

Deborah Anne Donovan Curriculum Vitae

Associate Professor, Department of Biology
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PROFESSIONAL PREPARATION

Ph.D., 1998. Zoology. University of British Columbia.

Dissertation title: Energetics of Activity in the Abalone, *Haliotis kamtschatkana*.
Supervisor: Dr. Thomas H. Carefoot

M.Sc., 1992. Ecology, emphasis in Physiological Ecology. University of California, Davis.

Thesis title: Erythrocyte cholinesterase activity in common California animal species.
Supervisor: Dr. Joseph G. Zinkl

Gifted and Talented Education Certificate, 1990. University of California, Riverside.

California Teaching Credential, 1987. California State University, San Jose.

B.Sc., 1986. Physiology. University of California, Davis.

APPOINTMENTS

Associate Professor. Fall 2004-Present. Biology and Science Education.

Western Washington University.

Assistant Professor. Fall 1998-Summer 2004. Biology and Science Education.

Western Washington University.

Courses taught: Introduction to Biology; General Biology II (Zoology); Introduction to Evolution, Ecology, and Biodiversity; Introduction to Organismal Biology; Physiological Ecology of Animals; Invertebrate Zoology; Scaling in Biology (undergraduate and graduate seminar); Animal Energetics (graduate seminar); Matter and Energy in Life Systems; Investigative Science; Science Methods and Curriculum for the Elementary School; Laboratory/Field Experience in Elementary Science; Fundamentals of Teaching Science; Methods in Secondary Education for Science Teachers; Teaching Science for the Secondary School; Student Internship Supervision

Academic Dean. Summers 1997-1998.

Johns Hopkins University-Institute for the Academic Advancement of Youth.

Directed faculty orientation including sessions on teaching and evaluating gifted students, and working with Teaching Assistants.

Supervised and evaluated 55 faculty members (instructors and teaching assistants) from a range of disciplines.

Acted as a liaison between IAAY and Loyola Marymount University.

Handled student disciplinary problems.

Science Instructor. Summers 1990-1996. Chemistry and Introduction to Laboratory Science.

Johns Hopkins University-Institute for the Academic Advancement of Youth.

Taught laboratory-based science courses for highly-gifted middle- and high-school students. Supervised a Teaching Assistant.

Developed curriculum for Chemistry and Introduction to Laboratory Science courses.

High School Science Instructor. 1987-1990. Physical Science and Chemistry.

San Bernardino City Unified School District, San Bernardino, CA.

Taught Advanced Placement Chemistry (2 years), Honors Chemistry (1 year), Chemistry (3 years), Sheltered Physical Science (1 year), Physical Science (2 years).

Extracurricular activities included Track and Field Coach (2 years), Cross Country Coach (1 year), Odyssey of the Mind Co-advisor (3 years), Academic Decathlon Chemistry Tutor (3 years).

Worked at the district level as a curriculum coordinator for Honors Chemistry.

PUBLICATIONS IN REFEREED JOURNALS

(*denotes undergraduate student co-author; ‡denotes graduate student co-author)

