

CURRICULUM VITAE

Deborah A. Duffield

Title: Professor, Department of Biology

Portland State University

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Education and Degrees:

Ph. D. 1977 University of California, Los Angeles (Genetics, Cytogenetics)

M.A. 1966 Stanford University, Stanford, CA (Biology)

B.A. 1963 Pomona College, Claremont, CA (Biology)

Professional and Research Experience:

1988-Present Professor, Biology Department, Portland State University,
Portland, OR. Principal teaching and research areas: Genetics,
Human Genetics, Population Structure and Dynamics, Evolution,
Evolutionary Genetics and Marine Mammals.

1983-1988 Associate Professor, Biology Department, Portland State University

1979-1983 Assistant Professor, Biology Department, Portland State University

1975-1977 Lecturer, Biology Department, University of California, Los Angeles:
Human Genetics, Comparative Genetics, Marine Mammals.

1976-1977 Research Associate, Biology Department, University of California,

1968-1970 Instructor, Biology Department, Old Dominion College, Norfolk, VA

Su 1967 Biological Research Scientist, Federal Civil Service (GS-11), Pt. Mugu,
CA. Cytogenetic research on the cetaceans.

Su 1965 Guest Research Scientist, Naval Undersea Research and Development
Center, Pt. Mugu, CA. Cytogenetic research on cetaceans.

Major Research Interests:

Genetic variability in natural populations. Cytogenetics, protein electrophoresis, nuclear DNA (fingerprinting and microsatellites) and mitochondrial DNA haplotype analysis of whale and dolphin species, emphasizing evolution and population structure and dynamics. Cetacean hemoglobins: structure and function; hemoglobin gene regulation. Physiological and genetic aspects of hematologic parameters related to diving capabilities and ecotype in marine mammals. Detection of organochlorines in marine mammal blubber. Inheritance of genetic disorders in horses. Genetic markers for tracking color pattern inheritance in horses.

Publications.

- Wintle, N.J.P., D.A. Duffield, N.B. Barros, R.D. Jones and J.M. Rice. 2010. Submitted. Total mercury in stranded marine mammals from the Oregon and Southern Washington coasts. Mar. Poll. Bull.
- Courbis, S., R.W. Baird, F. Cipriano and D. Duffield. 2010. Submitted. Population structure of Pantropical spotted dolphins near the main Hawaiian Islands: Evidence of multiple genetic stocks for management. Molec. Ecol.
- Norman, S.A., J. Huggins, T.E. Carpenter, J.T. Case, D.M. Lambourn, J. Rice, J. Calambokidis, J.K. Gaydos and D.A. Duffield. 2009. Submitted. GIS and spatio-temporal analyses of harbor porpoise (*Phocoena phocoena*) strandings during an Unusual Mortality Event in the Pacific Northwest (2006-2008). Mar. Mamm. Sci.
- Pelletier, T.A. and D.A. Duffield. 2009. Submitted. Phylogeography of the western red-backed salamander (*Plethodon vehiculum*) in the Pacific Northwest. J. of Herpetology.
- Dolan, A., M. Murphy, L. Redmond and D. Duffield. 2009. Accepted. Maternal characters and the production and recruitment of sons in the eastern kingbird (*Tyrannus tyrannus*). Behav. Ecol. Sociobiol.
- Walker, K.A., J.W. Davis and D.A. Duffield. 2008. Activity budgets and prey consumption of sea otters (*Enhydra lutris kenyoni*) in Washington. Aquatic Mammals 34:393-401.
- Valentine, K, Duffield DA, Patrick LE, Hatch DR, Butler VL, Hall RL, Lehman N. 2008. Ancient DNA reveals genotypic relationships among Oregon populations of the sea otter (*Enhydra lutris*). Conservation Genetics 9:933-938.
- Dolan, A., M. Murphy, L. Redmond, K. Sexton and D. Duffield. 2007. Extra-pair paternity and the opportunity for sexual selection in a socially monogamous passerine. Behav. Ecol. 18(6):985-993.
- Norman, S.A., C.E. Bowlby, M.S. Brancato, J. Calambokidis, D. Duffield et al. 2004. Cetacean strandings in Oregon and Washington between 1930 and 2002. J. Cetacean Res. Manage. 6(1):87-99.

Zinck, J.M., D.A. Duffield and P.C. Ormsbee. 2004. Primers for identification and polymorphism assessment of Vespertilionid bats in the Pacific Northwest. *Molecular Ecology Notes*, 4(2):239-242.

Zornetzer, H. and D.A. Duffield. 2003. Captive-born bottlenose dolphin x common dolphin intergeneric hybrids (*Tursiops truncatus* x *Delphinus delphis*). *Can. J. Zool.* 81: 1755-1762.

Duffield, D.A., N.B. Barros, E.O. Espinoza, S. Plön, F.M.D. Gulland and J.E. Heyning. 2003. Identifying pygmy and dwarf sperm whales (genus *Kogia*) using electrospray ionization mass spectrometry of myoglobin and hemoglobin. *Mar. Mamm. Sc:*19(2):395-399.

Duffield, D.A. and R.S. Wells. 2002. Molecular profile of a resident community of bottlenose dolphins, *Tursiops truncatus*. In: *Cell and Molecular Biology of Marine Mammals*. Ed. C.J. Pfeiffer. Krieger Publ. Co., Malabar, FL:3-11.

Parr, L. and D.A. Duffield. 2002. Interspecific comparison of mtDNA variation between extant species of manatee. In: *Cell and Molecular Biology of Marine Mammals*. Ed. C.J. Pfeiffer. Krieger Publ. Co., Malabar, FL:152-158.

