



# CURRICULUM VITAE

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## MICHAEL STEPHEN MOORING

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### Education

<b>Institution &amp; Location</b>	<b>Degree</b>	<b>Year</b>	<b>Field of Study</b>
University of Colorado, Boulder	B.A.	1987	Environmental, Population & Organismic Biology
University of California, Davis	M.Sc.	1990	Animal Behavior
University of California, Davis	Ph.D.	1993	Animal Behavior

### Academic Honors

#### Dates

1987  
1988, 1989, 1990  
1988, 1989  
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1994-1995  
1995-1996  
1999, 2002, 2004-2010, 2012-2025  
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2000, 2004, 2005, 2010, 2012-2013,  
2015-2019, 2024-2025  
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2003, 2021, 2024  
2004-2006  
2005-2009  
2011-2020  
2012-2018  
2019-2020  
2013-2022  
2021  
2023

#### Honors

Graduated summa cum laude, CU Boulder  
Recipient UC Davis Research Awards  
Recipient of Sigma Xi Grants  
Regents Fellow in Animal Behavior  
Storer Fellowship  
Society of Mammalogists Research Grant  
Robert Emrie Smith Fellowship  
University of California Fellowship  
Visiting Scientist, University of Pretoria  
NATO Postdoctoral Fellowship, University of Alberta  
PLNU Research & Special Projects (RASP) Grant  
PLNU Teaching Development Award  
  
PLNU Alumni Award  
PLNU Wesleyan Center Scholar  
New Mexico Dept. Game & Fish Grant  
PLNU Wesleyan Center Fellow  
PLNU Provost's Grant  
Visiting Associate Professor, UC Davis  
NSF-RUI Award IOB-0517771  
San Diego Zoo Jaguar Grant  
QERC Grant  
Sabbatical Grant  
Fellow of the Zoological Society of San Diego  
Hero for Heroes Award  
Ryan Botts Award for Excellence as an Honors Scholars Mentor

## **Employment & Experience**

- 2006-Present** Full Professor (tenured)  
Department of Biology  
Point Loma Nazarene University  
3900 Lomaland Drive  
San Diego, CA 92106-2899
- 2002 - 2006:** Associate Professor  
Department of Biology  
Point Loma Nazarene University
- 1997-2002:** Assistant Professor  
Department of Biology  
Point Loma Nazarene University
- 1996-1997:** Postdoctoral Research Associate  
Department of Anatomy, Physiology & Cell Biology  
School of Veterinary Medicine  
University of California, Davis, CA 95616 USA  
(Supervisor: Dr. Benjamin L. Hart)
- 1995-1996:** NATO Postdoctoral Fellow  
Department of Biological Sciences  
University of Alberta  
Edmonton, Alberta T6G 2E9 Canada  
(Sponsor: Dr. William M. Samuel)
- 1994-1995:** Visiting Scientist  
Department of Zoology & Entomology  
University of Pretoria  
Pretoria 0002, South Africa  
(Collaborator: Dr. Andrew A. McKenzie)
- 1990-1993** Research Associate  
Department of National Parks & Wild Life Management  
P.O. Box 8365, Causeway  
Harare, Zimbabwe  
(Chief Ecologist: Dr. A. Conybeare)

**Current Research Interests:** Neotropical predators and prey  
Circadian and lunar activity patterns of predators and prey  
Bison behavioral ecology and conservation  
Sexual segregation  
Sexual selection and reproductive behavior  
Behavioral endocrinology  
Acoustical communication  
Behavioral adaptations against parasites and disease  
Space use and habitat selection

**Professional Societies:** Animal Behavior Society  
International Society for Behavioral Ecology  
American Society of Mammalogists  
The Wildlife Society  
Association for Tropical Biology and Conservation  
Society for Conservation Biology

**Courses taught:** Conservation Ecology  
Neotropical Ecology  
Neotropical Mammalogy  
Conservation Biology  
Environmental & People  
Animal Behavior  
Vertebrate Biology  
Animal Biology  
Human Biology and Bioethics  
Anatomy and Physiology