- Donovan, D.A.**, and H.H. Taylor. (2008) Metabolic consequences of living in a wave-swept environment: effects of simulated wave forces on oxygen consumption, heart rate, and activity of the shell adductor muscle of the abalone *Haliotis iris*. *J. Exp. Mar. Biol. Ecol.* 354: 231-240.
- Farren[‡], H.M. and **D.A. Donovan**. (2007) Effects of sponge and barnacle encrustation on survival of the scallop *Chlamys hastata*. *Hydrobiologia.* 592: 225-234.
- Baldwin, J., J.P. Elias, R.M.G. Wells, and **D.A. Donovan**. (2007) Energy metabolism in the tropical abalone, *Haliotis asinina* Linné: comparisons with temperate abalone species. *J. Exp. Mar. Biol. Ecol.* 342: 213-225.
- Donovan, D.A.**, Pennings, S.C., and T.H. Carefoot. (2006) Swimming in the sea hare *Aplysia brasiliana*: cost of transport, morphometry and swimming behavior. *J. Exp. Mar. Biol. Ecol.* 328: 76-86.
- Donovan, D.A.**, J.P. Elias, and J. Baldwin. (2004) Swimming behavior and morphometry of the file shell *Limaria fragilis*. *Mar. Fresh. Beh. Phys.* 37: 7-16.
- Caldwell[‡], S.L. and **D.A. Donovan**. (2003) Energetics of swimming and crawling in the Lion Nudibranch *Melibe leonina*. *Veliger.* 46: 355-361.
- Donovan, D.A.**, B.L. Bingham, M. From, A.F. Fleisch*, and E.S. Loomis*. (2003) Effects of barnacle encrustation on the swimming behaviour, energetics, morphometry and drag of the scallop *Chlamys hastata*. *J. Mar. Biol. Assoc. U.K.* 83: 813-819.
- Donovan, D.A.**, B.L. Bingham, H.L. Farren[‡], R. Gallardo*, and V. Vigilant*. (2002) Effects of sponge encrustation on the swimming behavior, energetics and morphometry of the scallop *Chlamys hastata*. *J. Mar. Biol. Assoc. U.K.* 82: 469-476.
- Donovan, D.A.** and J. Baldwin. (1999) Cost of transport in the swimming bivalve *Limaria fragilis*. *Mar. Fresh. Beh. Phys.* 33: 51-58.
- Donovan, D.A.**, J.P. Danko*, and T.H. Carefoot. (1999) Functional significance of shell sculpture in gastropod molluscs: test of a predator-deterrent hypothesis in *Ceratostoma foliatum* (Gmelin). *J. Exp. Mar. Biol. Ecol.* 236: 235-251.
- Donovan, D.A.**, J. Baldwin, and T.H. Carefoot. (1999) The contribution of anaerobic energy to gastropod crawling and a re-estimation of minimum cost of transport in the abalone, *Haliotis kamtschatkana*. *J. Exp. Mar. Biol. Ecol.* 235: 267-278.
- Donovan, D.A.** and T.H. Carefoot. (1998) Effects of activity on summer and winter energy allocations in the Northern abalone, *Haliotis kamtschatkana*. *J. Shell. Res.* 17: 729-736.
- Carefoot, T.H., B.E. Taylor, and **D.A. Donovan**. (1998) Seasonality in digestive-gland size and metabolism in relation to reproduction in *Haliotis kamtschatkana*. *J. Shell. Res.* 17: 713-716.
- Carefoot, T.H., M. Harris, B.E. Taylor, **D.A. Donovan**, and D. Karentz. (1998) Mycosporine-like amino acids: possible UV-protection in eggs of the sea hare *Aplysia dactylomela*. *Mar. Biol.* 130: 389-396.
- Donovan, D.A.** and T.H. Carefoot. (1997) Locomotion in the abalone *Haliotis kamtschatkana*: pedal morphology and cost of transport. *J. Exp. Biol.* 200: 1145-1153.
- Taylor, B.E., **D.A. Donovan**, E. McLean, E. Donaldson, and T.H. Carefoot. (1996) Effect of recombinant vertebrate growth hormones on growth of adult abalone, *Haliotis kamtschatkana*. *Aquaculture.* 140: 153-158.
- Carefoot, T.H. and **D.A. Donovan**. (1995) Functional significance of varices in the muricid gastropod *Ceratostoma foliatum*. *Biol. Bull.* 189:59-68.
- Donovan, D.A.** and J.G. Zinkl. (1994) Modifications of a cholinesterase method for determination of erythrocyte cholinesterase in wild mammals. *J. Wild. Dis.* 30: 234-240.

MANUSCRIPTS IN REVIEW

(*denotes undergraduate student co-author; ‡denotes graduate student co-author)

Miner, B.G., **D.A. Donovan**, and K.E. Andrews*. Should I stay or should I go: predator and conspecific induced hatching in a marine snail. In review at *Oecologia*

MANUSCRIPTS IN PREPARATION

(*denotes undergraduate student co-author; ‡denotes graduate student co-author)

Donovan, D.A., Landel, C.J., and Hanley, D. Impact of a multi-institutional curriculum development project on science faculty. For submission to *Journal of Science Teacher Education*.

