

TAMMY A. MALDONADO, PhD.
Director of STEM Education and Outreach
Biological Sciences Initiative
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EDUCATION

- Ph.D. 2000 Environmental, Population and Organismic Biology, University of Colorado, Boulder
- Neuroscience Certificate 2000 University of Colorado, Boulder
- Postdoctoral Fellowship 2000-2001 Integrative Physiology, University of Colorado, Boulder
- M.A. 1995 Environmental, Population and Organismic Biology, University of Colorado, Boulder
- B.A. 1990 Environmental, Population and Organismic Biology, University of Colorado, Boulder

CURRENT PROFESSIONAL POSITION AND SKILLS

Director of STEM Education and Outreach – Biological Sciences Initiative, University of Colorado Boulder

- **Curriculum Development and Instruction**
 - **Teacher Professional Development** – develop, and deliver unique hands-on inquiry based science curriculum for K-12 teachers of Colorado and nationally. Curriculum is designed to highlight current biological scientific research conducted by faculty at the University of Colorado, Boulder.
 - **Instructor:**
 - **University of Colorado (ARSC 1450 STEM: Intro to STEM Methods)** – Developed and delivered a novel design – a science course based on University of Colorado STEM faculty research projects, that also serves to prepare and place undergraduates in research laboratories on campus.
 - **University of Colorado (MCDB2115 Biology: Live Science of the Earth System)** – Developed and delivered activity/inquiry based curriculum to undergraduates spring 2003, 2004.
 - **Faculty Consultant and Collaborations** – give expert advice to University of Colorado faculty members (and their laboratory personnel), collaborate with researchers to translate their current research into curricular materials assessable to and useful to a variety of audiences. Advises faculty on curriculum redesign for undergraduate courses. Help faculty deliver the developed curriculum to undergraduate students or K12 teachers thus helping to bridge research and education.
 - **Science Squad** (team of graduate students and postdoc outreach scientists) – Train members in research based science curriculum development for delivery to K-12 classrooms. Training includes curriculum design (science/topical learning goals) that are aligned with Science Standards (Colorado and Next Generation Science Standards), creation of material, worksheets, and power point presentations, class room management skills, presentation skills, addressing learning styles, teaching to English language learners, and student centered teaching.
 - **Collaborations** – work with University of Colorado research faculty and programs (e.g. CU Museum) to develop programs, projects and broader impacts pieces for various grant proposals. Collaboration includes recruiting and developing and delivering science curriculum to K-12 teachers.
- **Leadership and Supervise**
 - **Science Squad** - hire, train and supervise and evaluate Post-docs and graduate student members to develop and implement research based curriculum to students in K12 classrooms in the Denver metro area.
 - **Undergraduate Research Training Program** – present at undergraduate research orientation and training workshops. Train, advise and evaluate student oral and poster presentations.
- **Grants**
 - Howard Hughes Medical Institute HHMI - work with BSI administration to develop new and innovative outreach programs as well as undergraduate research program.
 - University of Colorado Outreach Council Grant – Collaborate with University of Colorado research faculty and programs (e.g., CU Museum) to write grants to fund outreach projects.
 - NSF Grants - work with University of Colorado faculty to write and implement Broader Impacts grant components.

- NSF DRK12 Grant – Co-PI on 3 million grant that is a collaborative effort with 4 other institutions in the US.
- NIH - work with University of Colorado faculty to write and implement education outreach.

ADDITIONAL CURRICULUM DEVELOPMENT AND INSTRUCTIONAL EXPERIENCE

University of Colorado

- **Professional Development** for K-12 Teachers in Colorado and Nationally
- **Postdoctoral Teaching:** Human Anatomy and Physiology
- **Pre-collegiate Development Program** – Developed and delivered course and laboratory content for Human Anatomy, Human Physiology, Advanced Biology, and Comparative Vertebrate Anatomy to economically disadvantaged and underrepresented high school students.
- **Graduate Teaching Assistant** – lectured and taught laboratory techniques to undergraduate students in Human Anatomy, Human Physiology, General Biology, Stream Ecology and Comparative Vertebrate Anatomy.
- **Prosector: University of Colorado** - Prepare dissection of human cadavers for demonstration/training and undergraduate Human Anatomy Teaching Labs.