**Marital status:** Married to Emma Mooring  
Two children: Rebekah and Timothy

## Research Publications

1. 1989 Mooring, M.S. Ontogeny of allogrooming in mule deer (*Odocoileus hemionus*). *Journal of Mammalogy* 70: 434-437.
2. 1990 Hart, B.L., Hart, L.A., & Mooring, M.S. Differential foraging of oxpeckers on impala in comparison with sympatric antelope species. *African Journal of Ecology* 28: 240-249.
3. 1991 Mooring, M.S. & Rubin, E.S. Nursing behavior and early development of Kenyan impala at the San Diego Wild Animal Park. *Zoo Biology* 9: 329-339.
4. 1992 Mooring, M.S. & Hart, B.L. Reciprocal allogrooming in dam-reared and hand-reared impala fawns. *Ethology* 90: 37-51.
5. 1992 Hart, B.L., Hart, L.A., Mooring, M.S. & Olubayo, R. Biological basis of grooming behaviour in antelope: The body size, vigilance and habitat principles. *Animal Behaviour* 44: 615-631.
6. 1992 Mooring, M.S. & Hart, B.L. Animal grouping for protection from parasites: Selfish herd and encounter-dilution effects. *Behaviour* 123: 173-193.
7. 1993 Mooring, M.S. & Hart, B.L. Effects of relatedness, dominance, age, and association on reciprocal allogrooming by captive impala. *Ethology* 94: 207-220.
8. 1993 Mooring, M.S. Predation on a newborn impala by a martial eagle. *Ostrich* 64: 185-186.
9. 1994 Mooring, M.S. Allogrooming, an essential activity in impala behaviour. *Zimbabwe Wildlife*, January 1994: 19-22.
10. 1994 Mooring, M.S., Mazhowu, W. & Scott, C.A. The effect of rainfall on tick challenge at Kyle Recreational Park, Zimbabwe. *Experimental & Applied Acarology* 18: 507-520.
11. 1995 Mooring, M.S. & Hart, B.L. Differential grooming rate and tick load of territorial male and female impala, *Aepyceros melampus*. *Behavioral Ecology* 6: 94-101.
12. 1995 Mooring, M.S. The effect of tick challenge on grooming rate by impala. *Animal Behaviour* 50: 377-392.
13. 1995 Mooring, M.S. & Hart, B.L. Costs of allogrooming in impala: Distraction from vigilance. *Animal Behaviour* 49: 1414-1416.
14. 1995 Mooring, M.S. & McKenzie, A.A. The efficiency of patch sampling for determination of relative tick burdens in comparison with total tick counts. *Experimental & Applied Acarology* 19: 533-547.
15. 1995 Mooring, M.S. & Mazhowu, W. Geographic distribution of ticks and comparison of tick load on male and female impala from three sites in Zimbabwe. *Zimbabwe Veterinary Journal* 26: 76-85.
16. 1996 Mooring, M.S. & Mundy, P.J. Interactions between impala and oxpeckers at Matobo National Park, Zimbabwe. *African Journal of Ecology* 34: 54-65.

17. 1996 Mooring, M.S., McKenzie, A.A. & Hart, B.L. Grooming in impala: Role of oral grooming in removal of ticks and effects of ticks in increasing grooming rate. *Physiology and Behavior* 59: 965-971.
18. 1996 Mooring, M.S. & Mundy, P.J. Factors influencing host selection by yellow-billed oxpeckers at Matobo National Park, Zimbabwe. *African Journal of Ecology* 34: 177-188.
19. 1996 Mooring, M.S., McKenzie, A.A. & Hart, B.L. Role of sex and breeding status in grooming and total tick load of impala. *Behavioral Ecology and Sociobiology* 39: 259-266.
20. 1997 Mooring, M.S. & Hart, B.L. Self grooming in impala mothers and lambs: Testing the body size and tick challenge principles. *Animal Behaviour* 53: 925-934.
21. 1997 Mooring, M.S. & Hart, B.L. Reciprocal allogrooming in impala lambs. *Ethology* 103: 665-680.
22. 1998 Mooring, M.S. & Samuel, W.M. Tick-removal grooming by elk (*Cervus elaphus*): testing principles from the programmed-grooming hypothesis. *Canadian Journal of Zoology* 76: 740-750.
23. 1998 Mooring, M.S. & Samuel, W.M. Tick defense strategies in bison: the role of grooming and hair coat. *Behaviour* 135: 693-718.
24. 1998 Mooring, M.S., Gavazzi, A.J., & Hart, B.L. Effects of castration on grooming in goats. *Physiology and Behavior* 64: 707-713.
25. 1998 Mooring, M.S. & Samuel, W.M. The biological basis of grooming in moose (*Alces alces*): programmed versus stimulus-driven grooming. *Animal Behaviour* 56: 1561\_1570.
26. 1999 Mooring, M.S. & Samuel, W.M. Premature loss of winter hair in free-ranging moose (*Alces alces*) infested with winter ticks (*Dermacentor albipictus*) is correlated with grooming rate. *Canadian Journal of Zoology* 77: 148-156
27. 1999 Mooring, M.S. & Dennis, N.J. Impala, the living fossil. *Africa Environment & Wildlife* 7: 52-61.
28. 2000 Samuel, W.M., Mooring, M.S., Aalangdong, O.I. Adaptations of winter ticks (*Dermacentor albipictus*) to invade moose and moose to evade ticks. *Alces* 36: 183-195.
29. 2000 Mooring, M.S., Benjamin, J.E., Harte, C.R., & Herzog, N.B. Testing the interspecific body size principle in ungulates: the smaller they come, the harder they groom. *Animal Behaviour* 60: 35-45.
30. 2002 Mooring, M.S., Reisig, D.D., Niemeyer, J.M., and Osborne, E.R. Sexually and developmentally dimorphic grooming: a comparative survey of the Ungulata. *Ethology* 108: 911-934.