Purce‡, D.N.S., **D.A. Donovan**, A.N. Maeda-Martinez, and V. Koch. Energetic physiology of two geographically isolated populations of the scallop *Nodipecten subnodosus* from Baja California Sur, Mexico.

GRANTS & AWARDS (SUBMITTED AND AWARDED)

Collaborative Research: Building a Life Science Curriculum for Elementary Teachers. \$83,853 (total grant \$250,178). NSF-CCLI. Submitted May 2009. Co-PI Dr. John Rousseau (Whatcom Community College).

Collaborative grant with Dr. Irene Salter (PI-CSU Chico) and Dr. Leslie Atkins (Co-PI CSU Chico).

Salinity Tolerance of the Invasive Clam, *Nuttallia obscurata*. \$67,006. Washington Sea Grant preliminary proposal. 2009. Co-authored with Dr. Jose Serrano-Moreno. (*declined*)

Summer Research Grant. \$5000. Western Washington University. 2008.

Biology and Geology for Everyday Thinking (BaGET). \$499,558. NSF-CCLI. 2008. Co-authored with Dr. George Nelson and Dr. Susan DeBari. (*declined*)

Enhancing Biological Education with High Quality Microscopy. \$ 39,300. Student Technology Fee, Western Washington University. 2007. Co-authored with Dr. Benjamin Miner.

Summer Research Grant. \$5000. Western Washington University. 2002.

A Capstone Course in Investigative Science for Pre-service Elementary Teachers. \$76,834. NSF-CCLI. 2001-2005.

Gender Equity Project. \$5000. Washington Research Institute. 1999-2003

Summer Research Grant. \$5000. Western Washington University. 1999.

Integration of Content and Pedagogy in a Science Content Course for Elementary Education Undergraduates. \$21,568. NSF-CCLI. 1999. (*declined*)

Marine Science as a Model for K-12 Science Instruction: Partnerships between Shannon Point Marine Center and Anacortes Public School Teachers. \$172,119. NSF-OCE. 1999. Co-authored with Dr. Gisele Muller-Parker (*declined*)

Full University Graduate Fellowship. \$13,500/yr. University of British Columbia. 1994-1996.

University Travel Award. \$500. University of British Columbia. 1994.

Kit Malkin Memorial Scholarship. \$2000. University of British Columbia. 1993-1994.

CONFERENCE PAPERS & POSTERS

(*denotes undergraduate student co-author; ‡denotes graduate student co-author)

Donovan, D., Landel, C., Hanley, D., and Nelson, G. Changing disciplinary science faculty knowledge and beliefs through curriculum development and implementation. Association of Science Teacher Education, International Conference. Hartford, CT. Jan 7-10, 2009.

Allee‡, R.M. and **Donovan, D.A.** The effects of anoxic conditions on thermal tolerance and stress protein levels of four local bivalves. Western Society of Naturalists 89th Annual Meeting. Vancouver, B.C. November 6-9, 2008.

Siegrist‡, Z.C. and **Donovan, D.A.** Temperature and salinity tolerances of the clams *Nuttallia obscurata*, *Protothaca staminea*, and *Venerupis philippinarum*. Western Society of Naturalists 89th Annual Meeting. Vancouver, B.C. November 6-9, 2008.

