

Amy G. Vandergast, Research Geneticist.

USGS Western Ecological Research Center, San Diego Field Station.

Education:

Ph.D. (2002) University of California, Berkeley; **M.S.** (1998) University of Hawaii, Manoa; **B.S.** (1995) University of California, San Diego.

Professional Positions:

2004 - present Research Geneticist, USGS, San Diego, CA

2004 - present Adjunct Assistant Research Professor, Dept. of Biology, SDSU, San Diego, CA

2002 - 2004 NSF Postdoctoral Fellow in Bioinformatics, USGS and SDSU, San Diego, CA

Research activities:

1. Landscape genetics and genomics of rare and endangered species
2. GIS mapping of population genetic diversity and evolutionary hotspots for conservation planning
3. Marker development using 454 sequencing

Publications:

Vandergast, AG, RD Inman, KR Barr, K Nussear, T Esque, SA Hathaway, DA Wood, PA Medica, JW Breinholt, C L Stephen, AD Gottscho, SB Marks, WB Jennings, and RN Fisher. 2013. Evolutionary hotspots in the Mojave Desert. *Diversity* 5: 293-319.

Richmond JQ, Barr KR, Backlin AR, Vandergast AG, and RN Fisher. 2013. Decay of species' range boundary: inferring the determinants of genetic declines in peripheral populations of the threatened California red-legged frog (*Rana draytonii*) in southern California. *Evolutionary Applications*. DOI: 10.1111/eva.12067.

Inman, RD, TC Esque, KE Nussear, P Lieitner, MD Matocq, PJ Weisberg, TE Dilts, and AG Vandergast. 2013. Is there room for all of us? Renewable energy and *Xerospermophilus mohavensis*. *Endangered Species Research* 20: 1-13.

Wood DA, AG Vandergast, KR Barr, RD Inman, KE Nussear, TC Esque and RN Fisher. 2012. Temporal and spatial congruence in lineage diversification in the Mojave and Sonoran Deserts and identification of regional evolutionary hotspots. *Diversity and Distributions*. DOI: 10.1111/ddi.12022

Roderick GK, Croucher PJP, Vandergast AG, Gillespie RG. 2012. Species differentiation on a dynamic landscape: Shifts in metapopulation and genetic structure using the chronology of the Hawaiian archipelago. *Evolutionary Biology* 39: 192-206.

Bohonak, AJ, and AG Vandergast. 2011. The value of DNA sequence data for studying landscape genetics. *Molecular Ecology* 20:2477-2479.

Vandergast, AG, WM Perry, RV Lugo, and SA Hathaway. 2011. Genetic Landscapes GIS Toolbox: Tools to map patterns of genetic divergence and diversity. *Molecular Ecology Resources* 11:158-161.

Wood, D, AG Vandergast, JA Lemos Espinal, RN Fisher, and AT Holycross. 2011. Refugial isolation and divergence in the Narrowheaded Gartersnake species complex (*Thamnophis*