Duffield, D.A. 2002. Extinctions: specific. In: *Encyclopedia of Marine Mammals*. Eds. W.F. Perrin, B. Würsig, H.G.M. Thewissen. Academic Press, San Diego, CA:408-410.

Duffield, D.A. and W. Amos. 2001. Genetic analyses. In: *CRC Handbook of Marine Mammal Medicine, 2nd Ed.* Eds. L.A. Dierauf and F.M.D. Gulland. CRC Press, Boca Rotan, FL:271-28.

Bossart, G.D., T.H. Reidarson, L.A. Dierauf and D.A. Duffield. 2001. Clinical pathology. In: *CRC Handbook of Marine Mammal Medicine, 2nd Ed.* Eds. L.A. Dierauf and F.M.D. Gulland. CRC Press, Boca Rotan, FL:383-436.

Duffield, D.A. and T.R. Robeck. Eds. 2000. *Bottlenose Dolphin Reproduction Workshop Report*. MMTAG, Silver Springs, MD. 376 pp.

Duffield, D.A. 2000. Genetic analysis as a tool for population management. In: D. Duffield and T. Robeck (eds.). *Bottlenose Dolphin Reproduction Workshop Report*. MMTAG, Silver Springs, MD. Pp. 163-173.

Duffield, D.A., E.D. Shell and M. Dudley. 2000. Demographic analysis of breeding bottlenose dolphins in North American zoological facilities: 1976-1998. In: D. Duffield

and T. Robeck (eds.). Bottlenose Dolphin Reproduction Workshop Report. MMTAG, Silver Springs, MD. Pp. 139-155.

Hayteas, D.L. and D.A. Duffield. 2000. High levels of PCBs and p,p'-DDE found in the blubber of killer whales (*Orcinus orca*). *Marine Pollution Bulletin* 40(6):558-561.

Reidarson, T.H., D. Duffield, and J. McBain. 2000. Hematology of marine mammals. In: Schalm's Veterinary Hematology, 5th Edition. Eds. B.F. Feldman, J.G. Zinkl and N.C. Jain. Williams and Wilkins, Baltimore, M.D. Pp. 1164-1173.

Duffield, D.A. and E.D. Shell. 1999. Hematology and Serum Chemistry Clinical Normal Values, Vol I (*Cephalorhynchus commersonii*, *Lagenorhynchus obliquidens*). Technical Booklet prepared for SeaWorld, Inc.

Duffield, D.A. and E.D. Shell. 1999. Hematology and Serum Chemistry Clinical Normal Values, Vol II (*Delphinapterus leucas*, *Pseudorca crassidens*). Technical Booklet prepared for SeaWorld, Inc.

Duffield, D.A. and E.D. Shell. 1999. Hematology and Serum Chemistry Clinical Normal Values, Vol III (*Tursiops truncatus*). Technical Booklet prepared for SeaWorld, Inc.

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Hayteas, D.L. and D.A. Duffield. 1998. The use of HPLC for the estimation of PCB and DDE residues in marine mammals. *J. of Chromatography B* 705:362-366.

Duffield, D.A. and P.L. Goldie. 1998. Tobiano spotting pattern in horses: linkage of T_O with Al_A and linkage disequilibrium. *J. Hered.* 89(1):104-106.

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Duffield, D.A., J. Chamberlin-Lea and J.E. Antrim. 1997. A complex chromosome rearrangement in the karyotype of a wild-caught male sea otter. *Endangered Species Update* 13:68-72.

Urian, K.W., D.A. Duffield, A.J. Read, R.S. Wells and E.D. Shell. 1996. Seasonality of reproduction on bottlenose dolphins, *Tursiops truncatus*. *J. Mamm.* 77(2):394-403.

- Duffield, D.A., Odell, D.K., McBain, J.F. and Andrews, B. 1995. Killer whale reproduction at Sea World. *Zoo Biology* 14:417-430.
- Bischof, L.L. and D.A. Duffield. 1994. Relatedness estimation of captive Asian elephants (*Elephas maximus*) by DNA fingerprinting. *Zoo Biology* 13:77-82.
- Duffield, D.A. and P. Goldie. 1992. Tobiano genetics research: an update. *Journal of the American Paint Horse Society*, October.
- Duffield, D.A., J. Chamberlin-Lea, J. Sweeney, D.K. Odell, E.D. Asper and W.G. Gilmartin. 1991. Use of corneal cell culture for R-band chromosome studies on stranded cetaceans. In: *Marine Mammal Strandings*. NOAA Technical Rept. Eds. J.E. Reynolds and D.K. Odell. NMFS 88:91-100.
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- Duffield, D.A. and R.S. Wells. 1991. The combined application of chromosome, protein and molecular data in the determination of social unit structure and dynamics in *Tursiops truncatus*. In: *Genetic Ecology of Whales and Dolphins*. Ed. A.R. Hoelzel. *International Whaling Comm Special Issue* 13:155-169.
- Blythe, L.L. B.D. Hultgren, A.M. Craig, L.H. Appell, E.D. Lassen, D.E. Mattson and D. Duffield. 1991. Equine degenerative myeloencephalopathy in a family of appaloosa horses: a clinical, viral and genetic evaluation. *J. Amer. Vet. Med. Assoc.* 198(6):1005-1013.
- Asper, E.D., D.A. Duffield, N. Dimeo-Ediger and D. Shell. 1990. Marine mammals in zoos, aquaria and marine zoological parks in North America: 1990 census report. *Intern. Zoo Yrbk.* 29:179-187.
- Asper, E.D., L.H. Cornell, D.A. Duffield and D.K. Odell. 1990. Hematology and serum chemistry values in bottlenose dolphins. In: *The Bottlenose Dolphin*. Eds. S. Leatherwood and R.R. Reeves. Academic Press, San Diego, CA:479-488.
- Duffield, D.A. and J. Chamberlin-Lea. 1990. Use of chromosome heteromorphisms and hemoglobins in studies of bottlenose dolphin populations and paternities. In: *The Bottlenose Dolphin*. Eds. S. Leatherwood and R.R. Reeves. Academic Press, San Diego, CA:609-622.