Red Rocks Community College

- **Instructor** - Anatomy and Physiology Lectures, Anatomy and Physiology Labs

RESEARCH INTERESTS

Ph.D. Dissertation

The distribution of the amyloid precursor protein, β -amyloid peptide and neurodegeneration in the brain of kokanee salmon (*Oncorhynchus nerka kennerlyi*): a model for brain aging.

M.A. Thesis

The salmon as a model for aging: β -amyloid plaques in the brain of senescent salmon (*Oncorhynchus nerka kennerlyi*).

Postdoctoral Fellowship

Evolution of the neuroendocrine control of reproduction in an invertebrate mollusc, *Aplysia californica*. (P.I. Dr. Pei-San Tsai, NSF-supported)

Research appointments involved the use of laboratory techniques which included: traditional histology, immunohistochemistry, whole-mount immunohistochemistry, radioimmunoassays, radioactive iodination, image analysis, flow cytometry, polymerase chain reaction (PCR), running gels, dot blots, high performance liquid chromatography (HPLC), axonal labeling (antero- and retrograde labeling), tissue and cell cultures, protein extractions, surgeries, dissections and tissue processing, laboratory management (supplies and hazardous waste), and organizing/scheduling collecting trips.

HONORS AND AWARDS

- Brain Research Interactive – Young Investigator's Award – 2000
- Environmental Population and Organismic Biology Departmental Teaching Award
University of Colorado, Boulder – 1999
- University of Colorado, Boulder Teaching Award– 1999
- University of Colorado Equity and Excellence Award– 1999
- Biological Sciences Initiative - Awarded 7 times for 5 students (see Grants and Fellowships section)

RESEARCH COLLABORATIONS

University of Colorado

- *Western blot analysis of salmon amyloid precursor protein and β -amyloid peptide.*
Robert Spencer, Psychology and Neuroscience Department
- *β -amyloid in brain-lesioned rats.*
Theresa Hernandez, Psychology and Neuroscience Department
- *Metal contamination and stress response in brown trout.*
David Norris, EPO Biology Department
- *Lizard Project, Brain Asymmetry*
Richard E. Jones, EPO Biology Department
- *Alligator Project, Mullerian Duct Regression*

Dr. Harriet Austin, EPO Biology Department

- *GnRH distribution in salmon*

Richard E. Jones, and David Norris, EPO Biology Department

University of Colorado, Denver

- *Reproductive disruption and intersex in white suckers (*Catostomus commersoni*)*

Dr. Vajda, Department of Integrative Biology

University of Denver

- *Radioimmuno assay of salmon cortisol cycle*

Dr. Robert Does, Biology Department

Colorado Division of Wildlife

- *Morphology of southern and northern redbelly dace and Parthenogenesis and Chromosome Analysis*
- *Brown Trout Immune Stress Response,*

University of Colorado Health Science Center

- *Visible Human Dissector Project*

PUBLICATIONS:

