J. Andrew Whitehead

Current Position:

Assistant Professor

Department of Biological Sciences, Louisiana State University. 202 Life Sciences Building, Baton Rouge, LA, 70803. Office: (225) 578-8210, Fax: (225) 578-2597, Email: andreww@lsu.edu (August 2005 to present).

Education:

Post-Doctoral Research Associate

Marine Genomics Center, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL. (May, 2003 to June 2005).
Fundulus evolutionary functional genomics research. Advisor: Dr. Douglas Crawford.

Doctor of Philosophy

Genetic and Molecular Ecotoxicology Laboratory, Graduate Group in Pharmacology and Toxicology, University of California, Davis, CA. March 22, 2003.
"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". Thesis Advisor: Dr. Ronald Brooks.

Research Funding:

- PENDING: **National Science Foundation**. Title: "Collaborative Research: The genomic basis of dramatic, rapid, convergent evolution in the killifish *Fundulus heteroclitus*. PI: Andrew Whitehead.

- **Gulf of Mexico Research Initiative**. Title: "Deepwater Horizon oil exposure effects on marsh fishes in at-risk habitats: Integrated laboratory and field studies". PI: Andrew Whitehead. Project period 2010-2011. Budget awarded: $149,967.

- **National Science Foundation** (1048206); DEB – Evolutionary Genetics Program. Title: "RAPID: Collaborative Research: Genetic Impact of the Deepwater Horizon Oil Release". PI: Andrew Whitehead. Project period 2010-2011. Budget awarded: $29,932.

- **National Science Foundation** (0723771); Emerging Frontiers – Environmental Genomics Program. Title: "Comparative functional genomics of physiological plasticity". PI: Andrew Whitehead. Project period 2007-2011. Budget awarded: $619,351.

- **National Science Foundation** (0652006); BES – Environmental Engineering Program. Title: "Ecological consequences of widespread post-hurricane Katrina oil spills: Integrating chemistry with biology in the field and laboratory". PI: Andrew Whitehead. Project period 2007-2011. Budget awarded: $333,446.

- **Louisiana State University Faculty Research Grant**. Title: "Conservation genetics and phylogeography of the threatened salmonid *Hucho taimen*". PI: Andrew Whitehead. Project period 2006-2007. Budget awarded: $9,922.

- **Louisiana Board of Regents** Research Competitiveness Subprogram. Title: "Stress ecology in south Louisiana following hurricane Katrina". PI: Andrew Whitehead. Project period 2006-2009. Budget awarded: $174,888.
  (NOTE: funds for the 2nd and 3rd year of this grant were returned to the Louisiana Board of Regents, as per contract instructions, after PI Whitehead had secured federal NSF funding).

- **National Science Foundation** (0553523); Small Grant for Exploratory Research, BES – Environmental Engineering and Technology Program. Title: "Ecotoxicological and functional genomic responses of killifish in the aftermath of hurricane Katrina". PI: Andrew Whitehead. Project period 2005-2006. Budget awarded: $29,870.

Manuscripts:

In Review:

Whitehead, A., Pilcher, W., Champlin, D. and Nacci, D. Common mechanism underlies repeated evolution of extreme pollution tolerance.

Whitehead, A. Comparative genomics in ecological physiology: Toward a more nuanced understanding of acclimation and adaptation.

Whitehead, A., J. Roach, S. Zhang, and F. Galvez. Genome regulatory response associated with osmotic acclimation.

Peer-Reviewed Publications:

Whitehead, A., J. Roach, S. Zhang, and F. Galvez (in press). Genomic mechanisms of evolved physiological plasticity in killifish distributed along an environmental salinity gradient. *Proceedings of the National Academy of Sciences of the United States of America.*

Jackson, SA, M. Bagley, **A. Whitehead**, D.A. Roberts, D. Duvernell, D. Nacci, and R.-L. Wang (in press). Isolation and characterization of novel microsatellite loci for Atlantic coastal killifish (*Fundulus heteroclitus*) from an expressed sequence tag (EST) library and cross-species amplification. *Molecular Ecology Resources*.