31. 2003 Mooring, M.S., Fitzpatrick, T.A, Fraser, I.C., Benjamin, J.E., Reisig, D.D. & Nishihira, T.T. Insect-defense behavior by desert bighorn sheep. *Southwestern Naturalist* 48: 635-643.
32. 2003 Mooring, M.S., Fitzpatrick, T.A, Benjamin, J.E., Fraser, I.C., Nishihira, T.T., Reisig, D.D., & Rominger, E.M. Sexual segregation in desert bighorn sheep (*Ovis canadensis mexicana*). *Behaviour* 140: 183-207.
33. 2004 Mooring, M.S., Blumstein, D.T. & Stoner, C.J. The evolution of parasite-defence grooming in ungulates. *Biological Journal of the Linnean Society* 81: 17-37.
34. 2004 Mooring, M.S. & Rominger, E.M. 2004. Reply – Is the activity budget the holy grail of sexual segregation? *Behaviour* 141: 521-530.
35. 2004 Mooring, M.S., Fitzpatrick, T.A, Nishihira, T.T., & Reisig, D.D. Vigilance, predation risk, and the Allee effect in desert bighorn sheep. *Journal of Wildlife Management* 68: 519-532.
36. 2004 Mooring, M.S., Patton, M.L., Lance, V.A., Hall., B.M., Schaad, E.W., Fortin, S.S., Jella, J.E., & McPeak, K.M. Fecal androgens of bison bulls during the rut. *Hormones & Behavior* 46: 392-398.
37. 2005 Mooring, M.S., Reisig, D.D., Osborne, E.R., Kanallakan, A.L, Wiseman, D.S., Huber, R.R. Sexual segregation in bison (*Bison bison*): a test of multiple hypotheses. *Behaviour* 142: 897-927.
38. 2006 Mooring, M.S., Patton, M.L., Lance, V.A., Hall., B.M., Schaad, E.W., Fetter, G.A., Fortin, S.S., & McPeak, K.M. Glucocorticoids of bison bulls in relation to social status. *Hormones & Behavior* 49: 369-375.
39. 2006 Mooring, M.S., Hart, B.L., Fitzpatrick, T.A, Benjamin, J.E., Fraser, I.C., Nishihira, T.T., and Reisig, D.D. Grooming in desert bighorn sheep and the ghost of parasites past. *Behavioral Ecology* 17: 364-371.
40. 2006 Mooring, M.S., Patton, M.L., Reisig, D.D., Osborne, E.R., Kanallakan, A.L., and Aubery, S.M. Sexually dimorphic grooming in bison: influence of body size and testosterone. *Animal Behaviour* 72: 737-745.
41. 2007 Mooring, M.S., Blumstein, D.T., Reisig, D.D., Niemeyer, J.M., and Osborne, E.R. Insect-repelling behaviour in bovids: role of mass, tail length, and group size. *Biological Journal of the Linnean Society* 91: 383-392.
42. 2008 Wyman, M.T., Mooring, M.S., McCowan, B., Penedo, M.C.T., and Hart, L.A. Bellow amplitude of bison reflects male quality, seasonal condition, and motivation. *Animal Behaviour* 76: 1625-1639.
43. 2012 Wyman, M.T., Mooring, M.S., McCowan, B., Penedo, M.C.T., Reby, D., and Hart, L.A. Acoustic cues to size and quality in the vocalizations of male North American bison, *Bison bison*. *Animal Behaviour* 84: 1381-1391.
44. 2014 Li, Z., Beauchamp, G., and Mooring, M.S. Relaxed selection for tick-defense grooming in Père David's deer? *Biological Conservation* 178: 12–18.

