

# Matocq Lab

population and evolutionary genetics of mammals

## Matocq CV

Marjorie Denise Matocq

Department of Natural Resources and Environmental Science

University of Nevada, Reno

### EDUCATION

2000 Ph.D., University of California, Berkeley Integrative Biology

Dissertation- Molecular genetics of the dusky-footed woodrat, *Neotoma fuscipes*.

1996 M.A., San Francisco State University

major: Biological Sciences concentration: Conservation Biology

Thesis- Factors that influence genetic diversity in *Dipodomys heermanni morroensis*.

1992 B.S., Magna Cum Laude, California Polytechnic State University, San Luis Obispo

major: Biological Sciences concentration: Ecology and Systematic Biology

### PROFESSIONAL APPOINTMENTS

2015 – pres. Professor, Department of Natural Resources and Environmental Science, University of Nevada, Reno.

2008 – 2015 Associate Professor, Department of Natural Resources and Environmental Science, University of Nevada, Reno.

2007- 2008 Associate Professor, Department of Biological Sciences, Idaho State University

2003 – 2008 Director, Molecular Research Core Facility, Idaho State University

2002 – 2007 Assistant Professor, Department of Biological Sciences, Idaho State University

2001-2002 Postdoctoral Fellow, Smithsonian Institution, Washington D.C.

### PUBLICATIONS

\* student or †postdoc author

2015. †Malaney, J.L. and M.D. Matocq. When congeners meet: using correlative models to assess the potential role of species interactions as determinants of range limits. In review.

2015. Dochtermann, N.A., M.D. Matocq. Speciation along a shared evolutionary trajectory in *Neotoma* spp. In review.
2015. Dilts, T.E., P.J. Weisberg, P. Leitner, M.D. Matocq, R.D. Inman, K.E. Nussear, and T.C. Esque. Multi-scale connectivity and graph theory highlight critical areas for conservation under climate change. *Ecological Applications*, accepted.
2015. Foley, J., D. Rejmanek, C. Foley, M.D. Matocq. Fine-scale genetic structure of woodrat populations (Genus: *Neotoma*) and the spatial distribution of their tick-borne pathogens. *Ticks and Tick-borne Diseases*, doi 10.1016/j.ttbdis.2015.10.017.
2015. †Malaney, J.L., C.R. Feldman, J. Wehausen, M. Cox, P. Wolff, and M.D. Matocq. Translocated to the fringe: genetic and niche variation in bighorn sheep of the Great Basin and northern Mojave deserts. *Diversity and Distributions* 21: 1063-1074.
2015. †Coyner, B., P.J. Murphy†, and M.D. Matocq. Hybridization and asymmetric introgression across a narrow zone of contact between *Neotoma fuscipes* and *N. macrotis* (Rodentia: Cricetidae). *Biological Journal of the Linnean Society* 115: 162-172.
2015. \*Bechtel, M.J., M.B. Teglás, P.J. Murphy†, and M.D. Matocq. Parasite prevalence and community diversity in sympatric and allopatric populations of two woodrat species (*Neotoma*, Sigmodontinae). *Journal of Wildlife Diseases* 51: 419-430.
2014. Rowe, R.J. and M.D. Matocq. Great Basin mammalian diversity through time. *Journal of Mammalogy*, Great Basin Special Feature 95: 1087-1089.
2014. Riddle, B.R., T. Jezkova, A. Hornsby\*, and M.D. Matocq. Assembling the modern Great Basin mammal biota: emerging insights from an integration of molecular biogeography and the fossil record. *Journal of Mammalogy*, Great Basin Special Feature 95: 1107-1127.
2014. \*Gillies, K., P.J. Murphy†, and M.D. Matocq. Hibernacula characteristics of Townsend's big-eared bats in southeastern Idaho. *Natural Areas Journal*, 34:24-30.
2014. \*Shurtliff, Q.S., P.J. Murphy†, and M.D. Matocq. Ecological segregation in a small mammal hybrid zone: habitat-specific mating opportunities and selection against hybrids restrict gene flow on a fine spatial scale. *Evolution* 68: 729-742.
2014. \*Hornsby, A.D. and M.D. Matocq. Patterns of evolutionary divergence and convergence in the bushy-tailed woodrat, *Neotoma cinerea*, across Western North America. *Journal of Mammalian Evolution* 21: 243-256.
2013. \*Shurtliff, Q.S., P.J. Murphy†, J. Yeiter\*, and M.D. Matocq. Experimental evidence for asymmetric mate preference across a woodrat (*Neotoma*) hybrid zone. *BMC Evolutionary Biology* 13: 220.
2013. Thomas, M.A, G.W. Roemer, C. J. Donlan, B.G. Dickson, M.D. Matocq, and J. Malaney. Ecology: Gene tweaking for conservation. *Nature* 501: 485.