Whitehead, A., D. Triant, D. Champlin, and D. Nacci (2010). Comparative transcriptomics implicates mechanisms of evolved pollution tolerance in a killifish population. *Molecular Ecology*, 19: 5186-5203.

The above publication is highlighted by a "News & Views" article in Molecular Ecology.

Whitehead, A., F. Galvez, S. Zhang, L.M. Williams, and M.F. Oleksiak (2010). Functional genomics of physiological plasticity and local adaptation in killifish. *Journal of Heredity*. doi: 10.1093/jhered/esq077 [Epub ahead of print].

Whitehead, A. (2010). The evolutionary radiation of diverse osmotolerant physiologies in killifish (*Fundulus* sp.). *Evolution*, 64(7): 2070-2085.

Whitehead, A. (2009). Comparative mitochondrial genomics within and among species of killifish. *BMC Evolutionary Biology*, 9:11.

Triant, D.A, and **A. Whitehead** (2009). Simultaneous extraction of high quality RNA and DNA from small tissue samples. *Journal of Heredity,* 100(2): 246-250.

Cheviron, Z.A., **A. Whitehead**, and R.T. Brumfield (2008). Transcriptomic variation and plasticity in rufous-collared sparrows (*Zonotrichia capensis*) along an altitudinal gradient. *Molecular Ecology,* 17: 4556-4569.

The above article was cited as a Faculty of 1000 Biology "Recommended Read".

Duvernell, D, J. Lindmeier, K. Faust, and **A. Whitehead** (2008). Relative influences of historical and contemporary forces shaping the distribution of genetic variation in the Atlantic killifish *Fundulus heteroclitus*. *Molecular Ecology*, 17: 1344-1360.

Burnett, K, and 25 authors including **A. Whitehead** (2007). *Fundulus* as the premier teleost model in environmental biology: Opportunities for new insights using genomics. *Comparative Biochemistry and Physiology Part D: Genomics and Proteomics***,** 2: 257-286

Whitehead, A, and D.L. Crawford (2006). Neutral and adaptive variation in gene expression. *Proceedings of the National Academy of Sciences of the United States of America* 103: 5425-5430.

The above article was cited as a Faculty of 1000 Biology "Must Read".

Whitehead, A, and D.L. Crawford (2006). Variation within and among species in gene expression: Raw material for evolution. *Molecular Ecology* 15: 1197-1211.

Whitehead, A, and D.L. Crawford (2005). Variation in tissue-specific gene expression among natural populations. *Genome Biology* 6: R13.

Whitehead, A, S.L. Anderson, A.B. Ramirez, and B.W. Wilson (2005). Cholinesterases in aquatic biomonitoring: Assay optimization and species-specific characterization for a California native fish. *Ecotoxicology* 14: 597-606.

Paschall, J., M.F. Oleksiak, J. VanWye, J.L. Roach, **A. Whitehead**, K.J. Kolell, and D.L. Crawford (2004). FunnyBase: A systems level functional annotation of *Fundulus* ESTs for the analysis of gene expression. *BMC Genomics* 5:96.

Whitehead, A., K. Kuivila, J.L. Orlando, S.Kotelevtsev, and S.L. Anderson (2004). Genotoxicity in native fish associated with agricultural runoff events. *Environmental Toxicology and Chemistry*. 23(12): 2868–2877.

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

Book Chapters:

Kullman, S.W., C.J. Mattingly, J.N. Meyer, and **A. Whitehead** (2010). Perspectives on Informatics in Toxicology. In, *A Textbook of Modern Toxicology, 4th edition* (Ernest Hodgson, editor). John Wiley and Sons, Hoboken NJ.

Invited Seminars:

"Comparative genomics in ecophysiology: toward a more nuanced understanding of acclimation and adaptation". The Journal of Experimental Biology 2011 Symposium: Integrating Biomechanics and Ecology. Cambridge, UK, March 2011.

