- Member of the Scientific Advisory Board, Butterfly Pavilion, Westminster, Colorado, 2003 – 2016
- Host 2016 International Congress of Arachnology, Golden, Colorado
- American Arachnological Society, Director, 2009 – 2011
- American Arachnological Society, President, 2007 – 2009

- American Arachnological Society, President Elect, 2005 - 2007
- American Arachnological Society, Managing Editor for *Journal of Arachnology*, 2001 – 2007
- American Arachnological Society, Director, 1999 – 2001
- Editorial Board member, Zoos' Print Journal, Coimbatore, India, 2005 – present
- Editorial Board member, Journal of Threatened Taxa, 2005 - present
- Team leader (and co-author) for revision of *Spider Genera of North America* with title of revised work changed to: *Spiders of North America: an identification manual*
- NSF review panel member for the Systematics and biodiversity projects panel, 2013
- NSF review panel member for Systematics and panel member for Biotic Surveys and Inventories grants, 2004
- Hosted American Arachnological Society annual meeting at DMNS, 2003
- Served on The Nature Conservancy invited workshop on the Southern Rocky Mountains Ecoregion, May 9-10, 2000
- Served on an NSF sponsored invited workshop in San Diego to plan the National Ecological Observatories Network, March 9-12, 2000
- Consultant for *Insects and Spiders*, Discovery Books, New York
- Reviewer for: European Zoological Journal (2018), Arachnology (2018), Biological Journal of the Linnean Society (2018), Journal of Arachnology (2018), Transactions of the Kansas Academy of Science (2018), Toxicon (2017), Science of Nature (2017), Journal of Arachnology (2017), Systematics and Biodiversity (2016), Journal of Global Agriculture and Ecology (2016), Journal of Arachnology (2016), Entomological News (2015), Animal Behaviour (2014), Zoologischer Anzeiger (2014), Sociobiology (2014), Behavioral Ecology & Sociobiology, Biological Journal of the Linnean Society, Functional Ecology, Psyche, The American Naturalist, Royal Society B, Revista de la Sociedad Entomológica Argentina, Zootaxa, Journal of Arachnology, Biology Letters, Animal Behaviour, Journal of Morphology, Journal of Arid Environments, Behavioral Ecology and Sociobiology, BioTropica, Annals of the Entomological Society of America, Australian Journal of Zoology, Proceedings of the International Congress of Arachnology, American Midland Naturalist, Journal of Insect Behavior, Florida Entomologist, Living World, Naturwissenschaften, Journal of Environmental Entomology, Serket: the Arachnological Bulletin of the Middle East, Environmental Entomology
- Grant reviewer for NSF, International Arid Lands Consortium
- Book reviewer for *Spiders of North America* field guide, Princeton University Press and *The Private Life of Spiders* by Paul Hillyard
- Resource person for arachnid-related questions, DMNS (200 – 300 questions per year)
- Co-organizer of the Annual meeting of the American Arachnological Society at the University of Florida, Gainesville, Florida, 1994
- Vice President of the Zoology Graduate Student Association, University of Florida, Gainesville, Florida, 1993-1994

MEDIA

- 2019: Buffs Talk Science Podcast: Episode 22: French Kissing a Butterfly (interviewed about museum curation): <https://buffstalkscience.com/2019/02/20/episode-22-french-kissing-a-butterfly/>
- 2018: Channel 7 Denver ABC, KITV 4 News, WENY News: interview about tarantula migration (<https://www.thedenverchannel.com/news/local-news/troops-of-tarantulas-arachnids-become-commonplace-in-southeastern-colorado-during-mating-season>); KOSI 101 radio interview about tarantula migration; Colorado Public Radio “Colorado Matters” segment about tarantula migration.
- 2017: Hypothesis or Theory – Denver Post letter to the editor
- 2014: Report on Mazda recall caused by spiders – Channel 9 News (local)
- 2012: The spider hunters– High Country News
- 2012: Colorado Matters radio interview (Colorado Public Radio) about the Colorado Spider Survey
- 2011: Interviewed for eHow.com online article entitled “Large Reddish Brown Spiders in Colorado
- 2010: Interviewed in California by NBC affiliate television station about Solifugae research project
- 2010: Interviewed for Boomer Alley Radio in Los Angeles about scientific discoveries

- 2010: Newspaper article in Modesto Bee, “Spider –hunter seeks ‘spawn of Satan’: Arachnid research brings team to Del Puerto Canyon (<http://www.modbee.com/2010/05/30/1188305/spider-hunter-seeks-spawn-of-satan.html>)
- 2010: Newspaper article in Patterson Irrigator, “Research draws scientist to Del Puerto Canyon”
- 2009: Interviewed by Boulder Daily Camera for newspaper article, “Facing Your Fears”
- 2008: Interviewed by Rocky Mountain News about case of purported death from spider bite
- 2008: Interviewed for Rocky Mountain News article, “Untangling the web”
- 2008: Interviewed for Wyoming Tribune-Eagle for article “Spiders in the Backyard” (for Halloween)
- 2008: Interviewed by Denver Post for article about common fears
- 2007: On Channel 9 television news to plug DMNS program, “Spiderman Demystified”
- 2007: Interviewed for article in Wyoming Tribune-Eagle
- 2006: Interviewed by Lucky Duck Productions about Colorado Spider Survey for broadcast on The Animal Planet
- 2006: Interviewed by The Science Teacher for article, “Career of the Month: Dcience in the Workplace. Apr/May 2006 in The Science Teacher
- Interviewed by Pueblo Chieftain for article about the Colorado Spider Survey
- 2006: Interviewed by SuperScience, Scholastic, Inc.
- 2005: Interviewed for article in Boulder paper on spiders
- 2005: Interviewed by Caspar Journal about spiders of medical importance
- 2005: Interviewed on Wyoming television and radio about lecture on spiders of medical importance
- 2004: Interviewed for “Been There, Done That” radio program from WHYIY NPR station in Philadelphia
- 2004: Interviewed for article in Denver Post for article about arachnid program (Betsy Lindorf)
- 2003: Interviewed for article in Denver Post
- 2002: Interviewed for KOA radio about *Eight Legged Freaks* movie
- 2001: Interviewed for Colorado Public Radio show “Colorado Matters” about the Colorado Spider Survey
- 2001: Interviewed for Utah Public Radio call-in show about CSS
- 2000: Interviewed for eCHIC.com magazine article about my career as a museum curator
- 2000: Interviewed for a Fort Collins Coloradoan article about the Colorado Spider Survey
- 1999: Wrote an article for The Range Ledger (Cheyenne Wells newspaper) about Spiders
- 1999: Interviewed at Channels 2, 4, and 9 to promote the First Annual Infested Festival
- 1999: Interviewed by The Denver Post for an article about the Colorado Spider Survey
- 1999: Interviewed by the Rocky Mountain News for an article about the Colorado Spider Survey
- 1999: Interviewed for an article about the fear of spiders in Women Outside magazine
- 1998: Interviewed by The Denver Post for an article about insects in the movies
- 1998: Interviewed on radio show, Chiropractic Connections about Entomophagy

MEMBERSHIP

- Society for the Study of Evolution
- Entomological Society of America
- Sigma Xi
- American Arachnological Society
- International Society of Arachnology
- British Arachnological Society
- European Society of Arachnology
- Xerces Society