2013. R.D. Inman, T. C. Esque, K.E. Nussear, P. Leitner, M.D. Matocq, P. Wiesberg, T. Dilts, A.G. Vandergast. Is there room for all of us? Renewable energy and *Xerospermophilus mohavensis*. *Endangered Species Research* 20: 1-18. Chosen as a featured article.
2012. Matocq, M.D., P.A. Kelly, S.E. Phillips, J.E. Maldonado. Reconstructing the evolutionary history of an endangered subspecies across the changing landscape of the Great Central Valley of California. *Molecular Ecology*, 21: 5918-5933.
2012. \*Hornsby, A.D. and M.D. Matocq. Differential regional response of the bushy-tailed woodrat (*Neotoma cinerea*) to late Quaternary climate change. *Journal of Biogeography* 39: 289-305.
2011. \*Bell, K.C. and M.D. Matocq. Regional genetic subdivision in the Mohave ground squirrel: evidence of historic isolation and ongoing connectivity in a Mojave Desert endemic. *Animal Conservation* 14: 371-381.
2010. \*Bell, K. and M.D. Matocq. Development and characterization of polymorphic microsatellite loci in the Mohave ground squirrel (*Spermophilus mohavensis*). *Conservation Genetics Resources* 2: 197-199.
2010. M.D. Matocq. Mating opportunities in animal hybrid zones. Invited contribution to: *Molecular Insights into Natural Resource Conservation and Management*, eds. A.J. DeWoody, J. Bickham, C. Michler, K. Nichols, O. Rhodes, and K. Woeste, Cambridge University Press.
- 2009 \*Bell, K., D. Hafner, P. Leitner, and M.D. Matocq. Phylogeography of the ground squirrel subgenus *Xerospermophilus* and assembly of the Mojave Desert biota. *Journal of Biogeography*, 37: 363-378.
2009. M.D. Matocq. A microarray's view of life in the desert: adding a powerful genomics tool to the woodrat's midden. Invited Perspectives article. *Molecular Ecology*, 18: 2310-2312.
2009. \*Runck, A.M., M.D. Matocq, and J.A. Cook. Historic hybridization and persistence of a novel mito-nuclear combination in red-backed voles (genus *Myodes*). *BMC Evolutionary Biology* 9: 114.
2008. Piaggio, A.J., K. E. Miller\*, M.D. Matocq, S. L. Perkins. Eight polymorphic loci developed and characterized from Townsend's big-eared bat, *Corynorhinus townsendii*. *Molecular Ecology Resources*, 9: 258-260.
2007. M.D. Matocq and P.J. Murphy. Fine-scale phenotypic change across a species transition zone in woodrats of the genus *Neotoma*: disentangling independent evolution from phylogenetic history. *Evolution* 61: 2544-2557.
2007. M.D. Matocq, C.R. Feldman, and \*Q. Shurtliff. Phylogenetic relationships of the woodrat genus *Neotoma* (Rodentia: Muridae): implications for the evolution of phenotypic variation in male external genitalia. *Molecular Phylogenetics and Evolution* 42: 637-652.
2006. \*Spear, S.F., C.R. Peterson, M.D. Matocq, and A. Storfer. Molecular evidence for recent population size reductions of tiger salamanders (*Ambystoma tigrinum*) in Yellowstone National Park. *Conservation Genetics* 7: 605-611.

2005. \*Spear, S.F., C.R. Peterson, M.D. Matocq, and A. Storfer. Using GIS to examine the landscape genetics of the Blotched Tiger Salamander (*Ambystoma tigrinum melanostictum*). *Molecular Ecology* 14: 2553-2564.

2004. M.D. Matocq. Reproductive success and effective population size in woodrats (*Neotoma macrotis*). *Molecular Ecology* 13: 1635-1642.

2004. M.D. Matocq and E.A. Lacey. Philopatry, kin clusters, and genetic relatedness in a population of woodrats (*Neotoma macrotis*). *Behavioral Ecology* 15: 647-653.

2002. M.D. Matocq Morphological and molecular analysis of a contact zone in the *Neotoma fuscipes* species complex. *Journal of Mammalogy* 83: 866-883.

2002. M.D. Matocq Phylogeographical and regional history of the dusky-footed woodrat, *Neotoma fuscipes*. *Molecular Ecology* 11: 229-242.

2001. M.D. Matocq Characterization of microsatellite loci in the dusky-footed woodrat, *Neotoma fuscipes*. *Molecular Ecology Notes* 1: 194-196.

2001. M.D. Matocq and F.X. Villablanca. Low genetic diversity in an endangered species: recent or historic pattern? *Biological Conservation* 98: 61-68.

2000. M.D. Matocq, M.N.F. da Silva, and J.L. Patton. Population genetic structure of two ecologically distinct Amazonian spiny rats: separating history and current ecology. *Evolution* 54: 1423-1432.

2000. Smith, F.A., M.D. Matocq, K.F. Melendez, A.M. Ditto, and P. Kelly. How isolated are Pleistocene refugia? Results from a study on a relict woodrat population from the Mojave Desert, California. *Journal of Biogeography* 27:483-500.

1999. Lacey , E., J. Maldonado, J. Clabaugh, and M.D. Matocq. Microsatellites isolated from tuco-tucos (*Ctenomys* sp.). *Molecular Ecology* 8: 1754-1756.

1997. Randall, J.A. and M.D. Matocq. Why do kangaroo rats (*Dipodomys spectabilis*) footdrum at snakes? *Behavioral Ecology* 8: 404-413.

1996. Garcia-Moreno, J., M.D. Matocq, M. Roy, E. Geffen, and R.K. Wayne. Relationships and genetic purity of the endangered Mexican Wolf based on analysis of microsatellite loci. *Conservation Biology* 10: 376-389.

## **COURSES TAUGHT**

Genetics (ISU), 3 units every Fall (enrollments 51-55)

Molecular Ecology (ISU), 3 units Fall 2003, 2005, 2007 (enrollments 6-19)

Topics in Molecular Ecology (ISU), 1 unit every semester (enrollments 6-10)

Senior Seminar (ISU), 1 unit Fall 2004, 2006 (enrollments 8, 9)

Conservation Biology (UNR), 3 units every Spring semester (enrollment ~75)

Graduate Molec. Ecology (UNR), 4 units every other year (enrollment 15-20)

“Survival skills” for grad. students, 2 units participating instructor, every year (en. ~7)

## AWARDS

2015 Vada Trimble Outstanding Graduate Mentor Award

2015 UNR Distinguished Outreach Faculty Award

2001 American Society of Mammalogist Award

2000 Joseph Mailliard Fellowship

1994 Robert I. Larus Award – AAAS

1994 Geraldine K. Lindsay Award for Excellence in the Natural Sciences – AAAS

## GRANTS

### Research

Differential adaptation to plant toxins: the role of chemically-mediated selection in reproductive isolation between mammalian herbivores. PI- Matocq, Co-PIs- J. Hayes, C. Jeffrey, L. Roberts; collaborator D. Dearing. National Science Foundation \$646,787, 2015-2019.