- Hersh, S.L. and D.A. Duffield. 1990. Distinction of Northwestern Atlantic offshore and coastal bottlenose dolphins based on hemoglobin profile and morphometry. In: *The Bottlenose Dolphin*. Eds. S. Leatherwood and R.R. Reeves. Academic Press, San Diego, CA.:129-142.
- Duffield, D.A. 1990. Genetic and physiological research applications in marine mammal medicine. In: *Practical Handbook of Marine Mammal Medicine: Health, Disease and Rehabilitation*. L.A. Dierauf, Ed. CRC Press, Boca Raton, FL: 371-380.
- Stevens, T.A., D.A. Duffield, E.D. Asper, K.G. Hewlett, A. Bolz, L.J. Gage and G.D. Bossart. 1989. Preliminary findings of restriction fragment differences in mitochondrial DNA among killer whales (*Orcinus orca*). *Can. J. Zool.* 67:2592-2595.
- Cornell, L.H., D.A. Duffield, B.E. Joseph and B. Stark. 1988. Hematology and serum chemistry of the beluga (*Delphinapterus leucas*). *J. Wildlife Diseases*, 24(2):220-224.
- Lambertsen, R.H., C.S. Baker, D.A. Duffield and J. Chamberlin-Lea. 1988. Cytogenetic determination of gender among individually identified humpback whales (*Megaptera novaeangliae*). *Can. J. Zool.* 66:1243-1248.
- Asper, E.D., L.H. Cornell, D.A. Duffield and N. Dimeo-Ediger. 1988. Marine mammals in zoos, aquaria and marine zoological parks in the United States and Canada; 1983 census report. *Intern. Zoo Ybk.* 27:287-294.
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- Lambertsen, R.H. and D.A. Duffield. 1987. Biopsy studies of the humpback whale, *Megaptera novaeangliae*. NMFS and Intern. Whaling Comm. Tech. Rept.
- Hultgren, B., D.A. Duffield, L.H. Appell, L. Blythe, P. Goldie, D. Clarkson and D. Shell. 1987. Current research topics in equine genetics, Part I. *Equine Practice* 9 (10):38-43.
- Duffield, D.A. and J. Chamberlin-Lea. 1986. Cytogenetic studies of the humpback whale in Atlantic and Pacific waters. NMFS Rept. 50-EANF-5-00094.
- Hultgren, B.D. and D.A. Duffield. 1986. Spotted horse research: an update. *Paint Horse Journal*, March, 1986:116-117.

Duffield, D.A. 1986. Investigation of Genetic Variability in Stocks of the Bottlenose Dolphin (*Tursiops truncatus*) and the Loggerhead Sea Turtle (*Caretta caretta*). NMFS Tech. Rept. NA83-GA-C-00036.

Duffield, D.A. and R.S. Wells. 1986. Population structure of bottlenose dolphins: (2) Genetic studies of dolphins along the central west coast of Florida. In: Population Structure of Bottlenose Dolphins. Ed. R.S. Wells. NMFS Tech. Rept. 45-WCNF-5-00366.

Duffield, D.A. 1986. *Orcinus orca* : a taxonomy and evolution - cytogenetics and population structure. In: Behavioural Biology of Killer Whales. Ed. J. Lockhard, B. Kirkevold. Alan R. Liss, New York:19-33.

Hedrick, M.S., D.A. Duffield and L.H. Cornell. 1986. Blood viscosity and optimal hematocrit in a deep-diving mammal, the northern elephant seal (*Mirounga angustirostris*). Can. J. Zool. 64:2081-2085.

Duffield, D.A. 1984. Karyology. In: Biopsy Studies of the Western Northern Atlantic Humpback Whale for Karyologic Determination of the Sex of Photographically Identified Individuals. E. R. Lambertsen. US Dept. of Comm. Rept. NA-83-FA-C-00017.

Duffield, D.A., S.H. Ridgway and L.H. Cornell. 1983. Hematology distinguishes coastal and offshore forms of dolphins (*Tursiops*). Can. J. Zool. 61(4):930-933.

Duffield, D.A. 1982. Indian River *Tursiops* : genetic studies. In: Live Capture, Marking and Resighting of Bottlenose Dolphins, *Tursiops truncatus*. Rept. NMFS Contract NA80-GA-C-00063:312-324.

Cornell, L.H., E.D. Asper and D.A. Duffield. 1982. Census update: captive marine mammals in North America. Intern. Zoo Yearbook 22:227-232.

Duffield, D.A. 1981. Genetic analysis in zoo management: Washington Park Zoo. In: Recent Developments in Research and Husbandry at the Washington Park Zoo. Ed. J. Mellen, A. Littlewood. Pp. 45-50.

Duffield, D.A. 1980. Electrophoretic comparison of genetic variability in *Tursiops*. In: HSWRI Tech. Rept. #80-122. Ed. E.D. Asper and D.K. Odell.

Duffield, D.A., M. Anne Spence and C. Paquin. 1978. Evaluation of metaphase association patterns of acrocentric chromosomes in the order Cetacea. Cytologia 43:541-549.

Duffield, D.A. 1977. Phylokaryotypic Evaluation of the Cetacea. Ph.D. Dissertation. University of California, Los Angeles.