"Comparative transcriptomics reveals mechanisms of acclimation and adaptation in killifish". NCRR Workshop: Realizing the Scientific Potential of Transcriptomics in Aquatic Models. Portland, OR, September 2010,

"Physiological and Genomic Effects of the Deepwater Horizon Drilling Disaster on Resident Marsh Fishes". NSF Workshop: Long-term monitoring of Coastal Ecosystem Responses to the Deepwater Horizon Oil Spill. Florida State University, Tallahassee, FL, September 2010

"Comparative transcriptomics among wild populations of killifish offers insights into mechanisms of adaptive acclimation". Department of Biological Sciences Seminar Series, University of Alabama. Birmingham, AL, August 2010.

"Comparative transcriptomics among wild populations of killifish offers insights into mechanisms of adaptive acclimation". Münster Meeting on Stress and Evolution: Stress as motor of evolution – Evolution as motor of the stress response. Münster, Germany, July 2010.

"Evolutionary divergence of transcriptomic responses to environmental stress among populations of killifish". Southeastern Louisiana University, Department of Biological Sciences. Hammond, LA, April 2010.

"Comparative genomics and comparative physiology of osmotic plasticity in killifish". Stanford University, Hopkins Marine Station. Pacific Grove, CA, October 2009.

"The plastic transcriptome: Variation in compensatory stress responses among populations and species of killifish". Program in Ecology, Evolution and Conservation Biology. University of Illinois at Urbana-Champagne. Urbana, IL, September 2009.

"Evolution of transcriptome variation: studying genotype-by-environment interactions". Keynote Speech. Center for Integrated Animal Genomics Spring Symposium. Iowa State University, Ames, IA, April 2009.

"The Genomics of Acclimation and Adaptation to Stress in Killifish". International Ph.D. course "Principles of Ecological Genomics". Free University of Amsterdam, Netherlands, February 2009.

"The Genomic Basis of Stress Tolerance in Killifish". University of Southern Mississippi, Department of Biological Sciences Seminar Series. Hattiesburg, MS, January 2009.

"Evolutionary and Ecological Genomics in Killifish". Louisiana State University, Department of Biological Sciences Seminar Series. Baton Rouge, LA, October 2007.

"Tracking Environmental Variation". Omics: Assembling Systems Biology. Centro Stefano Franscini on Monte Verità, Ascona, Switzerland, June 2007.

"Evolutionary and Ecological Functional Genomics in Killifish". Nature of Life Seminar Series. Institute of Ecological Sciences. Free University of Amsterdam, Netherlands, April 2007

"Evolutionary and Ecological Functional Genomics in Killifish". University of New Orleans, Department of Biological Sciences Seminar Series. New Orleans, LA, March 2007

"Ecological Genomics in Killifish". US Army Engineer Research and Development Center. Vicksburg, MS, March 2007.

"Evolutionary and Ecological Genomics in Killifish". Duke University,Integrated Toxicology Program Seminar Series. Durham, NC, February 2007.

"Evolutionary patterns of gene expression". Louisiana State University, Museum of Natural Science seminar series. Baton Rouge, LA, April 2006.

"Ecotoxicological and functional genomic responses of killifish in the aftermath of Hurricane Katrina". Louisiana State University, Department of Renewable and Natural Resources seminar series. Baton Rouge, LA, February, 2006.

"Ecotoxicological and functional genomic responses of Killifish in the aftermath of Hurricane Katrina". Hurricane Katrina Environmental Impacts Workshop. Boston, MA. December 2005.

"Genome-wide expression patterns among *Fundulus* populations". University of Miami NIEHS Marine and Freshwater Biomedical Sciences Center. November, 2003.

"Biomarkers in action: Examining the effects of dormant-season pesticide runoff on resident fish species". San Francisco Estuary Institute. Oakland, CA. March, 2001.

Academic Oral Presentations:

Whitehead, A., W. Pilcher, D. Champlin, and D. Nacci (2010). Functional genomics of convergent adaptive evolution of extreme pollution tolerance in killifish. 31st Annual Meeting of the Society of Environmental Toxicology and Chemistry. Portland, OR. November, 2010

Whitehead, A. (2009). Comparative Functional Genomics of Physiological Plasticity. Gordon Conference in Ecological and Evolutionary Functional Genomics. Tilton School, NH. July 2009.

Whitehead, A., J. Waldron, S. Zhang, and F. Galvez (2009). Environmental genomics of salinity stress in killifish. American Genetic Association Annual Symposium 2009: The Genetics and Genomics of Environmental Change. Brown University, Providence, RI. June 2009.

