Cassandra M.V. Nuñez

Iowa State University, Department of Natural Resource Ecology and Management
332 Science Hall II, Ames, Iowa, 50011
Mobile: (973)-820-5655, nunezcmv@iastate.edu, nunezcmv@gmail.com

Academic and Research Appointments:

Adjunct Assistant Professor, Department of Natural Resource Ecology and Management, Iowa State University, present.

Visiting Research Scholar, Department of Biological Sciences, Virginia Polytechnic Institute and State University, 2012–2014.

American Association for the Advancement of Science, Science and Technology Policy Fellow, NASA, Applied Sciences Program, Earth Science Division, 2011–2012.

Associate Research Scholar and Lecturer, Department of Ecology and Evolutionary Biology, Princeton University, 2004–2006; 2008–2011.

Co–Director, Primate Behavior, Wildlife Ecology, and Conservation Field School, Rutgers University, 2008.

Education and Outreach Coordinator, Phillip L. Boyd Deep Canyon Desert Research Center, University of California, Riverside, 2007–2008.

Lecturer and Mentor, Organization for Tropical Studies, Duke University, 2006.

Lecturer and Mentor, Princeton University Preparatory Program, Princeton University, 2005.

Lecturer, Rutgers University, 2004.

Lecturer and Mentor, Math and Science for Minority Students Program, Phillips Academy, 2004.

Project Manager, Serengeti Carnivore Disease Project, Princeton University, 2002–2003.

Project Manager, Zebras of Kenya Project, Earthwatch Institute, 2000–2001.

Consultant, National Park Service, Cape Lookout National Seashore, 1996–2000.

Education:

Ph.D. 2000 Behavioral Ecology, Princeton University, Princeton, New Jersey.

B.A. 1993 Laboratory Psychology, Douglass College, Rutgers University, New Brunswick, New Jersey.

Honors and Awards:

Writing Productivity Workshop (NSF-IOS sponsored), August 2013— selected participant
American Association for the Advancement of Science Fellowship, 2011–2012— $84,000.00
Sigma Xi Grant-in-Aid of Research (GIAR), 1996— $1,000.00
National Science Foundation Graduate Research Fellowship, 1994–1997— $120,000.00
Presidential Fellowship, 1993–1999— $40,000.00

American Psychology Association, 1992
Minority Undergraduate Students of Excellence Program, 1991–1993— $6,000.00

Research Interests:

My research integrates animal behavior and physiology in the wild to answer both applied and basic questions, using feral horses as a model system.

Contraceptive Management: My research has shown that contracepted mares are less loyal to the band stallion; they change social groups more often, particularly during the non-breeding season. In addition, contracepted mares extend reproductive cycling into the non-breeding season. How do these changes in behavior and reproductive physiology affect other members of the population? For example, has there been an increase in the escalation of male-male conflicts in an attempt to retain contracepted mares? Are levels of stress, measured through fecal cortisol, higher in groups that include more contracepted mares? Furthermore, how might the use of immunocontraception affect population fitness? Does stimulation of the immune system to achieve infertility select for individuals with low immunocompetence? Answers to these questions can help managers make more ethical and responsible decisions regarding the population control of species.

Mother-Young Relationships: How do differences in mothering strategy contribute to offspring survival? What can differences in communicative behaviors of mothers and infants tell us about the function of communication for different individuals? What do we really know about adoption in the wild? Answers to these questions can help researchers better understand the function of the juvenile stage in mammals and the importance of maternal effort and style to recruitment.

Publications:

Nuñez, C.M.V., J.S. Adelman, D.I. Rubenstein. 2015. Sociality increases juvenile survival after a catastrophic event in the feral horse (*Equus caballus*). **Behavioral Ecology**, 26(1), 138–147.
doi: http://beheco.oxfordjournals.org/content/early/2014/09/28/beheco.aru163.