White, J.R., D.R. Harkness, R.E. Isaacks and D.A. Duffield. 1976. Some studies on blood from the Florida manatee, *Trichechus manatus latirostris*. Comp. Biochem. Physiol. 55A:413-417.

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Baluda, M.C., D. Duffield Kulu and R.S. Sparkes. 1972. Cetacean hemoglobins: electrophoretic findings in nine species. Comp. Biochem. Physiol. 41B:647- 653.

Duffield Kulu, D. 1972. Evolution and cytogenetics. In: Mammals of the Sea: Biology and Medicine. Ed. S.H. Ridgeway. Thomas, Ill. pp 503-526.

Duffield, D.A., I. Veomett and R.S. Sparkes. 1971. Cytogenetic studies of four species of cetaceans. J. Mamm. 52:828-832.

Duffield, D.A., S.H. Ridgeway and R.S. Sparkes. 1967. Cytogenetic studies of two species of porpoise. Nature 213:189-190.

Papers in Proceedings:

Duffield, D.A. 1994. Keynote Address: The past, present and future of marine mammal management. Proceedings: IMATA Conf. Tacoma, WA. Nov. 6-11.

Duffield, D.A., Shell, D.E. and Schroeder, J.P. 1993. Bottlenose Dolphin North American Studbook. Marine Mammal Taxon Advisory Group. AAZPA. September.

Andrews, B.A. and Duffield, D.A. 1992. Captive propagation of marine mammal species in aquariums, zoos and marine zoological parks in North America. Proceedings: AAZPA Conf. Toronto, Canada. Sept 13-17, 1992:215-222.

Duffield, D.A., N. Dimeo-Ediger, D. Shell, P. Goldie. 1992. Studbook Demographic Reports: *Tursiops truncatus*, *Orcinus orca*, *Halichoerus grypus*, *Callorhinus ursinus*, *Lagenorhynchus obliquidens*, *Phoca vitulina*, *Odobenus rosmarus*, *Delphinapterus leucas*. AAZPA Marine Mammal Taxon Advisory Group. September.

Duffield, D.A. 1991. Status and trends in captive reproduction of killer whales in North America. NMFS, National Register. Nov 22, 1991.

Duffield, D.A. and R.S. Wells. 1990. Bottlenose dolphins: Comparison of census data from dolphins in captivity with a wild "population". Proceedings: 18th Ann. IMATA Conf., Chicago, Ill. Nov 4-9.

Duffield, D.A. and R.S. Wells. 1988. New ways of looking at whales: Use of molecular techniques in the study of social structure in bottlenose dolphins. In: The World's Whales, A Closer Look. Ed. S. Taylor. American Cetacean Society, San Pedro, CA:41-50.

Duffield, D.A., J. Chamberlin-Lea, M.A. Dudley and L.H. Cornell. 1986. Dolphin chromosome variation: an example of the application of R-band heteromorphism analysis to the discrimination of paternity. 17th Ann. Conf. International Assoc. Aquatic Animal Medicine. Biloxi, MS.

Duffield, D.A., M.A. Solangi, A. Veverka-Wright. 1986. Studies on the population structure of bottlenose dolphins in the Gulf of Mexico. Conf. IAAAM. Biloxi, MS.

Cornell, L.H., D.A. Duffield and J.E. Antrim. 1981. Clinical application of hematologic values in captive cetaceans. J. Zoo Animal Med. Proc., Annual Meeting, Seattle.

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In Preparation:

Owen, E.C.G., D.A. Duffield and R.S. Wells. Cooperation between non-relatives: alliances between adult male bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, Florida. Animal Behaviour.

Conference Presentations and Posters:

Duffield, D.A., N.B. Barros, D. D'Alessandro, K. Chandler, J. Husa, T. Boothe and J.M. Rice. 2010. Challenges for the Northern Oregon/Southern Washington Marine Mammal Stranding Network. National Marine Animal Health and Stranding Network Conference. Shepherdstown, West Virginia. April 6-9.

Rice, J.M., D.A. Duffield, N.B. Barros and D. D'Alessandro. 2010. Morbidity and mortality in marine mammals along the Oregon and Southern Washington coasts. National Marine Animal Health and Stranding Network Conference. Shepherdstown, West Virginia. April 6-9.

Norman, S.A., J. Huggins, T.E. Carpenter, J.T. Case, D.M. Lambourn, J. Rice, J. Calambokidis, J.K. Gaydos, M.B. Hanson, D.A. Duffield, S. Dubpernell, S. Berta and M.

Klope. 2010. GIS and spatio-temporal analyses of harbor porpoise (*Phocoena phocoena*) strandings during an Unusual Mortality Event in the Pacific Northwest (2006-2008). National Marine Animal Health and Stranding Network Conference. Shepherdstown, West Virginia. April 6-9.

Huggins, J.L., J. Calambokidis, M.B. Hanson, S.A. Norman, D.M. Lambourn, J.K. Gaydon, D.A. Duffield, K. Wilkinson, S.J. Jeffries and S. Raverty. 2010. Harbor porpoise stranding trends in Washington state: are higher levels of mortality no longer unusual? National Marine Animal Health and Stranding Network Conference. Shepherdstown, West Virginia. April 6-9.

Rice, J.M., D.A. Duffield and N.B. Barros. 2009. Morbidity and mortality in marine mammals along the Oregon and southern Washington coasts. . 18th Biennial Conference on the Biology of Marine Mammals. Quebec City, QC, Canada. 12 Oct-16 Oct.

