

# BIOGRAPHY

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## **Education:**

Ph.D. Comparative Pathology (1990), University of California, Davis  
B.A. Aquatic Biology (1983), University of California, Santa Barbara

## **Positions Held:**

Associate Professor, School of Aquatic & Fishery Sciences, University of Washington 2004 to present.

Assistant Professor, School of Aquatic and Fishery Sciences, University of Washington 2001-04.

Senior Fish Pathologist, California Department of Fish and Game, 1998 to 2002.

Associate Fish Pathologist, California Department of Fish and Game, 1988 to 1998.

## **Awards and Honors:**

J.A. Valentine Visiting Professor, University of Otago, New Zealand 1995.

American Fisheries Society, 2001 Most significant paper *Journal of Aquatic Animal Health*  
College of Ocean and Fishery Sciences, University of Washington, Distinguished Research Award, 2007.

Chercheur Etranger, Universite de Bretagne Occidentale, CNRS, Brest France – September 25, 2007-January 3, 2008

Distinguished Undergraduate Teaching Award, College of Ocean and Fishery Sciences, University of Washington, Recipient June 2009.

## **Selected Publications: (Out of 60)**

- Straus, K.M., and Friedman, C.S. 2009. Restoration aquaculture of the pinto abalone (*Haliotis kamtschatkana kamtschatkana* Jonas): impacts of rearing method on behavior, growth, and survivorship. *Marine and Freshwater Research*. *In press*.
- Travers, M.A., Le Bouffant, R., Friedman, C.S., Buzin, F., Cougard, B., Huchette, S., Koken, M., Paillard, C. 2009. Pathogenic *Vibrio harveyi*, in contrast to non-pathogenic isolates, intervenes with the p38 MAPK pathway to avoid an abalone haemocyte immune response. *Journal of Cellular Biochemistry* 106:152-160.
- Wight, N., Suzuki, J, Vadopalas, B. and Friedman, C.S. 2009. Development and optimization of quantitative PCR assays to aid *Ostrea conchaphila* restoration efforts. *Journal of Shellfish Research* 28(1):33-42.
- Rothaus, D.P., Vadopalas, B., and Friedman, C.S. 2008. Precipitous declines in pinto abalone (*Haliotis kamtschatkana kamtschatkana*) abundance in the San Juan Archipelago, Washington, USA, despite statewide fishery closure. *Canadian Journal of Fisheries and Aquatic Sciences* 65:2703-2711.
- Thomas, M.B., Lafferty, K.D., and Friedman, C.S. 2008. Biodiversity, species losses and introductions. *In*: "Biodiversity, Human Health and Sustainable