Nuñez, C.M.V., A. Scorolli, L. Lagos, D. Berman, A. Kane. 2014. Management of free-roaming horses *in* J.I. Ransom and P. Kaczensky, eds. **Wild Equids**. The Johns Hopkins University Press. *Invited, in review*.

Nuñez, C.M.V., J.S. Adelman, J. Smith, L.R. Gesquiere, and D.I. Rubenstein. 2014. Linking social environment and stress physiology in feral mares (*Equus caballus*): Group transfers elevate fecal cortisol levels. **General and Comparative Endocrinology**, 196: 26-33. doi: http://dx.doi.org/10.1016/j.ygcen.2013.11.012.

Nuñez, C.M.V., J.S. Adelman, and D.I. Rubenstein. 2013. A free-ranging, feral mare (*Equus caballus*) affords similar maternal care to her genetic and adopted offspring. **American Naturalist**, 182:674-681.

Nuñez, C.M.V. 2011. Management of wild horses with porcine zona pellucida: History, consequences, and future strategies, Pages 85-98 *in* J.E. Leffhalm, ed. **Horses: Biology, Domestication, and Human Interactions**. Nova Science Publishers, Inc. *Invited.*

Nuñez, C. M. V., C. S. Asa, and D. I. Rubenstein. 2011. Zebra reproduction, Pages 2851-2865 *in* A. O. McKinnon, E. L. Squires, W. E. Vaala, and D. D. Varner, eds. **Equine Reproduction, Second Edition**. Ames, IA, Wiley-Blackwell. *Invited.*

Nuñez, C.M.V., J.S. Adelman, and D.I. Rubenstein. 2010. Immunocontraception in wild horses (*Equus caballus*) extends reproductive cycling beyond the normal breeding season. **PLOS ONE**, 5(10): e13635. doi: http://dx.doi.org/10.1371/journal.pone.0013635.

Nuñez, C.M.V., J.S. Adelman, C. Mason, and D.I. Rubenstein. 2009. Immunocontraception decreases group fidelity in a feral horse population during the non-breeding season. **Applied Animal Behaviour Science**, 117: 74-83.
Rubenstein, D.I., **C.M.V. Nuñez**. 2008. Sociality and reproductive skew in horses and zebras, Pages 196-226 *in* R. Hager, C.B. Jones, eds. **Reproductive Skew in Vertebrates: Proximate and Ultimate Causes**. Cambridge University Press. *Invited.*

Nuñez, C.M.V. 2002. Safety first. **Swara, East African Wildlife Society**, 25 (1): 35.

Kaplan, D.H., **C.M.V. Nuñez**, and L.S. Katz. 1993. Effect of photoperiod on the behavioral response to estradiol (E2) in ovariectomized (Ovx) goats. **Biology of Reproduction**, 48 (Suppl.1): 138.

Teaching:

Courses (full responsibility for all material): Wildlife Behavioral Ecology (seminar), Comparative Physiology (with laboratory), Animal Behavior, Conservation Biology (with field work), Junior Tutorial in Statistics, Natural History of African Mammals (with field work), Desert Ecology (day course with field work), Natural History of Desert Species (day course with field work), Invasive Species Management (day course with field work).

Co-led courses (responsibility shared with other faculty): Laboratory Biology, Laboratory and Field Biology.

Teaching Assistantships (introducing material designed by others): Evolution and Behavior of the Sexes, Ecology of Fields and Forests, Conservation Biology, Evolutionary Ecology.

Mentorships (individuals and small groups): I have served as a mentor to nearly 40 Princeton seniors working on their senior theses. I have taught them field and data collection techniques, and have advised them on the analysis and interpretation of behavioral and demographic data for three ungulate species: feral horses, white-tailed deer, and cattle.

Outreach: I created and lead interpretive hikes at the Phillip L. Boyd Deep Canyon Desert Research Center, focusing on the area's natural history and archaeological significance, and instituted the Phillip L. Boyd Deep Canyon Public Lecture Series, which continues to offer presentations by local biologists and historians.