Wintle, N.J.P., D.A. Duffield, N.B. Barros, R.D. Jones and J.M. Rice. 2009. Total mercury in stranded marine mammals from the Oregon and southern Washington coast. 18th Biennial Conference on the Biology of Marine Mammals. Quebec City, QC, Canada. 12 Oct-16 Oct.

Courbis, S., R.W. Baird, F. Cipriano and D. Duffield. 2009. Population structure of pantropical spotted dolphins near the main Hawaiian islands: evidence of multiple genetic stocks. 18th Biennial Conference on the Biology of Marine Mammals. Quebec City, QC, Canada. 12 Oct-16 Oct.

Courbis, S., R.W. Baird, D. Duffield. 2007. Population Structure of Island-Associated Pantropical Spotted Dolphins (*Stenella attenuata*). 17th Biennial Conference on the Biology of Marine Mammals. Cape Town. South Africa. 29 Nov-3 Dec.

Valentine, K., D.A. Duffield, V.L. Butler, R.L. Hall, and N. Lehman. 2007. Ancient DNA reveals genotypic relationships among Oregon populations of the sea otter (*Enhydra lutris*). 17th Biennial Conference on the Biology of Marine Mammals. Cape Town. South Africa. 29 Nov-3 Dec.

Barros, N.B, M.K. Stolen, W. Noke Durden, D.A. Duffield and D.K. Odell. 2006. Biology and ecology of offshore bottlenose dolphins from the east coast of Florida. Southeast Mid-Atlantic Marine Mammal Symposium. Ft. Lauderdale, FL. 24-26 March.

Duffield, D.A. Management of genetic variability in representative North American facilities. 2005. Steering Committee Bottlenose Dolphin Reproduction Workshop. Parc Asterix, Paris, France October 3-5.

Van Elk, N., D.A. Duffield, D. Shell and M.G. Hartmann. Bottlenose dolphin reproduction: results of questionnaire. 2005. Steering Committee Bottlenose Dolphin Reproduction Workshop. Parc Asterix, Paris, France October 3-5.

Dolan, A.C., L. Redmond, K.Sexton, D. Duffield and M. Murphy. An Eastern Kingbird's guide to reproductive success. 2005. Amer. Ornithologist's Union. Santa Barbara, CA August 23-27.

Walker, K., J. Davis and D. Duffield. The Northern sea otter, *Enhydra lutris kenyoni*, along the Washington coast: abundance, activity budgets and prey consumption. 2005. Animal Behavior Society. Snowbird, UT August 6-10.

Walker, K., J. Davis and D. Duffield. The Northern sea otter, *Enhydra lutris kenyoni*, along the Washington coast: abundance, activity budgets and prey consumption. 2005. Sea Otter Conservation Workshop IV. Seattle Aquarium. Seattle, WA. Mar 14-16.

Duffield, D., E.O. Espinoza and N.B. Barros. Forensic identification and investigation of hybridization in marine mammals using hemoglobin and myoglobin molecular weight markers. 2004. Wildlife Forensics: The Missing Link in Conservation. NWAFFS. Ashland, OR October 25-29.

Duffield, D., H.R. Zornetzer, E.O. Espinoza and N.B. Barros. Use of biomarkers as species-level systematic and forensic molecular tools in the detection of cetacean hybrids. 2004. Cetacean Systematics: Approaches in Genetics, Morphology & Behavior. La Jolla, CA April 28-29.

Zornetzer, H.R. and D. Duffield. Morphological and photometric characterization of intergeneric hybrids between *Tursiops* and *Delphinus*, *Tursiops* and *Pseudorca*. 2004. Cetacean Systematics: Approaches in Genetics, Morphology & Behavior. La Jolla, CA April 28-29.

Owen, E., S. Watwood, R. Wells and D. Duffield. Reproductive and ecological functions of adult male alliances in bottlenose dolphins, *Tursiops truncatus*. 2003. 15th Biennial Conf. On the Biology of Mar. Mamm. Greensboro, NC. Dec 15-Dec. 19.

Wells, R.S., T.K. Rowles, H.L. Rhinehart, S. Hofmann, G. Mitchum, W.M. Jarman, A. Borrel, A. Aguilar, A.A. Hohn, J.C. Sweeney, D.A. Duffield, A. Hall. Integrating life

history, health and reproductive success data to examine potential relationships with organochlorine contaminants for bottlenose dolphins in Sarasota Bay, Florida. 2003. 15th Biennial Conf. On the Biology of Mar. Mamm. Greensboro, NC. Dec 15-Dec. 19.

T. McGuire, R. Brown, K. Chandler, D. Duffield, J. Hodder, B. Lagerquest, B. Mate, S. Reimer, J. Tuttle, S. Pearson, J. Koczur. The Oregon marine mammal stranding network: a model of a statewide network. 2003. 15th Biennial Conf. On the Biology of Mar. Mamm. Greensboro, NC. Dec 15-Dec. 19.

Scott, S.A., P.A. Ormsbee, J.M. Zinck, D.A. Duffield and L.A. Ruedas. 2003. Identification and distribution of *Myotis yumanensis* in Oregon. 33rd Annual North American Symposium on Bat Research. Lincoln, NE. Oct 8-11.

Dolan, A.C., M. Murphy and D.A. Duffield. 2003. A geographic comparison of extra-pair paternity in eastern kingbirds. Cooper Ornithological Annual Meeting. Flagstaff, AZ. April 30-May 3.

Duffield, D., K. Valentine and V. Butler. 2003. Pre-fur trade Oregon sea otters. Sea Otter Conservation Workshop III. Seattle Aquarium. Seattle, WA. Mar 14-16.

