

# JOHN D. ZARDUS – Curriculum Vitae

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Department of Biology  
The Citadel  
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## EDUCATION

Ph.D., 1998, (Biology) Northeastern University, Boston, Massachusetts  
Dissertation: “Larval development and autecology of the protobranch bivalve *Acila castrensis*” Advisor: M. Patricia Morse

M.S., 1991, (Zoology) Brigham Young University, Provo, Utah  
Thesis: “Diet of the barnacle *Balanus nubilus* (Darwin) and the effects of the anemone *Metridium senile* (Linnæus) on its feeding” Advisor: Lee F. Braithwaite

B.S., 1988, (Zoology) Brigham Young University, Provo, Utah.  
Minor: Botany

## ACADEMIC HONORS

Phi Kappa Phi, nominated 2007    Sigma Xi, elected 1994    Phi Sigma, elected 1989

## RESEARCH INTERESTS

With interests firmly anchored in marine invertebrates, the scope of my research extends to larval biology, field ecology, population genetics and molecular systematics. I am presently studying the evolution and ecology of commensal barnacles, of which a number of species live attached exclusively to hosts such as sea turtles and whales. I am exploring the utility of these crustaceans as natural tracking devices as well as their phylogenetic relationships and life-history dynamics. I have also been invited to serve as a co-investigator in the NSF-funded “Assembling the Bivalve Tree of Life” project.

## TEACHING INTERESTS

Specializing in marine biology and invertebrate zoology, I am enthusiastic about making clear for students patterns and processes at play in the tremendous diversity of life on this planet. I teach biology in the framework of evolutionary theory and historical development of the field, guided by the philosophy that one should teach about life where it lives whenever possible. Mentoring, to me, is integral to teaching and I invite students to join in my research and am active in assisting them in their professional development.

## ACADEMIC APPOINTMENTS

Assistant Professor in Marine Biology, Department of Biology, The Citadel, 2005.

Adjunct faculty, College of Charleston, Grice Marine Lab, Graduate Program in Marine Biology, 2006

**POSTDOCTORAL POSITIONS HELD**

Research Fellow, University of Hawaii, Honolulu, HI 2001-2005

Larval biology, settlement preference and population genetics of turtle barnacles; population linkages in a barnacle recently introduced to Hawaii; biofouling studies of diverse marine invertebrates using larval bioassays of settlement and adhesion (Michael G. Hadfield P.I.).

Postdoctoral Fellow, University of Massachusetts – Boston, MA 1999-2001

Population genetics of deep-sea mollusks, utilizing formalin-preserved specimens collected throughout the deep Atlantic (Ron J. Etter and Michael A. Rex co-P.I.'s).

**FIELD EXPERIENCE**

Southwater Caye Marine Reserve, Southwater Caye, Belize  
2006 Instructor, tropical ecology course (The Citadel)

University of Hawaii, Kewalo Marine Laboratory, Honolulu, HI  
2001-05 (see Postdoctoral Positions above)

Isles of Shoals Marine Laboratory, Appledore Island, ME  
1995 Co-instructor, marine ecology  
2000-01 Instructor, marine ecology

University of Washington, Friday Harbor Laboratories, Friday Harbor, WA  
1992-96 Ph.D. research, ecology and ontogeny of a deposit-feeding bivalve.  
1993 Larval Ecology course, Richard R. Strathmann and Alan L. Shanks instructors.  
1990 M.S. research, trophic ecology of a subtidal barnacle.

Harbor Branch Oceanographic Institution, Fort Pierce, FL  
1995 Deep-Sea Benthos course, Craig M. Young and Paul A. Tyler instructors.  
1995 JSL sub cruise, reproduction at hydrocarbon seeps, Craig M. Young P.I.  
1990 JSL sub cruise, fertilization in deep-sea echinoids, Craig M. Young and Kevin J. Eckleberger co-P.I.'s.

University of British Columbia, Bamfield Marine Station, Bamfield, British Columbia  
1994 Research Assistant, *in situ* kelp growth experiments, David O. Duggins and James E. Eckman co-P.I.'s.

Northeastern University, Marine Science Center, Nahant, MA  
1993 Research Assistant, TEM study of heart-kidney complex in primitive molluscs, M. Patricia Morse P.I.

Hawaii Volcanoes National Park, HI  
1989 Research Assistant, ant mapping study, Clive Jorgenson and Hal Black co-P.I.'s.

Stanford University, Hopkins Marine Station, Pacific Grove, CA  
1987-90 Research Assistant, barnacle feeding experiments, Lee F. Braithwaite P.I.

**RESEARCH SUPPORT**

Citadel Foundation

2007-08 Genetic relationships among barnacles associated with marine mammals.  
\$2,951, pending (Faculty Research Grant).

07-08 con't. Benign buddies and pesky parasites: the various barnacles commensal with loggerhead sea turtles in South Carolina. \$810, pending (Presentation of Research Grant).

