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EDUCATION

Ph.D., Genetics, University of California, Davis, 2007
Dissertation Title: Population genetics of the Sacramento splittail

B.S., Biology, Indiana University, Bloomington, 1997

RESEARCH EXPERIENCE

POSTDOCTORAL FELLOW, 4/07 – present

UC, Davis

- Discovery of genes associated with rainbow trout whirling disease resistance
- Genetic assessment/monitoring of salmonid species in the San Joaquin River

Collaborative Research Projects

- MHC diversity of Sacramento perch
- Microsatellite marker development for invasive jellyfish
- Captive genetic management of Delta smelt
- Parentage assessment of lake sturgeon

GRADUATE RESEARCHER, 9/02 – 4/07

UC, Davis

Primary Research Projects

- Taxonomic relationships between Clear Lake and Sacramento splittail (CA endemic minnow; CA and Federal Species of Special Concern)
- Distribution patterns of genetically distinct splittail populations
- Identification of genetically distinct splittail populations
- Microsatellite marker development for five cyprinid fish species

BIOLOGIST, 8/99 – 5/02

Dow AgroSciences

- Conducted molecular genetic research for the Department of Plant Transformation and Gene Expression
- Oversaw lab activities of six full time employees
- Accomplishments: constructed over 200 complex vectors for plant transformation and maize codon-biased four antibody genes for biopharmaceutical development

RESEARCH TECHNICIAN, 8/97 – 8/99

Indiana University

- Conducted molecular/cellular biology research for a cancer research center
- Accomplishments: identified and characterized proteins in the p75 Nerve Growth Factor Receptor and Vascular Endothelial Growth Factor Receptor signal transduction pathways

PUBLICATIONS

- Pincheira R, **Baerwald M**, Dunbar JD, Donner DB. 2009. Sall2 is a novel p75NTR-interacting protein that links NGF signaling to cell cycle progression and neurite outgrowth. *EMBO* 28: 261-273.
- Fisch K, Petersen J, **Baerwald MR**, Pedroia J, May B. 2009. Characterization of 24 microsatellite loci in delta smelt, *Hypomesus transpacificus*, and their cross-species amplification in two other smelt species of the Osmeridae family. *Mol Ecol Resources* 9: 405-408.
- Baerwald MR**, Feyrer FV, May B. 2008. Distribution of genetically differentiated splittail populations during the non-spawning season. *Trans Am Fish Soc* 137: 1335-1345.
- Baerwald MR**, Welsh AB, Hedrick RP, May B. 2008. Discovery of genes implicated in whirling disease infection and resistance in rainbow trout using genome-wide expression profiling. *BMC Genomics* 9: 37.
- Feyrer F, Hobbs J, **Baerwald M**, Sommer T, Yin QZ, Clark K, May B, Bennett W. 2007. Otolith microchemistry provides information complimentary to microsatellite DNA for a migratory fish. *Trans Am Fish Soc* 136: 469-476.
- Baerwald M**, Bien V, Feyrer F, May B. 2007. Genetic analysis reveals two distinct splittail (*Pogonichthys macrolepidotus*) populations. *Conserv Genet* 8: 159-167.
- Baerwald MR**, May B. 2004. Characterization of microsatellite loci for five members of the minnow family Cyprinidae found in the Sacramento – San Joaquin Delta and its tributaries. *Mol Ecol Notes* 4: 385-390.
- Gustin JA, Pincheira R, Mayo LD, Ozes ON, Kessler KM, **Baerwald MR**, Korgaonkar CK, Donner DB. 2004. Tumor necrosis factor activates CRE-binding protein through a p38 MAPK/MSK1 signaling pathway in endothelial cells. *Am J Physiol – Cell Physiol* 286: C547-C555.
- Guo DQ, Wu LW, Dunbar JD, Ozes ON, Mayo LD, Kessler KM, Gustin JA, **Baerwald MR**, Jaffe EA, Warren RS, Donner DB. 2000. Tumor necrosis factor employs a protein-tyrosine phosphatase to inhibit activation of KDR and vascular endothelial cell growth factor-induced endothelial cell proliferation. *J Biol Chem* 275: 11216-11221.
- Wu LW, Mayo LD, Dunbar JD, Kessler KM, **Baerwald MR**, Jaffe EA, Wang D, Warren RS, Donner DB. 2000. Utilization of distinct signaling pathways by receptors for vascular endothelial cell growth factor and other mitogens in the induction of endothelial cell proliferation. *J Biol Chem* 275: 5096-5103.

INVITED PRESENTATIONS

- UC DAVIS ECOLOGICAL GENETICS COURSE, 2009, “The use of gene expression techniques in ecological genetics”
- SUNY OSWEGO CONSERVATION BIOLOGY COURSE, 2008, “Genetic tools for conservation”
- SIMON FRASER UNIVERSITY DAVIDSON LABORATORY, 2008, “Whirling disease resistance in rainbow trout”
- PLANT AND ANIMAL GENOME CONFERENCE, 2007, “Discovering genes associated with whirling disease resistance”

UC DAVIS POPULATION GENETIC SOFTWARE SEMINAR, 2007, “Choosing the correct analyses for your research question”

SUNY OSWEGO EVOLUTION COURSE, 2006, “From genes to characters”

DAVIS HIGH SCHOOL BIOTECHNOLOGY COURSE, 2005, “Combating disease using genetics and molecular biology”

UC DAVIS CONSERVATION GENETICS SEMINAR, 2002, “Genetic consequences of population fragmentation”

TEACHING EXPERIENCE

CO-INSTRUCTOR FOR MOLECULAR METHODS IN CONSERVATION GENETICS COURSE AT UC DAVIS, 2008

- Course objective: provide working knowledge of common molecular techniques used in the fields of conservation and population genetics. Course format: lecture and student discussions to understand the conceptual basis behind lab techniques along with hands-on laboratory exercises.