Instructional Development: I have participated in the following workshops to further improve my teaching: SCALE UP Pedagogy to Create Inclusive Learning Environments (April 3, 2014), Flipping the Large Classroom (April 17, 2014), Peer Review Pedagogy to Support Authentic Engagements in Learning (April 23, 2014).

Scientific Meetings and Presentations:

Invited talks and posters:

"Mares gone wild: Immunocontraception alters female behavior and physiology in feral horses", University of North Carolina, Asheville, Department of Biology, Undergraduate Seminar Series. April, 2014.

"Mares gone wild: Immunocontraception alters female behavior and physiology in feral horses", Virginia Polytechnic Institute and State University, Department of Biological Sciences Ecology, Evolution, and Behavior Seminar Series. September, 2013.

"Immunocontraception in feral horses (*Equus caballus*) extends reproductive cycling beyond the normal breeding season", International Wild Equid Conference. September 2012.

"Immunocontraception, social behavior, and stress in a feral horse population", International Wild Equid Conference. September 2012.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", International Society for the Preservation of Mustangs and Burros. October 2008.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", Wikelski Laboratory Summit, Max Planck Institute of Ornithology. October 2008.

"The importance of safety and friends to the conservation of Grevy's zebra", The Living Desert, Grapes for Grevy's Fund Raiser. March 2008.

"Desert research topics", California Regional Environmental Educational Community Conference. December 2007.

Contributed talks and posters:

"Linking social behavior and stress physiology in feral mares (*Equus caballus*): Group transfers elevate fecal cortisol levels", Animal Behavior Society. August 2014.

"Linking social environment and stress physiology in feral mares (*Equus caballus*): Group transfers elevate fecal cortisol levels", Society for Conservation Biology, International Congress for Conservation Biology. July 2013.

"Horses gone wild! Contraception, Promiscuity, and Pregnancy… oh my!" Nerd Nite. December 2012.

"Biodiversity research and conservation biology from space: NASA's Biological Diversity and Ecological Forecasting Programs", Society for Conservation Biology, North America Congress for Conservation Biology. July 2012.

"NASA Applied Sciences Program: Providing remotely sensed data for conservation and management", Biodiversity Without Boundaries. April 2012.

"Why contracepted mares are more 'frisky' ", American Association for the Advancement of Science Research Blitz. March 2012.

"Engaging NASA in the definition and development of conservation applications", Society for Conservation Biology, International Congress for Conservation Biology. December 2011.

"Variation in the signaling between mares and foals (*Equus caballus*): Implications for the function of communication for mother and offspring", Acoustic Communication by Animals, Third International Symposium. August 2011.

"Immunocontraception in wild horses (*Equus caballus*) extends reproductive cycling beyond the normal breeding season", Princeton Research Symposium. Third place winner. November 2010.

"Immunocontraception in mares (*Equus caballus*) extends ovulatory cycling into the non-breeding season", Princeton Chapter of Sigma Xi, the Scientific Research Society, Graduate and Post-Doctoral Poster Competition. First place winner. April 2010.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", Princeton Chapter of Sigma Xi, the Scientific Research Society, Graduate and Post-Doctoral Poster Competition. First place winner. April 2009.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", Society for Integrative and Comparative Biology. January 2009.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", Princeton Research Symposium. Received Honorable Mention. November 2008.

"Mortality and recruitment of desert perennials as related to extreme drought: The loss of drought deciduous shrubs from low elevations", with Edward G. Bobich, Ecological Society of America. August 2008.

"Behavioral effects of immunocontraception on wild horses (*Equus caballus*)", Society for Conservation Biology. July 2008.

"The importance of safety in watering site choice of Grevy's zebra (*Equus grevyi*) mothers", Society for Conservation Biology. July 2002.

"Variation in the mother-infant relationship in wild horses; Implications for the function of the juvenile stage", Euro-American Mammal Congress: Challenges in Holarctic Mammalogy. July 1998.