- Donovan, D.**, Landel, C., Hanley, D., Minstrell, J. and Anderson, R. Curriculum development as a mechanism for changing science faculty knowledge and beliefs about teaching and learning. Math Science Partnership Learning Network Conference. Washington, DC. Jan 28-29, 2008.
- Miner, B.G., **Donovan, D.A.**, and Goulding*, T. Life history plasticity in embryos of *Nucella lamellosa*. Western Society of Naturalists 88th Annual Meeting. Ventura, CA. November 11-14, 2007.
- Goulding*, T.C., Miner, B.G., and **Donovan, D.A.** Phenotypic changes in the dogwinkle *Nucella lamellosa* in response to chemical cues of crab and sea star predators. Western Society of Naturalists 88th Annual Meeting. Ventura, CA. November 11-14, 2007.
- Donovan, D.A.** and Smith, B.K. Developing reformed science curricula for higher education and professional development settings. National Association for Research in Science Teaching. New Orleans, LA. April 15-18, 2007.
- Donovan, D.A.** and Taylor, H.H. Metabolic costs incurred by the abalone *Haliotis iris* when exposed to wave forces. Western Society of Naturalists 87th Annual Meeting. Redmond, WA. November 9-12, 2006.
- Purce[‡], D., **Donovan, D.**, Maeda-Martinez, A., and Koch, V. Comparative ecophysiology via reciprocal translocation of geographically isolated populations of *Nodipecten subnodosus* in Baja California Sur, Mexico. International Symposium on Physiological Aspects of Reproduction and Nutrition in Mollusks. La Paz, Mexico. November 6-9, 2006.
- Donovan, D.A.** An inquiry-based science course for preservice elementary teachers. American Society of Limnology and Oceanography. Salt Lake City, UT. February 20-25, 2005.
- Cowen[‡], S.C and **Donovan, D.A.** The effects of emersion, air temperature and wave force on tenacity in the limpet *Lottia pelta*. Western Society of Naturalists 85th Annual Meeting. Ronhert Park, CA. November 11-14, 2004.
- Donovan, D.A.**, Pennings, S.C., and T.H. Carefoot. Swimming in the sea hare *Aplysia brasiliana*: cost of transport, pedal morphometry, and swimming behavior. Western Society of Naturalists 84th Annual Meeting. Long Beach, CA. November 7-10, 2003.
- Moore*, E. and **Donovan, D.A.** To swim or to crawl: Energetic cost of transport for swimming and crawling in the giant nudibranch *Tritonia diomedea*. Western Society of Naturalists 84th Annual Meeting. Long Beach, CA. November 7-10, 2003.
- Donovan, D.A.** Effects of hydrodynamic forces on aerobic energy expenditure of the limpet *Lottia pelta*. Western Society of Naturalists 83rd Annual Meeting. Monterey, CA. November 8-11, 2002.
- Farren[‡], H.M. and **Donovan, D.A.** Protections conferred by sponge epibionts on the scallop *Chlamys hastata*: effects on barnacle encrustation and seastar predation. Western Society of Naturalists 83rd Annual Meeting. Monterey, CA. November 8-11, 2002.
- Donovan, D.A.** The effects of epibionts on the swimming energetics of the scallop *Chlamys hastata*. Western Society of Naturalists 81st Annual Meeting. Portland, OR. December 26-30, 2000.
- Music[‡], S.L. and **Donovan, D.A.** Swimming energetics of a marine gastropod, *Melibe leonina* (Gould). Western Society of Naturalists 81st Annual Meeting. Portland, OR. December 26-30, 2000.
- Donovan, D.A.** and Carefoot, T.H. Effects of activity on summer and winter energy allocations in the Northern abalone, *Haliotis kamtschatkana*. Third International Symposium on Abalone Biology, Fisheries and Culture. Monterey, CA. October 26-31, 1997.
- Donovan, D.A.**, Taylor, B.E and Carefoot, T.H. Seasonality in digestive-gland size and metabolism in relation to reproduction in *Haliotis kamtschatkana*. Third International Symposium on Abalone Biology, Fisheries and Culture. Monterey, CA. October 26-31, 1997.
- Donovan, D.A.** Effect of recombinant vertebrate growth hormone on growth of adult abalone, *Haliotis kamtschatkana*. Second International Symposium on Abalone Biology, Fisheries and Culture. Hobart, Tasmania. February 7-11, 1994.

INVITED TALKS

- Morphological, metabolic, and developmental responses of the whelk *Nucella lamellosa* to its predators. Western Washington University. Bellingham, WA. May 14, 2009.
- Hitching a ride with scallops: costs and benefits of swimming in bivalve molluscs. Bamfield Marine Science Centre, Bamfield, British Columbia. Nov. 20, 2003.

