J. Andrew Whitehead, Ph.D.

Marine Genomics Center, Rosenstiel School of Marine and Atmospheric Science, 1400 Rickenbacker Causeway, University of Miami, Miami, FL, 33149. Office: (305) 361-4665,
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Current Position:

Post-Doctoral Research Associate

Marine Genomics Center, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL. (May, 2003 to present).
I currently study the genetics underlying acclimation and adaptation in natural populations within a phylogenetic context. I apply a functional genomics approach using microarray technology, coupled with phylogenetic analyses, to evaluate the role of variation in gene expression in evolutionary adaptations of killifish (*Fundulus* sp.). Advisor: Dr. Douglas Crawford.

Education:

Doctor of Philosophy

Graduate Group in Pharmacology and Toxicology. University of California, Davis, CA. 2002.
"Pesticide contamination of Central Valley (California) watersheds: Biomarker and population genetic effects in native resident fish". Advisor: Dr. Susan Anderson.

Honors, Bachelor of Science

Specialized Honors in Environmental Toxicology. University of Guelph, Guelph, Ontario, Canada. 1996. Academic advisor: Dr. Keith Solomon.
Undergraduate thesis: "Effects of selective logging on small mammal diversity and abundance". Advisor: Dr. Ronald Brooks.

Honors and Awards:

- Best Platform Presentation Award. 11th Annual Meeting of the Northern California Chapter of the Society of Environmental Toxicology and Chemistry. Santa Cruz, CA. 2001.
- Bill Mason Memorial Scholarship Award. 1993/1994.

Grants and Fellowships:

- Natural Science and Engineering Research Council of Canada (NSERC) Post-Graduate Student Fellowship. July 2000 to June 2002.
- University of California Graduate Studies Student Travel Award. 2002.
- University of California Research Fellowship. 2002.
- Bodega Marine Science Association Student Travel Award. 2001.
- Society of Environmental Toxicology and Chemistry Student Travel Award. 2000.

- University of California Toxic Substances Research and Training Program (UC TSR&TP) Ecotoxicology Lead Campus Program Fellowship. July 1998 to June 2000.

Research Experience:

Post-Doctoral Research Associate, Marine Genomics Center

Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL. (May, 2003 to present).

Application of functional genomics using microarray technology, coupled with phylogenetic analyses, to evaluate the role of variation in gene expression in evolutionary adaptations of killifish (*Fundulus* sp.). Contributed toward development of fully sequenced and annotated ~6000 gene *Fundulus* microarray. Extensive development of microarray experimental design and rigorous statistical analysis, including 32-fold technical replication encompassing spot, array, and dye variation in order to characterize experimental error, and biological replication necessary for statistical inference among experimental groups. Have written and tested MatLab scripts that normalize and perform nested ANOVA on these large array datasets. Advisor: Dr. Douglas Crawford

Ph.D. Candidate, Genetic Ecotoxicology Laboratory

University of California, Davis, Bodega Marine Laboratory, 1999 to 2002.

Extensive population sampling of Sacramento sucker (*Catostomus occidentalis*) from multiple rivers throughout the Central Valley of California to evaluate possible impacts of long-term pesticide exposure on gene pools of exposed populations. Designed, built, and organized a molecular genetics laboratory with capabilities including polymerase chain reaction (PCR), acrylamide gel electrophoresis, restriction enzyme digestion, amplified fragment length polymorphism technique (AFLP), fluorescence laser-scanning for DNA visualization/quantification, and population genetic statistical analysis (Arlequin, TFPGA, MEGA, NTSYSpc, GENEPOP, GENETIX) for both dominant (AFLP) and codominant (microsatellite) molecular markers. Designed and conducted native fish biomarker experiments including field caging exposures during agricultural pesticide runoff events, laboratory exposures to field-collected water samples from pesticide runoff events, and pesticide spiking exposures. Expertise in DNA strand break analysis (comet assay), acetylcholinesterase enzyme activity analysis (modified Ellman assay), and mutagenicity analysis (Ames assay). Extensive experience in techniques for sampling of fish populations including backpack electrofishing, seining, and boat-based electrofishing. Supervisor: Dr. Susan Anderson.