- Jones, R.E.; Lopez, K.H.; **Maldonado, T.A.**; Summers, T.R.; Summers, C.H.; Propper, C.R.; and Woodling, J.D. Unilateral ovariectomy influences hypothalamic monoamine asymmetries in lizard (*Anolis carolinensis*). Gen. Comp. Endocrinol., 108 (1997), 306-315.
- Norris, D.O.; Donahue, S.; Does, R.M.; Lee, J.K.; **Maldonado, T.A.**; Ruth, T.; and Woodling, J.D. Impaired adrenocortical response to stress by brown trout, *Salmo trutta*, living in metal-contaminated waters of the eagle river, Colorado. Gen. Comp. Endocrinol., 113 (1998), 1-8.
- **Maldonado, T.A.**; Jones, R.E.; and Norris, D.O. Distribution of β -amyloid precursor protein in the brain of spawning (senescent) salmon: a natural, brain-aging model. Brain Research 858 (2000), 237-251.
- Norris, D.O.; Camp, J.; **Maldonado, T.A.**; and Woodling, J.D. Some aspects of hepatic function in feral brown trout, *Salmo trutta*, living in metal contaminated water. Comp. Biochem. Physiol. Part C 127 (2000) 71-78.
- Carruth, L.L.; Does, R.A.; **Maldonado, T.A.**; Norris, D.O.; Ruth, T.; and Jones, R.E. Elevation of plasma cortisol during the spawning migration of a landlocked Pacific salmon (*Oncorhynchus nerka kennerlyi*). Comp. Biochem. Physiol. Part C 127 (2000), 123-131.
- Kreiser, B.R.; Woodling, J.D.; and **Maldonado, T.A.** The redbelly dace (*Phoxinus*) of Colorado. Copeia, (2001).
- **Maldonado, T.A.**; Jones, R.E.; and Norris, D.O. Intraneuronal amyloid precursor protein (app) and appearance of extracellular β -amyloid peptide (A β) in the brain of aging kokanee salmon. J. Neurobiol. 53, (2002) 11-20.
- **Maldonado, T.A.**; Norris, D.O.; and Jones, R.E. Timing of neurodegeneration and β -amyloid (A β) peptide deposition in the brain of aging kokanee salmon. J. Neurobiol. 53, (2002) 21-35.
- Tsai, P.-S.; **Maldonado, T.A.**; and Lunden, J.B. Localization of gonadotropin-releasing hormone in the central nervous system and a peripheral chemosensory organ of *Aplysia Californica*. Gen. Comp. Endo. (2003) 130, 20-28
- Vajda, A.M.; Lopez, E.M.; **Maldonado, T.A.**; Woodling, J.D.; Norris, D.O. Reproductive disruption and intersex in white suckers *Catostomus commersoni* downstream of a Colorado wastewater treatment plant. Integr. Comp. Biol. 44, (2004) 655.
- John, D. Woodling; Elena M. Lopez; **Tammy A. Maldonado**; David O. Norris; Alan M. Vajda. Intersex and

other reproductive distribution of fish in wastewater effluent dominated Colorado streams. Comp. Biochem and Physiol. Part C 144 (2006) 10-15.

PRESENTED SCIENCE CURRICULUM AT CONFERENCES

National Association for Biology Teachers (2006, 2009)

National Science Teachers Association (2007, 2013)

Colorado Science Conference (2002-2013)

Colorado Biology Teachers Association (2013)

INVITED SPEAKER/GUEST LECTURES

University of Colorado, Boulder

- Sigma Xi Scientific Society – (2001 – Current 2015)

University of Colorado Health Science Center, Denver

- Pathology Grand Rounds Seminar Series – 1/18/01

University of Colorado, Boulder

- Comparative Vertebrate Anatomy
- Stream Biology
- Introduction to Neurophysiology

OUTREACH:

- Organize the University Colorado Boulder Café Scientifique scientific talks for the public (2008- current)
- La Raza – Enrichment program for Hispanic and Native American students
- Pre-collegiate Development Program – High School program recruiting under- represented and first generation students to the University of Colorado, Boulder.
- Jr. Café Sci – Founder of this program in 2009 - current

GRANTS AND FELLOWSHIPS

- NSF Postdoctoral Fellowship, University of Colorado, Boulder 2000-2001
- NIH (NIA) Pre-doctoral Fellowship, 1997-1999
- Graduate School University Fellowship, University of Colorado, Boulder – 1999
- Dean's Graduate Student Research Grant, University of Colorado, Boulder – 1994, 1996
- EPO Biology Departmental Grant, University of Colorado, Boulder – 1996
- Howard Hughes Medical Institute Undergraduate Research Grant, University of Colorado, Boulder – 1991- 1992
- Awarded several grant grants from the Hughes Undergraduate Biological Sciences Education Initiative on behalf of the following students:
 - Dan Garcia
 - Everlean Becerra
 - Melissa Ellis
 - Ginger Cotter
 - Chris Hill

PROFESSIONAL MEMBERSHIPS:

- Sigma Xi, The Scientific Research Society
- National Science Teacher Association
- Colorado Biology Teachers Association
- National Association of Biology Teachers
- Human Anatomy and Physiology Society
- Vice President of the University of Colorado Chapter of Sigma Xi (2012- current)
- President of the University of Colorado Chapter of Sigma Xi (2008 – 2012, 2014- present)