45. 2014 Mooring, M.S. and Penedo, M.C.T. Behavioral versus genetic measures of fitness in bison bulls (*Bison bison*). *Journal of Mammalogy* 95: 913-924.
46. 2018 Le Yang, Y.L., Ming, T., Zhigang, J., Zhongqiu, L., Mooring, M. Tick-defense grooming patterns of two sympatric Tibetan ungulates. *Journal of Zoology* 307: 1-7.
47. 2019 Sáenz-Bolaños, C., Fuller, T.K., Mooring, M.S., Porras, J., Sievert, P.R., Montalvo, V.H., Carrillo, E. Bush dogs in Central America: recent range expansion, cryptic distribution, or both? *Tropical Conservation Science* 12: 1-5.
48. 2020 Mooring, M. S., Eppert, A. A., and Botts, R. T. Natural selection of melanism in Costa Rican jaguar and onçilla: a test of Gloger's Rule and the temporal segregation hypothesis. *Tropical Conservation Science* 13: 1-15. <https://doi.org/10.1177/1940082920910364>
49. 2020 Botts, R. T, Eppert, A. A., Wiegman, T. J., Blankenship, S. R., Rodriguez, A., Wagner, A. P., Ullrich, S. E., Allen, G. R., Garley, W. M., Asselin, E. M., and Mooring, M. S. Does moonlight increase predation risk for elusive mammals in Costa Rica? *Tropical Conservation Science* 13: 1–21. DOI: 10.1177/1940082920952405
50. 2020 Botts, R. T, Eppert, A. A., Wiegman, Rodriguez, A., T. J., Blankenship, S. R., Asselin, E. M., Garley, W. M., Wagner, A. P., Ullrich, S. E., Allen, G. R., and Mooring, M. S. Circadian activity patterns of mammalian predators and prey in Costa Rica. *Journal of Mammalogy* 101: 1313–1331. DOI:10.1093/jmammal/gyaa103
51. 2021 Wyman, M. T., Pinter-Wollman, N., and Mooring, M. S. Trade-offs between fighting and breeding: a social network analysis of bison male interactions. *Journal of Mammalogy* 102: 504–519. DOI:10.1093/jmammal/gyaa172
52. 2021 González-Tenorio, R., Eppert, A. A., and Mooring, M.S. Diversidad y patrones de actividad de mamíferos silvestres medianos y grandes en la Cordillera de Talamanca, Costa Rica. *UNED Research Journal* 13: e3621. DOI: <https://doi.org/10.22458/urj.v13i2.3621>
53. 2022 Eppert, A. A., Botts, R. T., and Mooring, M. S. Selección natural del melanismo en jaguar y tigrillo (Carnivora: Felidae). *UNED Research Journal* 14(Supl.1): e3857. DOI: <https://doi.org/10.22458/urj.v14iS1.3857>
54. 2022 Mooring, M. S., and Eppert, A. A. Patrones de actividad circadiana y lunar del jaguar y el puma en relación con sus presas y competidoras (Carnivora: Felidae). *UNED Research Journal* 14(Supl.1): e3858. DOI: <https://doi.org/10.22458/urj.v14iS1.3858>
55. 2022 Villalobos-Hoffman, R., Ewing, J.E., Mooring, M.S. Do wildlife crossings mitigate the roadkill mortality of tropical mammals? A case study from Costa Rica. *Diversity* 14: 665. <https://doi.org/10.3390/d14080665>
56. 2023 Mooring, M., Cordero, A. M., Ewing, J. (2023). [Wildlife Crossings in Costa Rica: Are wildlife crossing structures effective in mitigating roadkill mortality on tropical highways?](#). OCELOTS Incubator: Creating an online module in tropical biology, (Version 2.0). QUBES Educational Resources. doi:10.25334/NK85-B873