Graduate Research Assistant, Genomic Variation Laboratory

Department of Animal Science, University of California, Davis, 1998.

Learned methods of DNA isolation, amplified fragment length polymorphism, gel electrophoresis, computer analysis of population genetic patterns, and was also introduced to other molecular markers including microsatellites and introns. Supervisor: Dr. Bernie May.

Graduate Research Assistant, Aquatic Toxicology Laboratory

Department of Veterinary Medicine, Anatomy, Physiology, and Cell Biology, University of California, Davis, 1997.

Assisted a postdoctoral researcher in experiments to isolate isoforms of cytochrome P450 involved in toxicological mechanisms of action in fish, and learned the tools of polymerase chain reaction, and gel electrophoresis. Supervisor: Dr. David Hinton.

Field Research Technician, Parks Canada

Banff National Park, Banff, AB, Canada, 1996-1997.
Snow-tracked large carnivores and ungulates to study the impacts of highway and railway developments on wildlife survivorship and habitat fragmentation. Compiled 10 years of wildlife mortality information, in combination with GIS analysis, to identify transportation-related factors correlated with large carnivore and ungulate mortality. Supervisor: Dr. Anthony Clevenger.

Wildlife Biologist, Wildlife Research Station

Department of Zoology, University of Guelph, Guelph, ON, Canada, summer 1995.
Live-trapped small mammals throughout the Provincial and National Parks of Ontario in a mark-recapture study evaluating long-term small mammal population trends. Also designed and undertook an independent research project to study the potential pressures of selective logging on small mammal diversity and abundance. Supervisor: Dr. Ronald Brooks.

Teaching Experience:

Workshop Instructor, University Extension

University of California, Davis, March 2002.
Conceived, designed, and taught a one-day workshop on the application of biomarkers for water quality monitoring. Attendees included scientists from Lawrence Livermore National Laboratory, CA Department of Fish and Game, CA Environmental Protection Agency, CA Regional Water Quality Control Board, CA Water Resources Control Board, US Department of Agriculture, and University of California Davis. Supervisor: Linda Vance.

Guest Lecturer, Bodega Marine Laboratory

University of California, Davis, 2001.
Lectured for the graduate course "Approaches to Problems in Coastal Toxicology" (PTX 230). Supervisor: Dr. Gary Cherr.

Teaching Assistant, Department of Environmental Toxicology

University of California, Davis, 1998.
Tutored students individually, taught review sessions, and graded term papers and exams for an upper-division course in Environmental Toxicology. Supervisor: Dr. Michael Denison.

Professional Affiliations:

- Society of Environmental Toxicology and Chemistry
- Northern California Chapter, Society of Environmental Toxicology and Chemistry
- Society for Conservation Biology

Manuscripts:

Peer-Reviewed Publications:

Whitehead, A., S.L. Anderson, K.M. Kuivila, J.L. Roach, and B. May (2003). Genetic variation among interconnected populations of *Catostomus occidentalis*: implications for distinguishing impacts of contaminants from biogeographical structuring. *Molecular Ecology* 12: 2817-2833.

Hansen, L.J., A. Whitehead, and S.L. Anderson (2002). Solar UV radiation enhances the toxicity of arsenic in *Ceriodaphnia dubia*. *Ecotoxicology* 11: 279-287.

Other Publications:

Orlando, J.L., K.M. Kuivila, and A. Whitehead (2003). Dissolved pesticide concentrations detected in storm-water runoff at selected sites in the San Joaquin River Basin, California, 2000-2001. U.S. Geological Survey Open-File Report 03-101. Sacramento, CA.

Whitehead, A. (2002). Tools for the took kit: Integrating biomarkers into water quality assessments. NorCal SETAC News 13(2): 11-12.

Manuscripts in Review:

Whitehead, A., B.W. Wilson, K. Kuivila, and S.L. Anderson. Genotoxicity in native fish associated with agricultural runoff events (submitted to *Environmental Toxicology and Chemistry*).

Manuscripts in Preparation:

Whitehead, A, S.L. Anderson, A.B. Ramirez, and B.W. Wilson. Fish cholinesterases in aquatic biomonitoring: Assay optimization and species-specific characterization.