Ecology of pygmy rabbit (*Brachylagus idahoensis*) in Nevada: integrating habitat quality, demography, and landscape connectivity. PI-Matocq, co-PIs P. Weisberg, J. Sedinger, K. Shoemaker. Nevada Department of Wildlife, Bureau of Land Management, U.S. Fish and Wildlife Service, Greater Hart Sheldon Fund. \$640,000, 2015-2019.

Landscape connectivity of a sagebrush obligate: functional continuity of habitat for the pygmy rabbit. PI-Matocq, co-PIs P. Weisberg, T. Dilts, J. Sedinger, E. Larrucea. Great Basin LCC, \$92,880, 2015-2017.

Monitoring small mammal communities in Nevada: elevational transects as indicators of biotic response to environmental change. PI-Matocq, co-PIs Rebecca Rowe, Eric Rickart, Jason Malaney. Nevada Department of Wildlife and Bureau of Land Management. \$121,000 2015-2017.

Genetic identification and habitat associations of the chipmunks of the Pine Forest Range, Nevada. Nevada Department of Wildlife, \$9,000, 2015-2016.

Bighorn sheep of Nevada: genomic-scale perspective on diversity and differentiation across the landscape. PI-Matocq. Nevada Experiment Station Hatch Program, \$105,000, 7/2014-6/2017.

Fine-scale landscape genetic structure of the pale kangaroo mouse (*Microdipodops pallidus*) and other heteromyids of the Smoky Valley of Nevada. PI-Matocq, graduate student- S. Hegg. Nevada Record Book Foundation, \$35,000, 9/2014-8/2016.

Regional landscape connectivity of mule deer in northeastern Nevada. PI-Matocq, NDOW collaborators: T. Wasley and C. Schroeder. Nevada Wildlife Heritage Program. \$36,000, 9/2014-8/2016.

Population genetic structure of the riparian brush rabbit (*Sylvilagus bachmani riparius*): using multiple marker systems to gain insight into historic and ongoing genetic connectivity. PIs-Matocq, P. Kelly, S. Phillips. Central Valley Project Conservation Program \$76,000, 4/2014-7/2016.

Habitat models for the pale kangaroo mouse (*Microdipodops pallidus*) and other heteromyids of the Smoky Valley of Nevada. PI-Matocq, graduate student- S. Hegg. Nevada Record Book Foundation,

\$24,000, 12/2013-6/2015.

Landscape genetics of black bears in Nevada. PIs Matocq, C Lackey. Nevada Wildlife Heritage Trust \$40,000 12/1-6/14.

Research planning grant. Ecological and genomic exploration of environmental change (EcoGenEx): assessing a century of climate change adaptation. PI-G. Roemer (New Mexico State Univ.), co-PIs M. Matocq, M. Thomas (Idaho State Univ.). National Science Foundation EPSCoR, Western Tri-State Consortium IWG \$14,000.

Distribution, abundance, and ecology of the pale kangaroo mouse (*Microdipodops pallidus*) in the Little Smoky Valley of Nevada. PIs- Matocq, P. Weisberg, J. Sedinger. Tonopah Solar \$200,000. 1/12-12/15

Applying novel tools to museum specimens to detect early signatures of species and community responses to environmental change. UNR-PI-Matocq, UC Berkeley-PI- E. Lacey. The Moore Foundation to UCB \$167,000 (ecology component of a larger grant) 1/12-12/14.

Population genetic diversity and connectivity in Nevada's mule deer. PI-Matocq. Nevada Wildlife Heritage Trust \$30,000 1/12-6/14.

Genetic diversity in the Mohave ground squirrel. PI- Matocq. Bureau of Land Management-CESU \$15,000. 11/11-10/14.

Landscape genetics and habitat connectivity of the Mohave ground squirrel. PIs Matocq and P.Weisberg. USGS \$78,028 4/11-1/13.

Identifying the incidence of *Mycoplasma*, *Mannheimia*, and lungworm across the genetic landscape of Nevada's bighorn sheep. PI Matocq. HATCH Grant, Nevada Agricultural Experiment Station, \$160,000 6/11-5/14.

Factors influencing desert bighorn sheep health and population persistence. PI-D. Thain, co-PIs-M. Gray, M. Matocq, T. Stringham, T. Shenkoru. Nevada Arid Rangelands Initiative \$175,000 7/10-6/13.

Research Experience for Undergraduates-CAREER: Competitive interactions in a woodrat hybrid zone. PI- M. Matocq. National Science Foundation \$7,000 07/01/10-06/30/13.

Research Experience for Teachers-CAREER: The role of the major histocompatibility complex in mate choice decisions in a hybrid zone. PI- M. Matocq. National Science Foundation \$18,000 07/01/10-06/30/13.

Landscape genetics of the *Neotoma fuscipes* (Rodentia, Cricetidae) species complex: evaluation of landscape variables as pre-isolating mechanisms of hybridization. Postdoctoral-PI B. Coyner, Supervisory-PI M. Matocq. National Science Foundation \$189,000 01/01/11-12/30/14.

CAREER: The roles of ecology, behavior, and morphology in maintaining species boundaries- demonstrating evolutionary processes to high school students in Idaho. PI Matocq. National Science Foundation \$510,000 08/01/07-7/30/14.

Bighorn sheep disease outbreaks: underlying genetic diversity of declining versus persistent populations. Boone and Crockett Club, Pope and Young Club \$25,902 7/10-12/12.