57. 2024 de Oliveira, T.G., Fox-Rosales, L.A., Ramírez-Fernández, J.D., Cepeda-Duque, J.C., Zug, R., Sanchez-Lalinde, C., Oliveira, M.J.R., Marinho, P.H.D., Bonilla-Sánchez, A., Marques, M.C., Cassaro, K., Moreno, R., Rumiz, D., Peters, F.B., Ortega, J., Cavalcanti, G., **Mooring, M.S., Blankenship, S.R.**, Brenes-Mora, E., Días, D., Mazim, F.D., Eizirik, E., Diehl, J.L., Marques, R.V., Ribeiro, A.C.C., Cruz, R.A., Pasa, E., Meira, L.P.C., Pereira, A., Ferreira, G.B., de Pinho, F.F., Sena, L.M.M., de Morais, V.R., Luiz, M.R., Moura, V.E.C., Favarini, M.O., Leal, K.P.G., Wagner, P.G.C., dos Santos, M.C., Sanderson, J., Araújo, E.P., Rodrigues, F.H.G. (2024). Ecological modeling, biogeography, and phenotypic analyses setting the tiger cats' hyperdimensional niches reveal a new species. *Scientific Reports*, 14, 2395. <https://doi.org/10.1038/s41598-024-52379-8>
58. 2024 Mooring, M.S. (2024). Programmed grooming after 30 years of study: a review of evidence and future prospects. *Animals*, 14, 1266. <https://doi.org/10.3390/ani14091266>
59. 2024 Bonilla-Sánchez, A., Sartor, C.C., Fox-Rosales, L.A., Feijó, A., Ramírez-Fernández, J.D., Brenes-Mora, E., **Mooring, M.S., Blankenship, S.R.**, Sánchez-Lalinde, C., Oliveira do Nascimento, F., Zug, R., Oliveira, M.J., Marinho, P.H.D., Ferreira, G.B., Solari, S., Gomes de Oliveira, T., Eizirik, E. (2024). Ecological niche modeling of the *Leopardus tigrinus* complex sheds light on its elusive evolutionary history. *Journal of Mammalogy*, gyae074, <https://doi.org/10.1093/jmammal/gyae074>
60. 2024 McCullough, I.M., Beirne, C., Soto-Navarro, C., **Eppert, A.**, Flatt, E., Kemp, Y.J.M., Molnar, P., **Mooring, M.S.**, Nikolova, Y., Olson, E., Pinto, C., **Porrás, J.**, Quirós, M.J.M., Rodríguez, G.S., Schipper, J., Tellez, C.R., Soto, J.S.V., Whitworth, A. (2024). Integrating high-resolution remote sensing and empirical wildlife detection data for climate-resilient corridors across tropical elevational gradients. *Biological Conservation*, 298, 110763. <https://doi.org/10.1016/j.biocon.2024.110763>.
61. 2024 Ramírez-Fernández, J.D., Fox-Rosales, L.A., **Mooring, M.S.**, Delgado-Carazo, J.C., **Blankenship, S.R.**, Powell, J.R., Méndez, Y., Acevedo-Loria, A., Brenes-Mora, E., Sanderson, J.G., de Oliveira, T.G. (2024). Distribution and habitat use patterns of the endangered Central American clouded oncilla (*Leopardus pardinoides oncilla*) in Costa Rica. *PLoS ONE* 19(9), e0310562. <https://doi.org/10.1371/journal.pone.0310562>



## Student Conference Presentations

1. Jill Benjamin, Cynthia Harte, Nathan Herzog, and Michael S. Mooring. "Testing the body size principle at the San Diego Wild Animal Park," presented by Jill Benjamin at the 24<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at University of California-Irvine in Irvine, California, May 1, 1999.
2. Thomas Fitzpatrick and Michael S. Mooring. "Optimal predators and vulnerable prey: predator-prey relations of bighorn sheep and mountain lions," presented by Thomas Fitzpatrick at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
3. Ian Fraser and Michael S. Mooring. "Grooming and the ghost of parasites past," presented by Ian Fraser at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
4. Jill Benjamin and Michael S. Mooring. "Fly-defense behavior by desert bighorn sheep," presented by Jill Benjamin at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
5. Danielle Garcia and Michael S. Mooring. "Exhibit preferences by visitors to the San Diego Zoo," presented by Danielle Garcia at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
6. Mark Houseman and Michael S. Mooring. "Role of the dominant male in great ape societies," presented by Mark Houseman at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
7. Daniel Miller and Michael S. Mooring. "Grouping against fly harassment in Calamian deer," presented by Daniel Miller at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
8. Amy Sheridan and Michael S. Mooring. "Reproductive constraints on sentry behavior in meerkats," presented by Amy Sheridan at the 25<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2000.
9. Thomas Fitzpatrick, Tara Nishihira, Dominic Reisig, and Michael S. Mooring. "Risk of mountain lion predation in desert bighorn sheep," presented by Thomas Fitzpatrick at the 26<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, in Santa Clara, California, April 28, 2001.
10. Tara Nishihira, Thomas Fitzpatrick, Dominic Reisig, and Michael S. Mooring. "Sexual segregation in desert bighorn sheep," presented by Tara Nishihira at the 26<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, in Santa Clara, California, April 28, 2001.
11. Dominic Reisig, Tara Nishihira, Thomas Fitzpatrick, and Michael S. Mooring. "Grooming and fly repelling behavior in desert bighorn sheep," presented by Dominic Reisig at the 26<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, in Santa Clara, California, April 28, 2001.