Scott, S.A., P.C. Ormsbee, J.M. Zinck, D.A. Duffield, and L.A. Ruedas. 2003. Identification and Distribution of *Myotis yumanensis* in Oregon. Joint Annual Meeting: Oregon Chapter and Northwest Section. The Wildlife Society, Eugene OR. Feb 10-14.

Scott, S.A., P.C. Ormsbee, J.M. Zinck, D.A. Duffield, and L.A. Ruedas. Identification and Distribution of *Myotis yumanensis* in Oregon. 2003. 2nd Four Corners Regional Bat Conf. and 1st Annual Western Bat Working Group Conf. for the Management and Conservation of Bats, Durango, CO. Jan 29-Feb 1.

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Duffield, D.A. and I. Kang. 1973. *Steno-Tursiops truncatus* hybrid: biochemical and karyotypic analysis. IAAAM. Vancouver, B.C.

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Research Funding

Sustainable response, enhanced data collection, analysis and educational outreach for the Northern Oregon/Southern Washington Marine Mammal Stranding Program (NOSWSP). NMFS/NOAA. August 1, 2009-July 30, 2010 (\$133, 284)

Condors in Oregon: Risk of Contaminants in Scavenged Marine Mammals. Future For Wildlife Conservation Fund. Oregon Zoo. Co-P.I. with Dr. Deke Gunderson and Dr. Nelio Barros. 8/1/09-6/30-10. (\$3500)

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. 7/1/09-6/30/10. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$134,000)

Enhancement of diagnostic capabilities and extension of geographic coverage for the northern Oregon/southern Washington Marine Mammal Stranding Program (NOSWSP). NMFS/NOAA. July 1, 2008-June 30, 2009 (\$133,336)

Population structure of island-associated dolphins: modeling gene flow and dispersal in island systems. EPA Greater Research Opportunities (for Sarah Courbis). Sept 2008-August 2011 (\$110,000)

Comparative characterization of the hemoglobin genes of diving mammals. Faculty Enhancement Program. 2008-09 (\$3250)

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. 7/1/08-6/30/09. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$133,000)

Diagnostic assessment of health and investigation of potential relationship of diet and exposure to biotoxins in stranded marine mammals in Oregon. NMFS Prescott Funding. 7/1/07-6/30/08. (\$129,615)

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. 7/1/07-6/30/08. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$132,86)

A test of combined near infrared spectroscopy and DNA analysis to estimate prey composition in scat of Steller and California sea lions from the Columbia River, Oregon. Sea Grant. 7/15/07-6/19/09 (for Sarah Libert) (\$12,865).

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. July 1, 2006 - June 30, 2007. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$143,035)

Prescott Grant - Implementation of an archival system for cetacean tissue and anatomical specimens collected during 10 years of stranding network activity. 15 January, 2005 - 14 January 2006. D.A. Duffield and Luis A. Ruedas. To be administered through PSU. (\$102,170). Extended to June 2007.

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. July 1, 2005 - June 30, 2006. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$147,680)

Proposal to examine sea otter mtDNA and oxygen isotope ratios in mussel shell in coastal middens. Sea Grant. Sept 2004 - Mar 2005. Co-PI with Roberta Hall; Anthropology, OSU. Grant is administered through OSU. (\$8,721.00)

Renew: Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. Dec. 2003-Nov 2004. Co-PI (Coordinator of northern Oregon MMSN) with Dr. Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$149,044)

Prescott Grant - Enhancing the capability of the Oregon Marine Mammal Stranding Network. Nov. 2002-Oct. 2003. Co-PI (Coordinator of northern Oregon MMSN) with Dr.

Jan Hodder (OIMB) and Dr. Bruce Mate (OSU); grant is administered through OSU. (\$157,500)

Use of midden-retrieved ancient DNA to study the historic distribution of sea otters in Oregon. Secondary Adaptation to Life in Water, University of Otago, Dunedin, NZ. Dec. 9-14. PSU Professional Travel Grant Program. 2002. (\$500)

Use of ancient DNA to determine the affiliation of Oregon sea otters. Sea Grant Program Development Grant. 2002. Co-PI with Dr. Virginia Butler; Anthropology, PSU (\$10,802)

Ancient DNA. Faculty Development Award, 2001-2002. (\$1760)

Use of ancient DNA to determine historical distribution of sea otters in Oregon. Provost's PSU Foundation Faculty Development Award. 2001. (\$1000)

Validation of paternity in a wild bottlenose dolphin population. Harbor Branch Oceanographic Institution. 2000-2001. (\$4,500)

Biotechnology. Co-PI with Dr. L. Weisel. Murdock. 2000-2002. (\$342,964)
Validation of size for reporting of microsatellite studies. Fac. Devel. Grant. 2000-2001. (\$2450)

Genetic analysis of bottlenose dolphin population structure, mating system and kinship. Disney Conservation Award (administered through Mote Marine Laboratory). 1999-2000. (\$8,090)

Development of fluorescent DNA markers for genetic studies of dolphin communities. Fac. Devel. Grant. 1998-99 (\$5943)

With MS student: Jan Zinck: Microsatellites and kinship, a study of captive populations of Straw-colored fruit bats (*Eidolon helvum*). Pittsburgh Zoo. 1996-1997 (\$2200)

A test of simple-sequence DNA techniques for studying population structure in bottlenose dolphins. Fac. Devel. Award. 1996-97 (\$4400)

With PhD student: Leslee Parr: Genetic assessment of Florida and Puerto Rico manatee populations. Save The Manatee Club. 1995-96 (\$6484)

M.J. Murdock Charitable Trust Grant of Research Corporation in the Partners in Science Program. 1990-1992 (\$13,000)

Determination of paternity in Asian elephants by DNA fingerprinting analysis. Nixon Griffis Fund for Zoological Research. 1988-89 (\$2300)