Identifying indicators of sagebrush ecosystem health. PIs- Matocq and J. Sedinger. Nevada Department of Wildlife \$48,900 7/10-12/12.

Bighorn sheep population declines: the role of forage quality, disease and genetics. PIs-D. Thain, T. Stringham, M. Gray, M. Matocq. State of Nevada, Wildlife Heritage Trust \$30,000 07/09-06/10.

Bringing Technology to the Student's Desk: Molecular Genetics in Reno's High School Classrooms. PI-Matocq. Nevada INBRE \$8,000 12/09-11/10.

Geographic distribution of genetic variation in Nevada's bighorn sheep (*Ovis canadensis*): Neutral and disease-related perspectives. PI Matocq. HATCH Grant, Nevada Agricultural Experiment Station, \$120,000 06/01/08-5/30/11.

Mating system and fine-scale genetic structure of *Spermophilus mohavensis*, the Mojave Ground Squirrel. PI Matocq. California Department of Fish and Game \$62,000 06/06-08/07.

Contact zone dynamics in the woodrats of Caswell Memorial State Park. PI Matocq. Endangered Species Recovery Program \$10,000 01/06-01/07.

Evolution and development of phenotypic variation in rodent genitalia. PI Matocq, Co-PI Michael Thomas (ISU). Idaho-NIH-INBRE \$5,500 04/06-06/06.

Local-scale population dynamics and connectivity in *Spermophilus mohavensis*, the Mojave Ground Squirrel. PI Matocq. California Department of Fish and Game \$58,000 01/05-06/06.

Field Research. PI Matocq. NSF EPSCoR Faculty Augmentation \$30,000 2/04- 12/04

Evolution of an emerging disease: a comparative population genetic approach. PI Matocq. Idaho State University Faculty Research Grant \$5,000 8/04-8/05.

Gene expression and development: a comparative approach to the study of phenotypic variation in male genitalia across the genus *Neotoma*. Co-PI Trent Stephens (ISU). PI Matocq. NIH-BRIN seed grant \$34,000 6/03-6/04.

Phylogeographic history and population genetic structure of the endangered Mojave Ground Squirrel. PI Matocq. California Department of Fish and Game \$66,000 8/03- 1/05.

#### *Education/Outreach*

Bringing Technology to the Student's Desk: Molecular Genetics in Reno's High School Classrooms. PI Matocq. Nevada INBRE \$8,000 12/09-11/10.

MOTR: Molecules on the Road, Bringing Molecular Genetics to the High School Students of Southeastern Idaho. Co-PI Rene Horton (ISU). PI Matocq. State Board of Education \$11,800 07/06-

07/07.

Idaho State University's Mobile Molecular Genetic Laboratory: Integrating Research and Teaching. PI Matocq. Idaho State University and Shoshone-Bannock Highschool \$6,500 12/04- 6/04.

UMEB: Undergraduate Training in Ecological and Evolutionary Analyses of Micro and Macrobiotic Systems. PI, Richard Inouye; co-PI's J. Cook, M. Watwood, E. Keeley, M. Matocq, P. Sheridan. National Science Foundation \$390,800 8/03- 8/07.

Developing training tutorials for the use of molecular analysis software. PI Matocq. Idaho State University, Technology Mediated Instruction Initiative \$5,000 6/03-6/04.

#### *University Infrastructure*

Transcriptome analysis of microbial stress responses. PI Linda Deveaux (ISU), Co-PI M. Matocq. Department of Defense \$155,000 1/06-1/07.

Acquisition of DNA sequencing and bioinformatics resources for the Molecular Research Core Facility at Idaho State University. PI Matocq, Co-PI Michael Thomas (ISU). National Science Foundation \$140,270 9/05-8/06.

Bioanalyzer for DNA and RNA quantification. PI Matocq. Idaho State University \$23,000 04/05-04/06.

Molecular Research Core Facility. PI Matocq. NSF Idaho-EPSCoR Instrumentation \$41,000 2/04-12/04.

#### *Graduate Student Collaborations*

Doctoral Dissertation Improvement Grant: Behavioral, genetic, and ecological dynamics of a woodrat (*Neotoma lepida*) hybrid zone in California. PI Matocq, Co-PI Quinn Shurtliff. National Science Foundation \$11,980 06/06-06/08.

Ecological correlates of genetic diversity in Townsends big-eared bats. PI Matocq, Co-PI Katie Miller. Bureau of Land Management \$10,000 06/06-06/08.

Hierarchical genetic structure of Townsend's big-eared bats in Southeast Idaho: from individual relatedness to patterns of gene flow among populations. PI Matocq , Co-PI Katie Miller. University Research Committee \$11,568 09/05-8/07.

Doctoral Dissertation Improvement Grant: Molecular and morphological perspectives on the dynamics of a postglacial colonization contact zone. PI Matocq, Co-PI Amy Runck. National Science Foundation \$11,000 06/03-06/06.