A tale of three seas: consistency of natural history traits in a Caribbean–Atlantic barnacle introduced to Hawaii. \$459, pending (Page Charge Grant).

2006-07 Genetic relationships among barnacles associated with sea turtles. \$2,944, awarded (Faculty Research Grant).

Form follows function in mode of attachment for barnacles commensal with sea turtles. \$1,672, awarded (Presentation of Research Grant).

2005-06 Morphological diversity among barnacles associated with sea turtles. \$2,838, awarded (New Faculty Research Grant).

Genetic divergence with depth and distance in a deep-sea bivalve, *Deminucula atacellana*. \$1,390, awarded (Presentation of Research Grant).

Multiple origins and incursions of the Atlantic barnacle *Chthamalus proteus* in the Pacific. \$653, awarded (Page Charge Grant).

#### Hawaii Conservation Alliance

2002-04 Introduction and dispersal of the Atlantic barnacle *Chthamalus proteus* in the Hawaiian Islands. \$10,000 Awarded (co-P.I. with Michael G. Hadfield).

#### Project AWARE Foundation

2003 Turtle barnacles as natural tracking devices: using genetic information from commensal barnacles to track migration patterns and population dynamics of sea turtles. \$1,000 Awarded.

### TEACHING EXPERIENCE

#### *Teaching*

The Citadel, Department of Biology, Charleston, South Carolina

- Tropical Rainforest & Reef Ecology, grad/undergrad, field course May/June 06, 07
- Introduction to Biology II, entering majors, core lecture course Spring 06, 07
- Introduction to Biology Lab II, entering majors, core lab course Spring 06, 07
- Research Intern, undergraduate directed research Fall 06, Spring 07
- General Biology, freshman/sophomore, non-majors core lecture course Fall 06
- Freshwater Biology, junior/senior, majors lab & lecture course Fall 06
- General Biology Lab, freshman/sophomore, non-majors core lab course Fall 05
- Marine Biology, junior/senior, majors lab & lecture course Fall 05

Cornell University – Shoals Marine Lab, Appledore Island, Maine

- Field Marine Biology and Ecology, zoology portion of an undergraduate course (Kathy Ann Miller co-instructor). Summers 2000-01.
- Field Marine Science II, ecology portion of an undergraduate course (Megan Dethier co-instructor). Summer 1995.

Wheelock College, Boston, Massachusetts

- Introduction to Oceanography, undergraduate science elective for non-majors. Fall 1997.

***Mentoring & Advising***

The Citadel, Department of Biology, Charleston, South Carolina  
 2006/07 Research Interns: Adam Ackerman (BIOL) & Maggie Bryan (HESS)  
 Student workers: Alan Benda (BIOL) & Garret Ryan (BIOL)

College of Charleston, Grice Marine Lab, Graduate Program in Marine Biology  
 2007 Thesis Advisor: Tucker Williamson

University of Hawaii – Undergraduate Mentoring in Environmental Biology, Honolulu, HI  
 2003-04 Lekelong I. Secharraimul, visiting student from Palau Community College.  
 2002-03 Vanessa Fread, visiting student from University of Guam.  
 (article about these students “UMEB program targets hard-to-find students.”  
*BioScience*, Jan. 2004, 54:15)

***Teaching Assistantships***

Northeastern University – fall/spring semesters, courses in East/West Mar. Biol. Prog. 1990-95  
 Brigham Young University – spring term, courses at Stanford’s Hopkins Mar. Station 1988-90  
 – fall/winter semesters, Invertebrate/Vertebrate Zoology, 1987-90

**PROFESSIONAL SKILLS**

DNA Extraction & PCR	Experimental Design	Invertebrate Taxonomy
Phylogenetic Analysis	Larval Culture	Photo- & Videomicrography
Statistical Analysis	Histology	Electron Microscopy (SEM & TEM)

**PROFESSIONAL & INSTITUTIONAL SERVICE**

Subject Editor, *Marine Biology Research*: Deep-Sea (excluding hydrothermal vents).

Invited Peer Reviews:

<i>Aquaculture</i>	<i>Invertebrate Reproduction &amp; Development</i>	<i>Marine Biology</i>
<i>Invertebrate Biology</i>	<i>Journal of Morphology</i>	<i>Invertebrate Zoology</i>
<i>Molecular Ecology</i>	<i>National Science Foundation grant proposal</i>	

University Committees (The Citadel)

Scholarships	2006 to present
Sabbaticals	2006 to present

**PROFESSIONAL AFFILIATIONS**

Society for Integrative and Comparative Biology (since 1991)

American Microscopical Society (since 1996)

The Crustacean Society (2003)