Whitehead, A. (2008). Functional genomics of acclimation and adaptation in killifish. Eighth International Congress on the Biology of Fish. Portland, Oregon, July, 2008.

Whitehead, A., and D.L. Crawford (2005). Neutral and adaptive variation in gene expression. Society for Molecular Biology and Evolution Meeting. Auckland, New Zealand. June, 2005.

Whitehead, A., and D.L. Crawford (2004). Evolutionary analysis of variation in global gene expression among Killifish populations. Evolution 2004. Ft. Collins, CO. June, 2004.

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.

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, A, N. Walker, C. Pilley, C. Bodinier, B. Dubansky, and F. Galvez (2010). Deepwater Horizon oil exposure effects on marsh fishes in at-risk habitats: Integrated laboratory and field studies. Collaborative Scientific Research in Relation to the Gulf Oil Spill. New Orleans, LA. November 2010.

Triant, D.A., D.E. Nacci, D. Champlin, and A. Whitehead (2009). The genomic basis for evolved pollution tolerance in killifish (*Fundulus heteroclitus*). Gordon Conference in Ecological and Evolutionary Functional Genomics. Tilton School, NH. July 2009.

Cheviron, Z.A., A. Whitehead, and R.T. Brumfield (2009). Adaptation to high-elevation in the rufous-collared sparrow (*Zonotrichia capensis*): Metabolic gene expression along an extreme elevational gradient. Gordon Conference in Ecological and Evolutionary Functional Genomics. Tilton School, NH. July 2009.

Whitehead, A., and D.L. Crawford (2004). Evolutionary analysis of variation in global gene expression among Killifish populations. Society for Molecular Biology and Evolution, Genomes and Evolution Meeting. Penn State University, PA. June, 2004.

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.

Teaching Experience:

Evolution – Primary Instructor (BIOL 3040, upper-division undergraduate course, certified communication-intensive course). Louisiana State University; Fall 2005, Fall 2006, Fall 2007, Spring 2009, Spring 2010, Spring 2011.

Evolutionary & Ecological Genomics – Primary Instructor (BIOL 7800, graduate course). Louisiana State University; Spring 2007, Fall 2007, Spring 2010, Spring 2011.

Professional Activities:

- **Member**: American Genetics Association, Society for the Study of Evolution, Society of Environmental Toxicology and Chemistry
- **Editorial Board Member**; Analytical Biochemistry, Frontiers in Aquatic Physiology, Frontiers in Evolutionary and Genomic Microbiology
- **Manuscript Reviewer**; Analytical Biochemistry, Auk, BMC Evolutionary Biology, Comparative Biochemistry and Physiology, Ecotoxicology, Environmental Science and Technology, Evolutionary Applications, Evolutionary Bioinformatics, Gene, Genomics, Journal of Experimental Biology, Journal of Experimental Zoology, Molecular Biology and Evolution, Molecular Ecology, PLoS Genetics, PLoS One, Trends in Ecology and Evolution.
- **Grant Reviewer**; National Science Foundation (for the Division of Ecological Biology, Division of Integrated Organismal Systems, Division of Environmental Biology, and for the Office of Polar Programs Antarctic Sciences Section), Netherlands Organization for Scientific Research Council for Earth and Life Sciences, Research Foundation – Flanders (the Belgian national scientific research funding foundation)
- **NSF panellist**: Population and Evolutionary Processes Cluster, Evolutionary Genetics panel, 2008.
- **LSU faculty search committee member**: "Evolutionary Genetics" (2007-2008) and "Computational Biology" (2008, 2009, 2010) searches.
- **LSU Ph.D. student dissertation committee member**: 10 students since 2005.
- **Session organizer** (*upcoming*); "Methods and Models for Ecotoxicological Genomics" for the SETAC North America 32nd Annual Meeting to be held November 13-17, 2011, in Boston, Massachusetts, USA.
- **Session moderator**; "Molecular Evolution: Gene Structure and Regulation". *At* Evolution 2004 in Ft. Collins, CO, June 2004.