Test of DNA fingerprinting in the West Indian manatee (*Trichechus manatus*). PSU Res. and Publ. 1988-89 (\$525)

DNA probes for animal genetic studies. Faculty Development Award. 1988-89 (\$5300)

Use of M13 phage to detect hypervariable DNA regions: application to the genetic studies in animals. PSU Res. and Publ. Grant. 1987-88 (\$900)

Correlation of the radiographic, pathologic, serum copper and zinc concentrations and chromosomal findings of equine osteochondrosis and comparison to cervical vertebral malformation-malarticulation (Wobblers - Type 3). Amer. Quarter Horse Association (subcontract to OSU Vet. School, Hultgren) 1986-87 (\$2600)

Vibration-isolation system for high resolution chromosome and in-situ DNA-hybridization studies. PSU R & P 1986 (\$1500)

Y-chromosome DNA probe: application to animal studies. Biomed. Res. Supp. Grant, PSU. 1985-1986 (\$1201)

Chromosomal evaluation of "wobbling": a test of a possible chromosome breakage syndrome. PSU/Res. and Devel. 1984-1985 (\$370)

Comparative blood viscosities in marine mammals. Amer. Phil. Society. 1984-1985 (\$1000)

Genetic toxicology in Pacific harbor seals (*Phoca vitulina*). Biomed. Res. Supp. Grant. 1984-1985. (\$500)

Chromosomal studies of "Wobblers". Subcontract: OSU School of Veterinary Medicine. 1984-1986. (\$3500)

High Performance Liquid Chromatography Equipment Grant. NSF 1983 (\$27,760)
Biological applications for high performance liquid chromatography. PSU/Res. and Devel. 1983-1984. (\$2760)

Comparison of red blood cell phosphoglyceric acid cycle activity correlation with species ecotype. PSU/Res. and Devel. 1982-1983. (\$1050)

Inheritance of chromosome markers in bottlenose dolphins. Biomed. Res. Support Grant (NIH). 1982-1983 (\$2200)

Structure of high oxygen affinity hemoglobins. Biomed. Res Grant. (NIH) 1981-1982 (\$2500)

Physiological and biochemical properties of cetacean hemoglobins: adaptation to hypoxia. Med. Res. Foundation, OR April 1978-April 1979 (\$2000)

Society Memberships

American Society of Mammalogists
 Evolution
 Society for Marine Mammalogy
 International Association of Aquatic Animal Medicine
 American Association of Zoological Parks and Aquaria

Awards

1999 John Eliot Allen Outstanding Teaching Award
 2006 John Eliot Allen Outstanding Teaching Award

Department and School Service

2009-2010 Promotion & Tenure Committee Chair
 2007 Sc 1, Sc 2 Building Inspection Team
 1982-Present Regional Coordinator of the Northwest Marine Mammal Stranding Network, NMFS
 1991-2006 Chair, Graduate Affairs Committee
 2003-2005 Faculty Senate
 2002-2005 Promotion and Tenure Committee
 1990-2003 University Biosafety Committee, PSU
 1998-2001 Promotion and Tenure Committee
 1992-1994 Coordinator, Biology Seminar Committee
 1990-1993 Faculty Senate, PSU
 1989-1990 Chair, Promotion and Tenure Committee
 1988 PSU Task Force on the Future of Graduate Studies
 1987 Co-director, N.I.S.E. Biology Teacher Summer Workshop

- 1985-1987 Coordinator, ESR Seminar Committee
 1982-1987 Chair, Biology Seminar Committee

Directorships:

- 1985-Present Co-Director of Vertebrate Biology Museum and Biology Museum Outreach Program (with L. Ruedas)
 1985-2005 Director of OSU/PSU Spotted Horse Research Group (with OSU School of Vet. Med.)

Community Service:

- 2000-Present Oregon Zoo Institutional Animal Care and Use Committee
 1995-Present Reviewer: Endowed Marine Mammal Program, OSU
 1985-Present Preparation of articulated marine mammals for local, state and national educational loan
 1982-Present Coordinator of the Northwest Marine Mammal Stranding Network Outreach Program (Astoria to Tillamook, OR & Long Beach, WA)
 1987-2005 Breeding Program analysis for paint horse breeders throughout the U.S. and Europe
 1987 Site Visit Team, Catlin Gable School Academic Review
 1987-1992 Board, Saturday Academy
 1987-1988 Board, Holy Redeemer School

Foundation & Board Memberships:

- 1991-Present Scientific Advisor, Marine Mammal Taxon Advisory Group, AAZPA
 1985-1999 Scientific Advisory Board, MarineWorld-Africa U.S.A., San Francisco, CA.
 1990-1999 Board Member, Elephant Research Fd., Bloomfield Hills, MI
 1985-1995 Scientific Advisory Board, California Marine Mammal Center, Marin County, CA.
 1989-1994 Scientific Advisor, Asian Elephant SSP, AAZPA.

Invited Lectureships & Workshop Participation:

- 2007 Hatfield Marine Science Center: Wave Energy Ecological Effects Workshop, Newport, OR. Oct 11-12.
 2005 Co-chair: EAAM Steering Group Bottlenose Dolphin Reproduction Workshop. International with 55 participants, held at Parc Asterix, Paris, France. Oct 3-5.
 2002 Sigma Xi. Application of New Genetic Technologies to the Study of Marine Mammals. Nov. 16.
 2001 Oregon Coast Aquarium. Marine Mammals. Nov 21.