12. Eric R. Osborne, Jason M. Niemeyer, Dominic D. Reisig, and Michael S. Mooring. "Developmentally dimorphic grooming in ungulates," presented by Eric Osborne at the 27<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University in Los Angeles, California, April 27, 2002.
13. Dominic D. Reisig, Eric R. Osborne, Jason M. Niemeyer, and Michael S. Mooring. "Effect of body size on fly-repelling behavior in ungulates," presented by Dominic Reisig at the 27<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University in Los Angeles, California, April 27, 2002.
14. Jason M. Niemeyer, Eric R. Osborne, Dominic D. Reisig, and Michael S. Mooring. "Sexually dimorphic grooming in ungulates," presented by Jason Niemeyer at the 27<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University in Los Angeles, California, April 27, 2002.
15. Adam L. Kanallakan, Dominic D. Reisig, Eric R. Osborne, and Michael S. Mooring. "Sexual segregation in bison: a test of multiple hypotheses," presented by Adam Kanallakan at the 28<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Colorado College in Colorado Springs, Colorado, April 26, 2003.
16. Eric W. Schaad, Brent M. Hall, and Michael S. Mooring. "Effective population size and conservation of bison at Fort Niobrara National Wildlife Refuge" presented by Eric Schaad at the 29<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 24, 2004.
17. Brent M. Hall, Eric W. Schaad, Jacquelynn E. Jella, Shavonne S. Fortin, and Michael S. Mooring. "Fecal androgens of bison bulls during the rut" presented by Brent Hall at the 29<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 24, 2004.
18. Shavonne S. Fortin, Jacquelynn E. Jella, Brent M. Hall, Eric W. Schaad, and Michael S. Mooring. "Glucocorticoids of bison in relation to social status" presented by Shavonne Fortin and Jacquelynn Jella at the 29<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 24, 2004.
19. Michael Dillenbeck, Kevin Yarbrough, and Michael S. Mooring. "Glucocorticoids of bison bulls in relation to social status" presented by Michael Dillenbeck at the 30<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University in Santa Clara, California, April 30, 2005.
20. Angela Merkens, Michael Dillenbeck, Timothy O'Brien, and Michael S. Mooring. "Effect of dominance on acoustical communication in bison bulls" presented by Angela Merkens at the 31<sup>st</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2006.
21. Timothy O'Brien, Angela Merkens, Michael Dillenbeck, and Michael S. Mooring. "Genetic parentage of bison compared with breeding behavior" presented by Timothy O'Brien at the 31<sup>st</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 29, 2006.

22. Daniel Sullivan and Michael S. Mooring. "Do bison females synchronize parturition by gestation adjustment?" presented by Daniel Sullivan at the 32<sup>nd</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University in Los Angeles, California, April 28, 2007.
23. Daniel Sullivan\*, Stefanie Eick\*, and Mike Mooring. "Role of progesterone in the estrous cycle of bison females", presented by Daniel Sullivan and Stefanie Eick at the 33rd Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 12, 2008.
24. Niccole Schultz\*, Kensey Stansberry-Perkins\*, Kerry Fulcher, and Mike Mooring. "Effect of progesterone on the annual reproductive cycle of bison females", presented by Niccole Schultz and Kensey Stansberry-Perkins at the 33rd Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 12, 2008.
25. Rachel Bettes\*, Mike Mooring, and Dennis Siegfried. "Tending effort and age in relation to reproductive success in bison bulls", presented by Rachel Bettes at the 33rd Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 12, 2008.
26. Lane Votapka\*, Jeremiah Minich, and Mike Mooring. "The influence of gates on space use by plains bison", presented by Lane Votapka at the 34th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 18, 2009.
27. Jeremiah Minich\*, Lane Votapka, and Mike Mooring. "Space use by plains bison before versus during the rut", presented by Lane Votapka at the 34th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 18, 2009.
28. Robert Perry\*, William Taylor and Mike Mooring. "Interactions between bison and horn flies", presented by Robert Perry at the Celebration of the Sciences at Point Loma Nazarene University in San Diego, California, November 20, 2009.
29. William Taylor\*, Robert Perry, and Mike Mooring. "Space use by bison in relation to migration and breeding season", presented by William Taylor at the Celebration of the Sciences at Point Loma Nazarene University in San Diego, California, November 20, 2009.
30. Mike Mooring\*. "A retrospective of seven seasons of bison research", presented by Mike Mooring at the Celebration of the Sciences at Point Loma Nazarene University in San Diego, California, November 20, 2009.
31. Alicia Jones\*, Marie Holman, Taylor Jordan, Alex Bauer, Jessica Davis, Peter Gilson, Troy Kurz, Robert Perry, Luke Tatum, Joshua Western, Amy Woods, Jared Yee, David Cummings, and Mike Mooring. "Studying neotropical ecology in Costa Rica", presented by Alicia Jones at the Celebration of the Sciences at Point Loma Nazarene University in San Diego, California, November 20, 2009.
32. William Taylor\*, Caleb Bryce\*, Kathryn Thompson, Robert Perry, Christian Sanders, and Mike Mooring. "Bison space use: influence of weather, sex, and topography", presented by William Taylor and Caleb Bryce at the 35th Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University in Santa Clara, California, April 24, 2010.