MENTOR TO UNDERGRADUATE RESEARCHERS AT UC DAVIS, 2002 - 2007

- Trained and supervised daily activities of undergraduate researchers

TEACHING WORKSHOP SERIES CERTIFICATION, UC DAVIS TEACHING RESOURCES CENTER, 2006

- Topics: Theories of Teaching, Teaching and Learning Styles, Alternative Teaching and Assessment Techniques, Hot Topics Facing Teachers, Teaching Philosophy

TEACHING ASSISTANT FOR GENES & GENE EXPRESSION COURSE AT UC DAVIS, 2004

- Led discussion sections and held office hours for 150 students, created concept-based exam questions, and led review sessions and graded exams for 300 students

GIFTS/GRANTS/HONORS

**CALIFORNIA DEPARTMENT OF FISH & GAME
CONTRACT 2008-2012, \$2,719,436 (CO-PI)**

**UC DAVIS GENOME CENTER CORE FACILITY PILOT
PROJECT GRANT 2008, \$2,000 (CO-PI)**

**UC DAVIS POSTDOCTORAL SCHOLARS
ASSOCIATION TRAVEL AWARD, 2008, \$500**

**USDA NRICGP POSTDOCTORAL FELLOWSHIP, 2008-
2009, \$125,000**

**MATTHEW CLOW SCHOLARSHIP, 2007, \$500
GRADUATE STUDENT ASSOCIATION TRAVEL**

AWARD, 2007, \$400

**WHIRLING DISEASE FOUNDATION GIFT, 2005-06,
\$120,000, (Gifted to B. May; M. Baerwald
principle author of reports)**

**PLANT & ANIMAL GENOMICS TRAVEL AWARD,
2009, 2006, \$2000**

JAMES E. WRIGHT GRADUATE AWARD, 2006, \$400

**UC DAVIS GRADUATE STUDENT TRAVEL AWARD,
2006, \$500**

**MARIN ROD & GUN CLUB SCHOLARSHIP, 2006,
\$1,500**

**GOLDEN WEST WOMEN FLYFISHERS
SCHOLARSHIP, 2005, \$1,500**

**GENETICS GRADUATE GROUP BLOCK GRANT, 2005,
\$4,000, tuition waiver**

**UC DAVIS WILDLIFE HEALTH CENTER
FELLOWSHIP, 2005, \$5,000**

HART, COLE & GOSS FELLOWSHIP, 2004-06, \$9,000

JASTRO SHIELDS RESEARCH AWARD, 2003-05, \$6,000

UC DAVIS GRADUATE RESEARCH MENTORSHIP

FELLOWSHIP, 2003-04, \$18,000, tuition waiver

MCOMIE FELLOWSHIP, 2003, \$3,000

**DOW AGROSCIENCES SCIENTIFIC RECOGNITION
AWARD, 2000-02, \$1,500**

**INDIANA UNIV UNDERGRADUATE RESEARCH
SCHOLARSHIP, 1997, \$1000**

RESEARCH SKILLS

DNA

General DNA Techniques: Polymerase Chain Reaction (PCR), restriction digestion, polyacrylamide gel electrophoresis (PAGE), Rapid Amplification of cDNA Ends (RACE), DNA purification (kits, phenol chloroform, CTAB), Southern blot hybridization, DNA sequencing

Cloning: ligation, transformation, plasmid isolation, genome walking, site-directed mutagenesis

Tissue Culture: stable and transient mammalian cell transfection (lipofection and calcium phosphate), Peripheral Blood Mononuclear Cell (PBMC) isolation

Genotyping: microsatellite development, microsatellite multiplex PCR, allele scoring

RNA

General RNA Techniques: RNA isolation, Reverse Transcriptase Polymerase Chain Reaction (RT-PCR), quantitative RT-PCR (qRT-PCR)

Microarrays: messenger RNA amplification, Cy3/Cy5 labeling, hybridization

PROTEIN

General Protein Techniques: yeast two-hybrid assay, Bradford assay, SDS PAGE, PHAST gel, co-immunoprecipitation, Western blot hybridization

FISHERIES

General Field and Aquaculture Techniques: beach seining, gill netting, aquaculture care and maintenance, parasitic infection, tissue dissection

SOFTWARE

DNA Analysis: Genetics Computer Group (GCG), PHRED, Sequencher, Vector NTI

Population Analysis: Arlequin, FSTAT, GeneClass2, Genepop, GDA, Genetix, PAUP, PHYLIP, POPGENE, SPAGeDi, STRUCTURE, TCS, TFPGA, Whichrun

Microarray: GeneTraffic, Significance Analysis of Microarrays (SAM)

Statistical Analysis: JMP, SAS

PROFESSIONAL SERVICE

Manuscript/proposal reviews within last four years: *BMC Genomics*, *Parasitology*, *Great Lakes Fishery Commission*, *BMC Genet*, *J Mol Evol*, *Fisheries*, *P Natl Acad Sci USA*, *Conserv Genet*, *Sci Total Environ*

Genetics Graduate Group admissions committee, 2007

Animal Science advancement committee, 2005 – 2006

Genetic Graduate Group seminar series organizer, 2005 – 2006

Genomic Variation Laboratory safety officer, 2002 – 2005

PROFESSIONAL AFFILIATIONS

American Association for the Advancement of Science
American Fisheries Society
Society for Conservation Biology