- 2000 AAAS Symposium, "What is a Species?" Invited talk. Speciation in marine mammals: a view of evolutionary flexibility. AAAS Pacific Division, Regional Meeting. Ashland, OR. June 13.
- 2000 Gulf of Mexico Bottlenose Dolphin Workshop. NMFS. Sarasota, FL. Mar 14-15.
- 1999 Co-chair: Bottlenose Dolphin Reproduction Workshop. International with 95 participants held in San Diego, CA. June 3-6.
- 1998 Invited Chair. Breeding in wild populations. Reproduction Workshop. World Marine Mammal Science Conference; Monaco, Jan 18-20.
- 1996 Invited Lecturer: LifeLong Learning, Alaska & Russia.
- 1987-95 Invited Lecturer: World Explorer Cruises, Alaska.
- 1994 Invited Keynote Speaker: San Diego Science Educator's Association Conf. San Diego, CA.
- 1994 Invited Keynote Speaker: The Past, Present and Future of Marine Mammal Management. International Marine Animal Trainers Association. Tacoma, WA.
- 1992 Invited Speaker (with B.A. Andrews). Captive propagation of marine mammal species in aquariums, zoos and marine zoological parks in North America. AAZPA Conf. Toronto, Canada.
- 1992-94 Invited Lecturer: MarQuest Cruises, Antarctica.
- 1992 Invited Participant: Workshop-Exploring the Reintroduction of Captive Marine Mammals. Naval Command, Control & Ocean Surveillance Ctr. Albuquerque, NM.
- 1988 Invited Speaker: Molecular Studies of Cetaceans. ACS 3rd Biennial Conf. and Symposium, Monterey, CA.
- 1987 Invited section leader: Workshop on Stranded Marine Mammals. 7th Biennial Conf. on Biology of Marine Mammals. Miami, FL.
- 1984 Invited Speaker: Marine Mammal Hybrids. 1st Annual West Coast Mar. Mammal Conf. San Francisco, CA.

Graduate Students

Major Advisor:

- Gary Haight (MS, 1984)
 Melissa Estes (MS, 1985)
 Tracy Stevens (MS, 1989)
 Dave Hayteas (MS, 1990)
 Laura Bischof (MS, 1990)
 Suzanne Krippaehne (MS, 1993)

Dave Hayteas (PhD, 1996)
 Darcy Babcock (MS, 1996: with OHSU)
 Joel Lenox (MS-1997)
 Kristine Hayes (MS-1997)
 Rick Merizon (MS -1998: with Courtney)
 Theresa Silver (MS-S99)
 Jan Zinck (PhD-F99)
 Karen Lewis (MS-Su2000)
 Brad Farris (MST-F99)
 Jason Wiles (MST-F99)
 Leslee Parr (PhD-2000)
 Katherine Callison (MS-2002; with Forbes)
 Stephanie Mirkes (MS-2002, with Bethea, ORPC)
 Tanya Sommer (MST-2003)
 Rebekah Hull (MS-LOA, with Zinck)
 Cynthia Restrepo (MST-2005)
 Kim Valentine (MS-LOA)
 Shonene Scott (MS-2005)
 Janina Lamb (MS-2004)
 Amy Dolan (PhD-2006 F)
 Kristen Walker (MS-2006 S)
 Stephanie Sackett (MST-2005)
 Aimee Hart (MST-2005)
 Paula Aguiar (PhD - 2005, with Boone)
 Sarah Courbis (PhD F05-current)
 Sarah Libert (MS F06-2009)
 Aubrey Buckert (MS F06-current)
 Meghan Martin ((MS F06-F08, with Shepherdson)
 Tara Pelletier (MS F06- 2009)
 Sabre Mahaffy (MS F07- current)
 Nate Wintle ((MS F07- current)
 Diana Dishman (MS F08-current)
 Sarah Crawford (MST F08-current)
 Leigha Tingey (MS F09-current)
 Meghan Martin (PhD F09-current)

Committee Member:

Tim Donlon (MS)
 Jim Warner (PhD)
 Carol Wilson (MS)
 Terry Coons (MS)

Diane Wagener (MS)
 Nancy Kirkinin (MS)
 Susan Gauthier (MS)
 Jeb Bevers (MS)

Rosemary Lown (MS)	Jill Turner (MS)
Lance Morgan (MS) San Francisco State College	
Diane Sweeney (ME) University of California, San Diego	
Barry Anderson (MS)	Jerry Fugate (MS)
Rosemary Lown (MS)	Erik Terdal (PhD)
Dawn Andrews (MS)	Ed DeGrauw (PhD)
Dane Crossley (MS)	Sally Sauter (MS)
Nancy Scott (MS)	Eric Katz (MS)
Michelle Thompson (MS)	Barbara Slade (MS)
Terra Lang (MS)	David Sinn (MS)
Loren Walker (MS)	Robert Godfree (PhD)
Helen Wallace (PhD)	Zasha Bassett (MS)
Edward Owen (PhD, UCSC)	
Heather Zornetzer (Senior Thesis, Reed College)	
Jill Mikucki (MS)	Will Simpson (MS)
John Rossi (MS)	Christy Brown (MS)
Mischa Connine (MS)	Brad Ryan (PhD)
Laura Roberts (MS)	Barbara Edmunds (PhD)
Luke Redmond (MS)	Jodie Delavan (MS)
Phil Jones (PhD current)	Lorelei Patrick (MS)
Zac Harlow (MS)	Sarah Smith (PhD)
Andrew Imrie (MS)	George Batton (MS current)
Camie Meller (PhD current)	Jennifer Richardson (MS F08)
Laurie Dizney (PhD F08)	Heather Drought (MS, Anthr S06)
Petra Redinger (PhD LOA)	Alys Jones (MS-current)
Robert Richardson (MS-current)	