33. Caleb Bryce\*, Jared Yee, William Taylor, Robert Perry, and Mike Mooring. "Phototrapping elusive mammals in a Costa Rican montane cloud forest", presented by Caleb Bryce at the 36th Annual West Coast Biological Sciences Undergraduate Research Conference at Pacific Lutheran University in Tacoma, Washington, April 16, 2011.
34. Jared Yee\*, Caleb Bryce, William Taylor, Robert Perry, and Mike Mooring. "Retrospective interviews to establish historical presence of mammals in the upper Savegre Valley of Costa Rica", presented by Jared Yee at the 36th Annual West Coast Biological Sciences Undergraduate Research Conference at Pacific Lutheran University in Tacoma, Washington, April 16, 2011.
35. Caleb Bryce. "Optimal survey methods for elusive mammals in a tropical cloud forest in Costa Rica", presented at the Honors Scholar Conference at Point Loma Nazarene University, 2011.
36. Austin Fares\*, Ryan Dahl\*, Caleb Bryce, and Mike Mooring. "Large mammal biodiversity in a Costa Rican montane cloud forest", presented by Austin Fares and Ryan Dahl at the 37th Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University in Los Angeles, California, April 21, 2012.
37. Trisha Stull. "Apex predators of Costa Rica: a survey of current knowledge", presented at the Honors Scholar Conference at Point Loma Nazarene University, 2012.
38. Hannah Green. "Behavioral cues of breeding receptivity in a female jaguar (*Panthera onca*)", presented at the Honors Scholar Conference at Point Loma Nazarene University, 2012.
39. Ryan Dahl\*, Jonathan Piazza\*, Austin Fares, Eduardo Alvarez, and Mike Mooring. "Invasion of a Costa Rican montane cloud forest by coyote", presented by Ryan Dahl and Jonathan Piazza at the 38th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University in San Diego, California, April 20, 2013.
40. Eduardo Alvarez\*, Austin Fares, Ryan Dahl, Jonathan Piazza, and Mike Mooring. "Species richness, diversity, and relative abundance of large mammals in protected areas and buffer zones of the Talamanca Cordillera, Costa Rica", presented at the 38th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 20, 2013.
41. Eduardo Alvarez. "Integrating occupancy modeling and interview data to predict presence of jaguars (*Panthera onca*) and other large mammals in Tapanti National Park, Costa Rica", presented at the 2014 Honors Scholar Conference at Point Loma Nazarene University, 2014.
42. Dylan Poorboy. "Analysis of occupancy for mammalian species in the tropical montane ecosystems of Costa Rica", presented at the 2015 Honors Scholar Conference at Point Loma Nazarene University, San Diego, CA (April 18, 2015).
43. Dylan Poorboy\*, Jessica Fowler, Carol Williams, and Mike Mooring. "Occupancy analysis of mammalian species in the tropical montane ecosystems of Costa Rica", presented at the 40th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 25, 2015.
44. Carol Williams\*, Jessica Fowler\*, Dylan Poorboy, and Mike Mooring. "Activity budgets of elusive mammals in a Costa Rican cloud forest", presented at the 40th Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 25, 2015.
45. Ellen Asselin\*, Tanner Mathews, Jessica Fowler, Dylan Poorboy, and Mike Mooring. "Inferring predator-prey relations of Neotropical mammals from activity budgets", presented at the 41st Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 9, 2016.