- Development", Sala, O. and Parmesan, C (eds.). SCOPE/Diversitas publication.
- Batista, FM, Arzul, I, Pepin, JF, Ruano, F, Friedman, CS, Boudry, P, And Renault, T. 2007. Detection of ostreid herpesvirus 1 DNA by PCR in bivalve molluscs: A critical review. *Journal of Virological Methods* 139(1):1-11.
- Burge, C.A., Judah, L.R.J., Conquest, L, Griffin, F.J., Cherr, G.N., Cheney, D., Suhrbier, A, Suhrbier, A, Olin, P.G., and Friedman, C.S. 2007. Examination of factors affecting survival of the Pacific oyster, *Crassostrea gigas* along the west coast of North America: Multiple stressors, family lines and seasonality. *Journal of Shellfish Research*. 26(1):163-172.
- Friedman, C.S., Scott, B.B, Streng, R.E., and McCormick, T.B. 2007. Oxytetracycline as a tool to manage and prevent losses of the endangered white abalone, *Haliotis sorenseni*, to withering syndrome. *Journal of Shellfish Research* 26(3):887-885.
- Chambers, Melinda D., Glenn R. VanBlaricom, Lorenz Hauser, Fred Utter, Carolyn S. Friedman. 2006. Genetic structure of black abalone (*Haliotis cracherodii*) populations in the California islands and central California coast: impacts of larval dispersal and decimation from Withering Syndrome. *Journal of Experimental Marine Biology and Ecology* 331:173-185.
- Vadopalas, B. Bouma, J., Jackels, C., and Friedman, C.S. 2006. Application of quantitative PCR for simultaneous identification and quantification of larval abalone *Journal of Experimental Marine Biology and Ecology* 334:219-228.
- Burge, C.A., Griffin, F.J., and Friedman, C.S. 2006. Summer mortality and herpes virus infections of the Pacific oyster, *Crassostrea gigas*, in Tomales Bay, California. *Diseases of Aquatic Organisms* 72:31-43.
- Friedman, C.S. Infection with *Xenohaliotis californiensis*. 2006. *In: Aquatic Animal Health Code. World Organisation for Animal Health. 9<sup>th</sup> edition, pp.149-154.*
- Friedman, C.S., Brown, H.M, Ewing, T.W., Griffin, F.J., Cherr, G.N. 2005. Pilot study of the Olympia oyster *Ostrea conchaphila* in the San Francisco Bay Estuary: description and distribution of diseases. *Diseases of Aquatic Organisms* 65:1-8.
- L.I. Vilchis, M.J. Tegner, J.D. Moore, C.S. Friedman, K.L. Riser, T.T, Robbins, and P.K. Dayton. 2005. Effects of ocean warming on the growth, reproduction and survivorship of red and green abalones in southern California. *Ecological Applications* 15(2):469-480.
- Friedman, C.S., Stokes, N.A., Burreson, E.S., Barber, B., Elston, R.A. and Reece, K. 2005. Identification of a herpes-like virus in Pacific oysters, *Crassostrea gigas* Thunberg, in Tomales Bay, California. *Diseases of Aquatic Organisms* 63:33-41.
- Braid, B. A., J. D. Moore, T. T. Robbins, R. P. Hedrick, R. S. Tjeerdema, and C. S. Friedman. 2005. Health and survival of red abalone, *Haliotis rufescens*, under varying temperature, food supply, and exposure to the agent of withering syndrome. *Journal of Invertebrate Pathology* 89(3):219-231.
- Chambers, M.D.\*, Vanblaricom, G.R., Friedman, C.S., and Hurn, H. 2005. Drift card simulation of larval dispersal from San Nicolas island, CA, during black abalone spawning season. *Proceedings of the Sixth California Islands Symposium. D.K.Garcelon and C.A. Schwemm (eds.). National Park Service Technical Publication CHIS-05-01. Institute for Wildlife Studies, Arcata California, pp. 421-434.*
- Estes, R.M., Friedman, C.S., Elston, R.A., and Herwig, R. 2004. Pathogenicity of shellfish hatchery bacterial isolates to Pacific oyster larvae, *Crassostrea gigas*: A microplate assay. *Diseases of Aquatic Organisms* 58:223-230.
- Luengen, A.C., Friedman, C.S., Raimondi, P.T., and Flegal, A.R. 2004. Evaluation of Immune Responses as Indicators of Contamination in San Francisco Bay, Using a Novel

- Phagocytosis and Phagocytic Index Method Developed for Mussels. *Marine Environmental Research*. 57(3): 197-212.
- Friedman, C.S., and Finley, C.A. 2003. Evidence for an anthropogenic introduction of “*Candidatus Xenohaliotis californiensis*”, the etiological agent of withering syndrome, into northern California abalone populations via conservation efforts. *Canadian Journal of Fisheries and Aquatic Sciences* 60:1424-1431.
- Friedman, C.S., Trevelyan, G., Mulder, E.P., and Fields, R. 2003. Development of an oral administration of oxytetracycline to control losses due to withering syndrome in cultured red abalone *Haliotis rufescens*. *Aquaculture* 224(1-4):1-23.
- Friedman, C.S., Biggs, W., Shields, J.D. and Hedrick, R.P. 2002. Transmission of Withering Syndrome in black abalone, *Haliotis cracherodii* Leach. *Journal of Shellfish Research*. 21(2):817-824.
- Moore, J.D., Finley, C.A., Robbins, T.T., and Friedman, C.S. 2002. Withering syndrome and restoration of southern California abalone populations. *California Cooperative Fisheries Investigations Reports* 43:112-117.
- Diggles, B.K., Nichol, J., Wakefield, S., Hine, P.M., Cochenec, N., Reece, K., Roberts, R., and Friedman, C.S. 2002. Pathology of cultured paua *Haliotis iris* by a haplosporidian parasite, with some observations on the course of disease. *Diseases of Aquatic Organisms* 50:219-231.
- Baxa DV, M. El-Matbouli, KB Andree, M. Caffara, S. Gresoviac, C.S. Friedman and RP Hedrick. 2002. In situ hybridization: a detection tool for fish pathogens and its application on recent advances on whirling disease research. In: *Diseases in Asian Aquaculture IV*. CR Lavilla-Pitogo and ER Cruz-Lacierda (eds.) pp. 293-300. Fish Health Section, Asian Fisheries Society, Manila, Philippines.