- Demands on energy expenditure of marine molluscs. Western Washington University. Bellingham, WA. Oct. 1, 2003.
- Energetics and morphometrics of swimming bivalves. University of Texas, Marine Science Institute. Pt. Aransas, TX. May 12, 2003.
- Hitching a ride with scallops: costs and benefits. Heron Island Research Station and Heron Island Resort. Queensland, Australia. August 1, 2002.
- Energetics of swimming and crawling in marine molluscs. University of Washington, Department of Fisheries and Aquatic Sciences. June 6, 2002.
- Energetics of marine invertebrates. Western Washington University Bureau of Faculty Research/Sigma Xi. February 24, 2000.
- The contribution of anaerobic energy to the cost of transport of crawling and swimming molluscs. Shannon Point Marine Center. April 16, 1999.

GRADUATE THESIS DIRECTION

- Virginia Selz, MESP. Nitrogen source impacts on *Synechococcus* nutrient acquisition and grazing susceptibility. In progress. Committee co-chair (with S. Strom)
- Rachel Allee, Biology. Effects of anoxic conditions on thermal tolerance and stress protein levels in four local bivalves. In progress.
- Zachary Siegrist, Biology. Temperature and salinity tolerance of three local clams. In progress.
- Jonathan Robinson, MESP. Effects of simulated wave force on the metabolism of the volcano limpet, *Diodora aspera*. Completed Spring 2009.
- Deborah Purce, MESP. Comparative ecophysiology of two geographically isolated populations of Lion's Paw scallop, *Nodipecten subnodosis* in Baja California Sur, Mexico. Completed Winter 2007.
- Scott Cowan, Biology. The effects of emersion, temperature, and wave force on tenacity of the limpet, *Lottia pelta*. Completed Fall 2005.
- Jason Hall, MESP. Impacts of *Microspora ficulinae* (Chlorophyceae) association with *Halichondria panicea* (Demospongiae) on the chemical armament, pigmentation, and growth of *Archidoris montereyensis* (Archidorididae). Completed Fall 2005. Committee co-chair (with K. Van Alstyne)
- Michael Thimgan, MESP. Effects of wave force and period on the energy expenditure of the intertidal marine gastropod, *Scutus antipodes*. Completed August 2005.
- Jeannie Gilbert, MESP. A seasonal study of the benthic invertebrate community of the lower Samish River. Completed August 2005.
- Kerri Fredrickson, MESP. Does the addition of β -dimethylsulfoniopropionate to coastal phytoplankton communities act as a feeding deterrent? Completed June 2004. Committee co-chair (with S. Strom).
- Joseph Balsiger, Science Education. Curriculum review of NSRC/STC Experiments with plants using the Project 2061 curriculum analysis procedure. Completed June 2004. Major advisor.
- James Selleck, MESP. Spawning and recruitment events of the invasive Varnish Clam *Nuttalia obscurata* and the fisheries Littleneck Clam *Venerupis philippinarum*. Completed December 2003.
- Heather Farren, MESP. Sponge epibionts protect the scallop *Chlamys hastata* from barnacle encrustation and sea star predation. Completed March 2003.
- Christopher May, Biology. Effects of wave period and force on tenacity of *Acmaea mitra*, the Whitecap limpet. Completed December 2002.
- Sandra Caldwell, MESP. The energetics of crawling and swimming the hooded nudibranch, *Melibe leonina*. Completed June 2001.

PROFESSIONAL ORGANIZATIONS

- California Malacozoological Society
Western Society of Naturalists
American Society of Limnology and Oceanography
National Science Teachers Association
Washington Science Teachers Association
Association for Science Teacher Education

PEER REVIEW WORK

Journal of Experimental Marine Biology and Ecology

Maine Ecology Progress Series

Journal of Shellfish Research

Comparative Biochemistry and Physiology

Marine and Freshwater Behaviour and Physiology

American Malacological Bulletin

Journal of Comparative Physiology B

Biological Journal of the Linnaean Society

Bulletin of Marine Science

Biological Bulletin

NSF proposal review

NSF, Directorate for Geosciences, Geosciences Education panel. July 12-13, 2001.

NSF, Division of Ocean Sciences, Research Experience for Undergraduates panel, Nov. 3-4, 2004.

NSF, Division of Research on Learning in Formal and Informal Settings, Discovery Research K-12 (DR-K12)

Program panel, March 13-14 2008

External reviewer for PhD theses (University of Auckland, Monash University)