- rufipunctatus*) as revealed by multilocus DNA sequence data. *Molecular Ecology* 20:3856-3878.
- Steele, AN, MA Simovich, D Pepino, K McNamara Schroeder, AG Vandergast, and AJ Bohonak. 2009. Optimization of DNA extraction methods for encysted embryos of the endangered fairy shrimp, *Branchinecta sandiegonensis*. *Conservation Genetics* 10: 1777-1781.
- Vandergast, AG, DA Wood, MA Simovich, and AJ Bohonak. 2009. Identification of co-occurring *Branchinecta* fairy shrimp from encysted embryos using multiplex polymerase chain reaction. *Molecular Ecology Resources* 9: 767-770.
- Vandergast, AG, EA Lewallen, J Deas, AJ Bohonak, DB Weissman, and RN Fisher. 2009. Loss of genetic connectivity and diversity in urban microreserves in a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: *Stenopelmatus* "santa monica") *Journal of Insect Conservation* 13:329-345.
- Pendleton, EC, AG Vandergast, and TL King. 2008. Conservation genetics and species recovery. *Endangered Species Bulletin* 33:57-59.
- Vandergast, AG. 2008. Kipuka in RG Gillespie, and DA Clague, editors. *Encyclopedia of Islands*. University of California Press, Berkeley, CA.
- Vandergast, AG, SA Hathaway, RN Fisher, J Boys, and AJ Bohonak. 2008. Are hotspots of evolutionary potential adequately protected in southern California? *Biological Conservation* 141:1648-1664.
- Weissman, D, AG Vandergast, and N Ueshima. 2008. Jerusalem crickets in J Capinera, editor. *Encyclopedia of Entomology*. Kluwer Academic Publishers, Dordrecht, The Netherlands
- Wood, DA, JM Meik, AT Holycross, RN Fisher, and AG Vandergast. 2008. Molecular and phenotypic diversity in the Western Shovel-nosed snake, with emphasis on the status of the Tucson Shovel-nosed snake (*Chionactis occipitalis klauberi*). *Conservation Genetics* 9:1489-1507.
- Vandergast, AG, AJ Bohonak, DB Weissman, and RN Fisher. 2007. Understanding the genetic effects of recent habitat fragmentation in the context of evolutionary history: phylogeography and landscape genetics of a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: *Stenopelmatus*). *Molecular Ecology* 16:997-992.
- Vandergast, AG and RG Gillespie. 2004. Effects of natural forest fragmentation on a Hawaiian spider community. *Environmental Entomology* 33: 1296 – 1305.
- Vandergast, AG, RG Gillespie, and GK Roderick. 2004. Influence of volcanic activity on the population genetic structure of Hawaiian *Tetragnatha* spiders: fragmentation, rapid population growth and the potential for accelerated evolution. *Molecular Ecology* 13:1729-1743.
- Vandergast, AG and GK Roderick. 2003. Mermithid parasitism of Hawaiian *Tetragnatha* spiders in a fragmented landscape. *Journal of Invertebrate Pathology* 84(2): 128-136.
- Vandergast, AG 2002. Ecology and genetics of habitat fragmentation in spiders of Hawaiian kipukas, Dissertation. ESPM, Division of Insect Biology. University of California, Berkeley.

Reports

- Barr, KR, AG Vandergast, and BE Kus. 2013. Genetic structure in the cactus wren in southern California. Data summary report prepared for California Department of Fish and Wildlife. U.S. Geological Survey, Western Ecological Research Center, Sacramento, CA.

- Wood, DA, and AG Vandergast. 2013. Population genetics of the giant gartersnake (*Thamnophis gigas*) of the Great Central Valley using novel microsatellite loci. Data summary report prepared for Brookfield Natomas LLC. U.S. Geological Survey, Western Ecological Research Center, Sacramento, CA.
- Barr KR, AG Vandergast and BE Kus. 2012. Genetic Connectivity in the Coastal Cactus Wren. Data Summary report prepared for San Diego Association of Governments. U.S. Geological Survey, Western Ecological Research Center. Sacramento, CA.
- Richmond, JQ, DA Wood, C Hoang, and AG Vandergast. 2011. Quantitative assessment of population genetic structure and historical phylogeography of the Alameda Whipsnake *Masticophis lateralis euryxanthus*. Data Summary prepared for USFWS Sacramento FWO U.S. Geological Survey, Western Ecological Research Center, Sacramento, CA.
- Vandergast, AG, RD. Inman, KR Barr, DA Wood, KE Nussear, TC Esque, SA Hathaway and RN Fisher. 2011. Mapping Habitat and Genetic Diversity in the Desert Southwest. Data Summary prepared for Bureau of Land Management. U. S. Geological Survey, Western Ecological Research Center, Sacramento, CA.
- Lahti, ME, AG Vandergast, Y Matta, AJ Bohonak, K Davis, and M Simovich. 2010. Data summary for the 2010 field and genetic surveys of the Riverside fairy shrimp (*Streptocephalus woottoni*) in southern California. U. S. Geological Survey Western Ecological Research Center, Sacramento CA. Prepared for U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office.
- Wood, DA, AG Vandergast and RN Fisher. 2006. Assessment of Genetic Diversity in the Western Shovel-nosed Snake (*Chionactis occipitalis*), with Special Emphasis on the Subspecific Status of the Tucson Shovel-nosed Snake (*C. o. klauberi*). Project Report. Prepared for Arizona Game and Fish Department. U.S. Geological Survey, Western Ecological Research Center

Selected Presentations:

- Wood DA, AG Vandergast, KR Barr, RD Inman, TC Esque, KE Nussear, and RN Fisher 2013. The potential impact of renewable energy development on regional evolutionary hotspots in the Mojave and Sonoran Deserts. Invited Presentation. Special Symposium: Impact of energy development on amphibians and reptiles in North America. Joint Meeting of Ichthyologists and Herpetologists July 10 – 15 2013. Albuquerque, NM
- Esque, T.C., K.K. Drake, K.E. Nussear, L.A. DeFalco, S. Scoles-Sciulla, P.A. Medica, R.D. Inman, A. Vandergast. 2012. Response of the Mojave Desert Tortoise to Post-fire Changes in Habitat. Special Session on Responding to an Ecological Collision: Native Species Management, Biological Invasions and Fire. World Congress on Fire Ecology, Association of Fire Ecologists. Portland, OR. 5 Dec.
- Wood, DA and AG Vandergast. 2012. Assessing population structure and subspecific status of the Western Shovel-nosed snake across the Colorado and Sonoran desert scrub valleys of California and Arizona. Oral Presentation. The Wildlife Society Annual Conference. Portland, OR.
- Barr, KR, BE Kus, K Preston and AG Vandergast. 2012. Urban landscape genetics of a protected song bird. Oral Presentation. 5th North American Ornithological Conference. Vancouver, Canada.

- Inman, RD, AG Vandergast, KE Nussear, TC Esque, RN Fisher, SA Hathaway, KR Barr, M Lahti, DA Wood. 2012. Renewable energy in the desert southwest: assessing the impacts on habitat and genetic hotspots. Western Section of the Wildlife Society. Sacramento, CA
- Barr, KR, BE Kus, AG Vandergast and K Preston. 2012 Conservation Genetics of the coastal cactus wren: preliminary results. Ecological Research and Monitoring in Orange County Workshop. Irvine, CA.
- Vandergast, AG, K Nussear, TC Esque, RN Fisher, KR Barr, RD Inman, SA Hathaway and DA Wood. 2011. Hotspots of genetic diversity and differentiation in the desert southwest and potential impacts of renewable energy development. The Wildlife Society. Waikoloa, HI.
- Wood, DA, AG Vandergast, JL Espinal, RN Fisher, AT Holycross. 2011. Estimating the distribution of genetic variation within the narrow-headed gartersnake species complex and its utility in informing conservation management practices. The Wildlife Society. Waikoloa, HI.
- Vandergast AG. 2011. Evolutionary Processes in Volcanic Systems. Intl. Seminar on the Geological and Ecological Values of Protected Volcanic Fields. China Assoc. for Volcanology, Chinese Academy of Sciences and Northeast Forestry Univ. Harbin, China.
- Nussear, KE, TC Esque, AG Vandergast, RN Fisher. 2010. Potential impacts of renewable energy development to wildlife movement and population persistence in the desert southwest. The Wildlife Society. Snowbird, UT.
- Vandergast, AG. 2007. Landscape characteristics shape population genetic structure in Jerusalem crickets (Orthoptera: Stenopelmatidae: *Stenopelmatus* sp.). Entomological Society of America. San Diego, CA
- Vandergast, AG, D Weissman, A.J Bohonak and RN Fisher. 2007. Phylogeography and landscape genetics of a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: *Stenopelmatus*). Pacific Branch Entomological Society of America. Portland, OR.
- Vandergast, AG, RN Fisher, J Boys and AJ Bohonak. 2006. Conserving evolutionary hotspots in Southern California. The Society for Conservation Biology. San Jose, CA.

Symposia and Workshops:

- Organizer and Speaker. Genetics for Monitoring and Management Workshop. San Diego Management and Monitoring Program and USGS, Western Ecological Research Center. January 2014. San Diego, CA.
- Invited Speaker. 2013 Whitney and Anna Harris Conservation Forum: Energy Production Meets Biodiversity. November 2013. St. Louis Zoo, St. Louis, MO.
- Invited Speaker. International Seminar on the Geological and Ecological Values of Protected Volcanic Fields. China Association for Volcanology, Chinese Academy of Sciences and Northeast Forestry University. May 2011. Harbin, China.
- Invited Speaker. USGS Genetics and Genomics Showcase. March 2010. Washington D.C.
- Invited Speaker. Special Symposium: The Role of Landscape Heterogeneity in Insect Metapopulations and Metacommunities. December 2007. Entomological Society of America, National Meeting. San Diego, CA.
- Invited Speaker. Special Symposium: Phylogeography and Intraspecific Diversity of Western North American Arthropods. March 2007. 91st Annual Pacific Branch Meeting of the Entomological Society of America. Portland, OR.

Invited Speaker. Special Symposium: Conservation of Evolutionary Hotspots. July 2006. Society for Conservation Biology. San Jose, CA.

Invited Speaker. Terrestrial Invertebrate Workshop. March 2005. California Department of Parks and Recreation. Davis, CA.