Academic Oral Presentations:

Whitehead, A., S.L. Anderson, B.P. May, K.Kuivila, and B.W. Wilson (2002). Change in gene pools of native fish populations exposed to long-term pesticide contamination. 23rd Annual Meeting of the Society of Environmental Toxicology and Chemistry. Salt Lake City, UT. November, 2002.

Whitehead, A., S.L. Anderson, B.P. May, K. Kuivila, and B.W. Wilson (2001). Evaluating the effects of dormant-season pesticide contamination on native fish: A combined laboratory and field biomarker approach. 11th Annual Meeting of the Society of Environmental Toxicology and Chemistry Northern California Regional Chapter. Santa Cruz, CA. June, 2001.

Whitehead, A., S.L., Anderson, B.P. May, K. Kuivila, and B.W. Wilson (2001). Assessing the effects of pesticide contamination on native fish populations: A combined field and laboratory approach. UC Davis Graduate Group in Pharmacology and Toxicology Annual Symposium. Davis, CA. June, 2001.

Whitehead, A., S.L. Anderson, B.W. Wilson, K. Kuivila, and J.D. Henderson (2000). Biomarkers in action: Examining the effects of dormant-season pesticide runoff on resident fish species. San Francisco Estuary Institute Regional Monitoring Program Annual Meeting. Oakland, CA. March, 2001.

Bagley, M.J., S.L. Anderson, A. Whitehead, G.T. Tranah, and B.P. May (1999). Comparison of RAPDs and AFLPs for monitoring genetic diversity of contaminant-exposed fish populations. 20th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Philadelphia, PA. November, 1999.

Academic Poster Presentations:

Whitehead, J.A., S.L. Anderson, K. Kuivila, and B.W. Wilson (2001). Biomarker responses in fish exposed to pesticide runoff in the field and laboratory. 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry. Baltimore, MD. November, 2001.

Whitehead, A., S.L. Anderson, B.W. Wilson, K. Kuivila, and J.D. Henderson (2001). Biomarkers in action: Evaluating the effects of dormant-season pesticide contamination on native fish species. University of California Toxic Substances Research and Training Program Annual Symposium. Lake Tahoe, CA. April, 2001.

Whitehead, J.A., S.L. Anderson, B.P. May, B.W. Wilson, K. Kuivila, J.D. Henderson, and A.B. Ramirez (2000). Pesticide impacts on gene pools of California native fish: Assessing exposure and effects at the individual and population levels. 21st Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nashville, TN. November, 2000. Also presented at: 3rd Annual San Francisco Bay Area Conservation Biology Symposium. Davis, CA. January, 2001.

Whitehead, J.A., S.L. Anderson, B.P. May, K. Kuivila, B.W. Wilson, D.E. Hinton, J.L. Orlando, and J.D. Henderson (2000). Pesticide impacts on gene pools of California native fish: A combined laboratory and field approach. CALFED Science Conference. Sacramento, CA. October, 2000.

Wilson, B.W., A. Whitehead, A. Ramirez, J. Henderson, S. Henson, and S. Anderson (2000). Optimization of cholinesterase assays to study exposure of fish tissues to organophosphate pesticides and other agrochemicals. CALFED Science Conference. Sacramento, CA. October, 2000.

Whitehead, A., S.L. Anderson, B.P. May, K. Kuivila, and B.W. Wilson (2000). Ecotoxicological impacts of pesticide exposure on native fish populations: Assessing exposure and effects at the individual and population levels. National Institute of Environmental Health Sciences. Annual UC Davis Symposium. Napa, CA. August, 2000.

Whitehead, A., and Anderson, S.L. (1999). Pesticide-induced change in gene pools of at-risk populations: Examining the long-term population-level consequences of contaminant exposure. International Congress on Ecosystem Health. Sacramento, CA. August, 1999.

Whitehead, A., and Anderson, S.L. (1999). Pesticide impacts on gene pools of natural populations: A combined laboratory and field approach. National Institute of Environmental Health Sciences. Annual UC Davis Symposium. Napa, CA. August, 1999.

Whitehead, A., and Anderson, S.L. (1999). Population-level markers of biological effect from chronic pesticide exposure: Genetic patterns in California native fish. University of California Toxic Substances Research and Training Program Annual Symposium. Santa Barbara, CA. April, 1999.