#### *Grants as a graduate student*

1998, 1999 American Museum of Natural History: Theodore Roosevelt Fund

1998, 1999 American Society of Mammalogists Research Grant

1998, 1999 Sigma Xi Research Grant

1998 National Science Foundation Doctoral Dissertation Improvement Grant



1998 U.C. Berkeley Vice Chancellor's Research Grant  
1996, 1997 Mildred Mathias Research Grant  
1993 American Wildlife Research Foundation Grant

## **UNIVERSITY, PROFESSIONAL AND COMMUNITY SERVICE**

2014-pres. Member, Director of LAM, UNR Attending Veterinarian Search  
2014-pres. Chair, Associate Vice President for Research Search  
2014-pres. Member, Population Ecology Faculty Search  
2014-pres. Member, Peer Review Committee, NRES, UNR  
2013-pres. Chair, UNR Institutional Animal Care and Use Committee  
2013-pres. Associate Editor, Journal of Mammalogy  
2013-pres. American Society of Mammalogists, Board of Directors  
2013-pres. Member, Nevada Safety Committee  
2013 Member, Awards Committee, NRES, UNR  
2013 Panelist, National Science Foundation  
2013 Member, NESCent Working Group, Integrating paleoecology and genetics  
2013 Organizer, Ecology and Biology of Small Mammals session, TWS  
2012 Organizer, Mammalian Diversity through time in the Great Basin symposium, ASM  
2012-pres. Chair, Grinnell Award Committee, American Society of Mammalogists  
2012-2013 Associate Chair, Institutional Animal Care and Use Committee, UNR  
2012-2015 Member, Grant Writing Committee, EECB, UNR  
2011-pres. Member, Executive Committee, NRES, UNR  
2010-2014 Nevada Chapter Representative, Western Section of The Wildlife Society  
2010-pres. Member, Admissions Committee and Graduate Research Comm., EECB, UNR  
2009-2013 Member, Institutional Animal Care and Use Committee, UNR  
2008-2013 Member, Bylaws and Election Committee, CABNR, UNR  
2008-2013 Member, Undergraduate and Graduate Committees, NRES, UNR  
2008-pres. Member, Nevada's Wildlife Action Plan Sagebrush Technical Advisory Team  
2008-pres. Director, Nevada High School Outreach Program in Genetics  
2003-pres. Member, Mohave Ground Squirrel Technical Advisory Group (Calif. Fish & Game)  
2003-2014 Member, Research Grant Committee, American Society of Mammalogists  
2003-2014 Member, Student Honoraria Committee, American Society of Mammalogists  
2007 Panelist, National Science Foundation  
2006-2012 American Society of Mammalogists, Board of Directors  
2004-2008 Teaching Committee, Department of Biological Sciences, ISU  
2004-2008 Capital Outlay Committee, Department of Biological Sciences, ISU  
2002-2008 NIH-BRIN Steering Committee, ISU  
2002-2003 Bioinformatics Coordinator, ISU

## **REFEREED ARTICLES AND GRANTS**

American Naturalist; Animal Conservation; Behavioral Ecology; Behavioral Ecology and Sociobiology; Biological Conservation; Biological Journal of the Linnean Society; Conservation Genetics; Evolution; Hereditas; Journal of Biogeography; Journal of Heredity; Journal of Mammalogy; Journal of Mammalian Evolution; Molecular Ecology; Restoration Ecology; Systematic Biology; National Geographic Society; National Science Foundation; U.S. Civilian Research and Development Foundation, U.S. Geological Survey-National Climate Change and Wildlife Science Center

## **INVITED SEMINARS**

Department of Conservation Biology, National Zoological Park; Hastings Natural History Reservation; National Museum of Natural History; California State University, Humboldt; California State University, Los Angeles; Montana State University, Bozeman; Johns Hopkins University; University of Washington, Seattle; Department of Biology, Boise State University; Department of Biology, University of Utah, Salt Lake City; Museum of Vertebrate Zoology and Department of Integrative Biology, University of California, Berkeley; Department of Biology, College of Southern Idaho; Department of Biology, Utah State University; Department of Ecology and Evolution, University of New Mexico; Department of Wildlife and Natural Resources, Texas A & M; Department of Biology, Texas Tech University; Department of Biology, San Francisco State University; Department of Biology, University of Nevada, Las Vegas; Department of Biology, Kansas State University; Department of Ecology and Evolutionary Biology, Cornell University.

## **FOREIGN LANGUAGES**

French: reading, writing, and speaking.

## **STUDENTS/ RESEARCH ASSOCIATES**

### *Graduate Students*

Kayce Bell, M.S. (ISU, graduated Summer 2006); Amy Runck, PhD (ISU, graduated Fall 2006); Katie Miller, M.S. (ISU, graduated Fall 2007); Tracey King, M.S. (ISU, graduated Spring 2008); Angela Hornsby, M.S. (UNR, graduated Summer 2009), Susan Parsons, M.S. (ISU, graduated Summer 2009), Quinn Shurtliff, Ph.D. (ISU, graduated Summer 2009); Michaela Koenig, M.S. (CP-SLO; graduated Fall 2011); Angela Hornsby, Ph.D. (UNR, 2009-present; NSF EPSCoR Climate Change Fellow), Sarah Hegg, M.S. (UNR, 2013-present), Jen Gansberg (UNR, 2015-pres.).

### *Undergraduate Students*

Jinsil Kim, Matt Larson, Teresa Tsosie, Johnny Bender, Kelli Aleman, Shannon Boyle, Jaclyn Yeiter, Sam Matsaw, Raederle Clay, Hillary Squires, Cassidy Michaelis, Katherine Ogle (UNR), Johnny Daggett (UNR), Terra Gleeson (UNR-NSF-REU), Shawnee Wilson (UNR, CABNR Scholarship), Jessica Felton (UNR-NSF-REU), Kyle Bridgewater (UNR), Michael Koch (UNR, Undergraduate Research Grant), Mitch Gritts (NSF-REU, EPCoR and NIH-INBRE research grants), Rachel Vale (UNR Honors Thesis), Sean Delaplain (UNR-NSF-REU), Katherine King (UNR-NSF-REU), Kaitlynn Mattern (UNR-NSF-REU), Rachel Anderson (UNR-Honors thesis), Ciara Viola (UNR-NSF-REU), Jen Gansberg (UNR), Alex McBride (UNR), Briana Kooreman (UNR)

### *Highschool*

Emily Jahsman, student, ISU  
Sarah Dyer, teacher, UNR

### *Postdoc*

Janet Loxterman, ISU  
Meeghan Gray, UNR (with David Thain)  
Brandi Coyner, UNR  
Peter Murphy, UNR  
Jason Malaney, UNR

## **PAPERS PRESENTED AT PROFESSIONAL MEETINGS**

\*student, †postdoc, #highschool teacher

2015. M.D. Matocq, P.J. Murphy, C. Jeffrey, L. Richards, T. Parchman. Genomic and ecological interactions in woodrat contact zones: next-gen enabled insights into hybridization and diet. Invited speaker in symposium "Genome Evolution in Mammals". Annual Meeting of the American Society of Mammalogists, Jacksonville, Florida, June 12-16.