46. Tanner Mathews\*, Ellen Asselin, Dylan Poorboy, Jessica Fowler, and Mike Mooring. “Using scat detection dogs to investigate the population genetics of elusive felids”, presented at the 41st Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 9, 2016.
47. Tanner Mathews\*, Kirra Connolly and Mike Mooring. “The use of scat detection dogs for the genetic analysis of felid populations in Costa Rica”, presented at the 42<sup>nd</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, Santa Clara, California, April 22, 2017.
48. Kirra Connolly\*, Tanner Mathews, Sarah Hennessy and Mike Mooring. “Rapid assessment of habitat suitability for burrowing owl relocation”, presented at the 42<sup>nd</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, Santa Clara, California, April 22, 2017.
49. Abner Rodriguez\*, Timothy Wiegman, Wyatt Garley, Mike Mooring, and Ryan Botts. “The relationship between the lunar cycle and activity patterns of Neotropical predator and prey species”, presented at the 43<sup>rd</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Saint Mary’s University, Moraga, California, April 14, 2018.
50. Timothy Wiegman\*, Abner Rodriguez, Wyatt Garley, Mike Mooring, and Ryan Botts. “Computational analysis of population activity patterns based on camera trap data of Neotropical mammals”, presented at the 43<sup>rd</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Saint Mary’s University, Moraga, California, April 14, 2018.
51. Amy Eppert\*, Abner Rodriguez, Steven Blankenship, Timothy Wiegman, Ryan Botts, and Mike Mooring. “Predator-prey relationships in high elevation Costa Rican ecosystems”, presented at the 44<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at the University of San Diego, San Diego, California, April 6, 2019.
52. Steven Blankenship\*, Amy Eppert, Abner Rodriguez, Timothy Wiegman, Mike Mooring, and Ryan Botts. “New camera trap survey reveals rare and elusive mammals at La Amistad International Park, Costa Rica”, presented at the 44<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at the University of San Diego, San Diego, California, April 6, 2019.
53. Abigail Wagner\*, Amy Eppert, Steven Blankenship, Sierra Ullrich, Gabrielle Allen, Ryan Botts, and Mike Mooring. “Does moonlight increase predation risk for elusive mammals in Costa Rica?”, prepared for the 45th Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles California, April 2020 [cancelled due to the COVID-19 pandemic].
54. Amy Eppert\*, Steven Blankenship, Sierra Ullrich, Abigail Wagner, Gabrielle Allen, Ryan Botts, and Mike Mooring. “Natural selection of melanism in Costa Rican Jaguar and oncilla: a test of Gloger’s Rule and the Temporal Segregation hypothesis”, prepared for the 45th Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles California, April 2020 [cancelled due to the COVID-19 pandemic].
55. Sierra Ullrich\*, Amy Eppert, Steven Blankenship, Abigail Wagner, Gabrielle Allen, Ryan Botts, and Mike Mooring. “Circadian activity patterns of mammalian predators and prey in Costa Rica”, prepared for the 45th Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles California, April 2020 [cancelled due to the COVID-19 pandemic].
56. Dane Brizzolara\* and Mike Mooring. “An analysis of soil acidity management practices by small-scale farmers in Vara Blanca, Costa Rica”, prepared for the 45th Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles California, April 2020 [cancelled due to the COVID-19 pandemic].
57. Amy A. Eppert\*, Michael S. Mooring, and Ryan T. Botts. “Natural selection of melanism in Costa Rican jaguar and oncilla”, presented at the 2020 Animal Behavior Society Virtual Conference, July 28-31, 2020.

58. Amy A. Eppert\*, Ryan T. Botts, and Michael S. Mooring\*. “Selección natural del melanismo en jaguar y tigrillo costarricenses”, presented at presented online at Simposio Ciencia y Desarrollo Comunitario en ACLA-P, October 27, 2021.
59. Michael S. Mooring\* and Amy A. Eppert\*. “Patrones de actividad circadiana y lunar del jaguar y el puma en relación con sus presas y competidoras”, presented online at Simposio Ciencia y Desarrollo Comunitario en ACLA-P, October 27, 2021.
60. Ellie Deer\* and Mike Mooring. “Single season occupancy analysis incorporating covariates of Baird’s tapir”, presented at the 45<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Point Loma Nazarene University, San Diego, California, April 9, 2022.
61. Sarah Turcic\*, Emily Bohnet\*, Daniel Rocha, and Mike Mooring. “Comprehensive single-season occupancy analysis with covariates for all species within genus *Tapirus*”, presented at the 46<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles, California, April 22, 2023.
62. Lily Bright\*, Daniel Rocha, and Mike Mooring. “Intraguild competition of ocelot (*Leopardas pardalis*) and coyote (*Canis latrans*) in Costa Rica”, presented at the 46<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Loyola Marymount University, Los Angeles, California, April 22, 2023.
63. Cate Geiman\* and Mike Mooring. “Spatial segregation of jaguar and puma in Costa Rica”, presented at the 47<sup>th</sup> Annual West Coast Biological Sciences Undergraduate Research Conference at Santa Clara University, Santa Clara, California, April 6, 2024.