2015. J. Malaney, T. Wasley, C. Schroeder, and M.D. Matocq. Spatial genetic variation and functional connectivity of Great Basin mule deer. Annual Meeting of the American Society of Mammalogists, Jacksonville, Florida, June 12-16.

2014. M.D. Matocq, P.J. Murphy, C. Jeffrey, L. Richards, T. Parchman. Genomic and ecological interactions in woodrat contact zones: next-gen enabled insights into hybridization and diet specialization. Invited speaker in symposium "Applying genomics for conservation and management of wildlife." Annual Meeting of The Wildlife Society, Pittsburgh, Pennsylvania, October 25-30.

2014. J. Gansberg, J. Malaney, and M.D. Matocq. Strong foundations: investigating the genetic diversity of translocated bighorn sheep populations. Annual Meeting of The Wildlife Society, Pittsburgh, Pennsylvania, October 25-30.

2014. M.D. Matocq and P.J. Murphy. Where woodrats meet: genetic, morphological, and ecological differentiation at the boundaries between species. Invited speaker in symposium "Dynamic landscapes and the diversification of North American rodents". Annual Meeting of the Geological Society of America, Vancouver, British Columbia, October 19-22.

2014. M.D. Matocq, P.J. Murphy, L. Richards, C. Jeffrey. Diet specialization across a woodrat hybrid zone. Annual Meeting of the American Society of Mammalogists, Oklahoma City, OK, June 6-10.

2014. A. Hornsby\* and M.D. Matocq. Using approximate Bayesian computation to compare historical demographic scenarios as estimated by ecological niche models and subfossil abundances. Annual Meeting of the American Society of Mammalogists, Oklahoma City, OK, June 6-10.

2014. J. Malaney†, C.R. Feldman, J. Wehausen, P. Wolff, M. Cox, and M.D. Matocq. Genetic and niche variation in the bighorn sheep of the Great Basin and northern Mojave Deserts. Annual Meeting of the American Society of Mammalogists, Oklahoma City, OK, June 6-10.

2014. M.D. Matocq, T.E. Dilts, P.J. Weisberg, P. Leitner, K.C. Bell, R.D. Inman, K.E. Nussear, and T.C. Esque. Historic and ongoing processes contributing to genetic diversity and divergence in the Mohave Ground Squirrel (*Xerospermophilus mohavensis*). Annual Meeting of The Western Section of the Wildlife Society, Reno, NV, Jan. 28-31.

2014. J. Malaney†, C.R. Feldman, P. Wolff, and M.D. Matocq. Translocated to the fringe: genetic and niche variation in bighorn sheep of the Great Basin and Northern Mojave Deserts. Annual Meeting of The Western Section of the Wildlife Society, Reno, NV, Jan. 28-31.

2014. T.E. Dilts, P.J. Weisberg, P. Leitner, M.D. Matocq, R.D. Inman, K.E. Nussear, and T.C. Esque. Landscape connectivity of the Mohave Ground Squirrel: A multi-scale framework for conservation prioritization. Annual Meeting of The Western Section of the Wildlife Society, Reno, NV, Jan. 28-31.

2014. S. Hegg\*, P.J. Weisberg, M.D. Matocq. Habitat associations of the pale kangaroo mouse (*Microdipodops pallidus*) in the Lower Smoky Valley of Nevada. Annual Meeting of The Western Section of the Wildlife Society, Reno, NV, Jan. 28-31. Awarded best student poster presentation.
2013. M.D. Matocq. Evolutionary and ecological history of western *Neotoma*: using ancient DNA and isotopes to investigate species interactions and turnover. Invited participant NESCent (National Evolutionary Synthesis Center) Catalysis group.
2013. S. Hegg\* and M.D. Matocq. Distribution, abundance and ecology of the pale kangaroo mouse in the Lower Smoky Valley of Nevada. Annual Meeting of The Wildlife Society, Milwaukee, WI, October 5-10.
2013. A. Hornsby\* and M.D. Matocq. *Neotoma* species turnover identified by ancient DNA from paleomidden feces. Annual Meeting of the American Society of Mammalogists, Philadelphia, PA, June 14-18.
2013. J. Malaney†, C. Feldman, M.D. Matocq. Bighorn sheep at the edge of the translocated range: genetic and environmental variation. Annual Meeting of the American Society of Mammalogists, Philadelphia, PA, June 14-18.
2013. M.D. Matocq, B. Coyner†, and P. Murphy†. Reproductive success across a hybrid zone in *Neotoma*: differential fitness effects among pure and hybrid genotypic classes. Annual Meeting of the American Society of Mammalogists, Philadelphia, PA, June 14-18.
2013. B. Coyner† and M.D. Matocq. Genetic analysis of a hybrid zone between two species of woodrats (*Neotoma*). Annual Meeting of the American Society of Mammalogists, Philadelphia, PA, June 14-18.
2013. P. Murphy† and M.D. Matocq. Experimental tests of interactions between woodrats across a zone of secondary contact: asymmetry in body size and aggression limit interspecific mating. Annual Meeting of the American Society of Mammalogists, Philadelphia, PA, June 14-18.
2013. B. Coyner† and M.D. Matocq. The use of next generation sequencing in the study of population genetics of small mammals. Annual Meeting of the Western Section of The Wildlife Society, Sacramento, CA, January 30-February 1.
2013. P. Murphy† and M.D. Matocq. Behavioral and ecological interactions between two woodrat species in contact in coastal California. Annual Meeting of the Western Section of The Wildlife Society, Sacramento, CA, January 30-February 1.
2012. M.D. Matocq, P. Kelly, S. Phillips, J. Maldonado. Reconstructing the evolutionary history of an endangered subspecies across the changing landscape of the Great Central Valley of California. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. M.D. Matocq. Historic and ongoing processes determining genetic variation in the Mohave ground squirrel. Invited seminar to Department of Defense Workshop on the Mohave Ground Squirrel, Barstow CA., July 2012.

2012. A. Hornsby\* and M.D. Matocq. Patterns of habitat suitability for two *Neotoma* species in the Great Basin through Quaternary climate change. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. B. Coyner† and M.D. Matocq. Next generation sequencing in the study of population genetics of a hybrid zone in *Neotoma*. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. P. Murphy† and M.D. Matocq. Diet displacement in woodrats in secondary contact in coastal California. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. B. Riddle, T. Jezkova, M.D. Matocq. Emerging models of mammalian diversification and distributional dynamics in and around the Great Basin. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. E. Frare\*, E. Hekkala, C.R. Feldman, M.D. Matocq. A century of climate change in small mammal populations in the Tahoe Basin, California. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. S. Dyer#, A. Hornsby\*, B. Coyner†, and M.D. Matocq. Bringing molecular genetics to high school students. Annual Meeting of the American Society of Mammalogists, Reno, Nevada, June 22-26.
2012. A. Hornsby\* and M.D. Matocq. Quaternary biogeography of *Neotoma cinerea*: linking genetic patterns with environmental change. Annual Meeting of the Society for the Study of Evolution, Ottawa, Canada, July 6-10.
2012. M.D. Matocq, P. Kelly, S. Phillips, J. Maldonado. Genetic history of the endangered San Joaquin Valley woodrat, *Neotoma fuscipes riparia*. Annual Meeting of the Western Section of The Wildlife Society, Sacramento, California, February 1-3.
2012. M. Koenig, F.X. Villablanca, M.D. Matocq, A Shaffner, and S. Steinmaus. Morphological changes in two sister species of *Neotoma* in areas of allopatry and sympatry along a zone of secondary contact. Annual Meeting of the Western Section of The Wildlife Society, Sacramento, California, February 1-3.
2011. M.D. Matocq, P. Kelly, S. Phillips, J. Maldonado. Demographic history of the riparian woodrat: evidence of trans-valley connectivity across the San Joaquin Valley of California. 18th Annual Meeting of The Wildlife Society, Waikoloa, Hawaii, November 5-10.
2011. M. Gritts\* and M.D. Matocq. Immunogenetic interactions between host and parasite. 18th Annual Meeting of The Wildlife Society, Waikoloa, Hawaii, November 5-10.
2011. A. Hornsby\* and M.D. Matocq. Differential regional response by a small mammal to late Quaternary climate change. 15th Evolutionary Biology Meeting, Marseille France, September 27-30.
2011. M. Gritts\*, A. Hornsby\*, and M.D. Matocq. Has recent climate change caused a genetic bottleneck in a Sierra Nevada population of the bushy-tailed woodrat? UNR Spring Undergraduate Research and Creative Activities Symposium.

2011. M. Gritts\*, P.J. Murphy†, and M.D. Matocq. INBRE: UNR undergraduate research symposium. Major histocompatibility complex and mate choice. UNR Summer Undergraduate Research Symposium.

2011. A. Hornsby\* and M.D. Matocq. Ecogeographic and phylogenetic patterns in *Neotoma cinerea* morphology. Annual Meeting of The American Society of Mammalogists, Portland State University, Portland, Oregon, June 11-15.

2011. M.D. Matocq. Population genetic structure and regional history in the Mohave ground squirrel (*Xerospermophilus mohavensis*). Annual Meeting of the Western Section of The Wildlife Society, Riverside California, February 9-12.

2010. A. Hornsby\* and M.D. Matocq. Quaternary biogeography of *Neotoma cinerea*: Linking genetic patterns with climate change. 90th Annual Meeting of The American Society of Mammalogists, University of Wyoming, Laramie, WY, June 11-15.

2010. A. Hornsby\* and M.D. Matocq. Quaternary biogeography of *Neotoma cinerea*: Linking genetic patterns with climate change. Annual Nevada EPSCoR Climate Change Conference, Las Vegas, NV, February 2.

2010. K. Kirn\*, S. Maienschein\*, L. Vogedes, W. Mandeville, J. Hasenau, and M. D. Matocq. Husbandry and unique characteristics of the dusky-footed woodrat, *Neotoma fuscipes*. District 8 Conference of the American Association for Laboratory Animal Science, Tempe, AZ, May 5-7.

2009. M.D. Matocq. Population genetic structure of the Mohave ground squirrel. Mohave Ground Squirrel Technical Advisory Group Meeting, Ridgecrest, CA, September 24.

2009. M.D. Matocq and J. Crawford\*. Hybridization between *Neotoma fuscipes* and *Neotoma macrotis* in isolated populations of the Central Valley of California. 89th Annual Meeting of The American Society of Mammalogists, University of Alaska, Fairbanks, AK, June 24-28.

2009. Q. Shurtliff\* and M.D. Matocq. Genetic, behavioral, and environmental dynamics of a woodrat hybrid zone in California. Annual meeting of the Society for the Study of Evolution, Moscow, ID, June 13-17.

2008. Q. Shurtliff\* and M.D. Matocq. She loves me, she loves me not: testing female mate preferences in a woodrat (*Neotoma*) hybrid zone. 88th Annual Meeting of The American Society of Mammalogists, South Dakota State University, Brookings, SD, June 21-25.

2008. M.D. Matocq. The roles of ecology, behavior, and morphology, in maintaining species boundaries; what the packrats of MVZ continue to teach us. Museum of Vertebrate Zoology Centennial Celebration, Alumni Symposium, University of California, Berkeley, CA, March 14-15 (Invited speaker).

2007. K.C. Bell\*, P. Leitner and M.D. Matocq. Contributions of historic and contemporary processes to genetic diversity in *Spermophilus mohavensis*, the Mohave ground squirrel. 87th Annual Meeting of The American Society of Mammalogists, University of New Mexico, Albuquerque, NM, June 6-9.

2007. K.E. Miller\* and M.D. Matocq. Genetic structure of Townsend's big-eared bat: mitochondrial and nuclear perspectives. 87th Annual Meeting of The American Society of Mammalogists, University of New Mexico, Albuquerque, NM, June 6-9.
2006. M.D. Matocq and P.J. Murphy. Genetic and morphological variation across an area of transition between *N. fuscipes* and *N. macrotis*. 86th Annual Meeting of The American Society of Mammalogists, University of Massachusetts Amherst, Amherst, MA, June 17-21.
2006. K.C. Bell\*, P. Leitner and M.D. Matocq. Phylogeography of *Xerospermophilus*. 86th Annual Meeting of The American Society of Mammalogists, University of Massachusetts Amherst, Amherst, MA, June 17-21.
2006. A. Runck\*, M.D. Matocq, and J. Cook. When a barrier is only a filter: dynamics of a red-backed vole (*Clethrionomys* sp.) Hybrid zone in northwest territories. 86th Annual Meeting of The American Society of Mammalogists, University of Massachusetts Amherst, Amherst, MA, June 17-21.
2005. K.C. Bell\* and M.D. Matocq. Population genetic structure of the Mohave Ground Squirrel. 85th Annual Meeting of the American Society of Mammalogists, Southwest Missouri State University, Springfield, MO, June 15-19.
2004. M.D. Matocq, A. Runck\*, and M. Larsen\*. Patterns of genetic diversity and ectoparasite load within the *Neotoma fuscipes* species complex. 84th Annual Meeting of the American Society of Mammalogists, Humboldt State University, Arcata, CA, June 11-16.
2004. K.C. Bell\*, P. Leitner, and M.D. Matocq. Mitochondrial sequence analysis of phylogeography and population structure in the Mohave ground squirrel (*Spermophilus mohavensis*). 84th Annual Meeting of the American Society of Mammalogists, Humboldt State University, Arcata, CA, June 11-16.
2004. T. King\*, T. Windholz, and M.D. Matocq. Using museum records to establish a predictive GIS model of potential *N. cinerea* habitat. 84th Annual Meeting of the American Society of Mammalogists, Humboldt State University, Arcata, CA, June 11-16.
2004. Q. Shurtliff\*, C.R. Feldman, and M.D. Matocq. Systematics and the evolution of genitalia in the genus *Neotoma* based on mitochondrial and nuclear markers. 84th Annual Meeting of the American Society of Mammalogists, Humboldt State University, Arcata, CA, June 11-16.
2003. M.D. Matocq. Reproductive success and effective population size in woodrats (*Neotoma macrotis*). Annual meeting of the Society for the Study of Evolution, California State University, Chico, CA, June 21-24.
2003. J. Kim\* and M.D. Matocq. Contrasting patterns of molecular variation in neutral and functional genes: an examination of the evolution of phenotypic variation in external male genitalia. Annual meeting of the Idaho NIH-BRIN Universities, Boise State University, Boise, ID, August 11-15.
2002. M.D. Matocq. Mating system and social structure of the dusky-footed woodrat, *Neotoma fuscipes*: the influence of local dynamics on population differentiation. 82nd Annual Meeting of American Society of Mammalogists, McNeese State University, Lake Charles, LA, June 15-19.

2001. M.D. Matocq. Morphological and molecular analysis of a contact zone in the *Neotoma fuscipes* species complex. 81st Annual Meeting of American Society of Mammalogists, University of Montana, Missoula, MT, June 16-20. (Invited plenary talk; recipient of the ASM award).

2000. M.D. Matocq. Phylogeography and regional history of the dusky-footed woodrat, *Neotoma fuscipes*: mitochondrial and nuclear perspectives. Annual meeting of the Society for the Study of Evolution, Indiana University, Bloomington, IN, June 23-27.

1999. M.D. Matocq, M. Da Silva, and J.L. Patton. Riverine diversification of Amazonian rats: uncoupling history from local ecology. Annual meeting of the Society for the Study of Evolution, University of Wisconsin, Madison WI, June 22-26.

1996. M.D. Matocq, M. Da Silva, and J.L. Patton. Hierarchical genetic structure of two species of spiny rats (genus *Proechimys*) from the Amazon. 76th Annual meeting of the American Society of Mammalogists, University of North Dakota, Grand Forks, ND, June 15-19.

1995. M.D. Matocq. Low historic genetic diversity in the endangered Morro Bay kangaroo rat, *Dipodomys heermanni morroensis*: an mtDNA study of museum specimens. Annual meeting of the Society for the Study of Evolution, McGill University, Montreal, Quebec, July 8-12.

1995. M.D. Matocq. Low historic genetic diversity in the endangered Morro Bay kangaroo rat, *Dipodomys heermanni morroensis*: an mtDNA study of museum specimens. National AAAS meeting, Atlanta, GA, February 16-21. (Invited presentation).