## PUBLICATIONS

*Published*

- Zabin, C.J., **J.D. Zardus**, F. Pitombo, V. Fread and M.G. Hadfield (in press). A tale of three seas: consistency of natural history traits in a Caribbean-Atlantic barnacle introduced to Hawaii *Biological Invasions*.
- Zardus, J.D.**, R.J. Etter, M.R. Chase, M.A. Rex and E.E. Boyle 2006. Bathymetric and geographic population structure in the pan-Atlantic deep-sea bivalve *Deminucula atacellana* (SCHENCK 1939). *Molecular Ecology* 15:639-651.
- Zardus, J.D.** and M.G. Hadfield 2005. Multiple origins and incursions of the Atlantic barnacle *Chthamalus proteus* in the Pacific. *Molecular Ecology* 14:3719-3733.
- Zardus, J.D.** and M.G. Hadfield 2004. Larval development and complementary males in *Chelonibia testudinaria*, a barnacle commensal with sea turtles. *Journal of Crustacean Biology* 24: 409-421.
- Boyle, E.E., **J.D. Zardus**, M.R. Chase, R.J. Etter and M.A. Rex 2004. Strategies for molecular genetic studies of preserved deep-sea macrofauna. *Deep-Sea Research* 51:1319-1336.
- Zardus, J.D.** 2002. Protobranch bivalves. *Advances in Marine Biology* 42:1-65.
- Zardus, J.D.** and A. Martel 2001. Phylum Mollusca: Bivalvia. In, *Atlas of Marine Invertebrate Larvae*. C.M. Young, M. Sewell & M. Rice eds., pp. 289-325. Academic Press.
- Zardus, J.D.** and M.P. Morse 1998. Embryogenesis, morphology and ultrastructure of the pericalymma larva of *Acila castrensis* (Bivalvia: Protobranchia: Nuculoida). *Invertebrate Biology* 117:221-244.
- Morse, M.P. and **J.D. Zardus** 1997. Bivalvia. In, *Microscopic Anatomy of Invertebrates Vol. 6A: Mollusca II*. F.W. Harrison and A.J. Kohn eds., pp. 7-118. Wiley-Liss, Inc.

*Publications Submitted*

- Zardus, J.D.**, Y. Huang, C. Tran and M.G. Hadfield (submitted). Microbial biofilms facilitate adhesion in biofouling invertebrates. *Biological Bulletin*.
- Zardus, J.D.** and G.H. Balazs. Two previously unreported barnacles commensal with sea turtles in Hawaii and a comparison of their attachment modes. *Crustaceana*.

*Publications in Preparation*

- Cai, Y. and **J.D. Zardus**. Taxonomic revision of the genus *Tetraclita* in the western Pacific. For submission to *Raffles Bulletin of Zoology*.

*Conference Presentations (\*denotes presenter)*

**Zardus, J.D.\***, P. Zárate, and E.S. Beaumont 2007 (poster). Benign buddies and harmful hitchhikers: consequences of the connection of barnacles with sea turtles. 27th Annual Sea Turtle Symposium, Feb. 22-28, Myrtle Beach, South Carolina.

Zárate, P.\*, E.S. Beaumont, and **J.D. Zardus**, P.H. Dutton, and J.A. Seminoff 2007 (poster). Epibiont occurrence in Galapagos green turtles (*Chelonia mydas*) at nesting and feeding grounds. 27th Annual Sea Turtle Symposium, Feb. 22-28, Myrtle Beach, South Carolina.

**Zardus, J.D.\*** and G.H. Balazs 2007 (oral). Form follows function in mode of attachment for barnacles commensal with sea turtles. Society for Integrative and Comparative Biology, Jan. 3-7, Phoenix, Arizona.

**Zardus, J.D.\***, R.J. Etter, M.R. Chase, M.A. Rex and E.E. Boyle 2006 (oral). Genetic divergence with depth and distance in a deep-sea bivalve, *Deminucula atacellana*. Society for Integrative and Comparative Biology, Jan. 4-8, Orlando, Florida.

**Zardus, J.D.\*** and M.G. Hadfield 2005 (oral). Genetic comparisons between native Atlantic and invasive Pacific populations of the barnacle *Chthamalus proteus*. Society for Integrative and Comparative Biology, Jan. 4-8, San Diego, California.

Hadfield, M.G.\*, N. Shikuma, Y. Huang, B. Nedved and **J.D. Zardus** 2005 (oral). Do bacteria dictate the sequence of biofouling community development by signaling larval settlement? Society for Integrative and Comparative Biology, Jan. 4-8, San Diego, California.

**Zardus, J.D.\*** and M.G. Hadfield 2004 (oral). Genetic tracks of the invasion of Hawai'i by an Atlantic barnacle. Hawaii Conservation Conference, Jun. 29-30, Honolulu, Hawaii.

**Zardus, J.D.\*** and M.G. Hadfield 2004 (poster). A barnacle's perspective of the sea-turtle lifescape: what can turtle-barnacle biology tell us about sea turtles? 24th Annual Sea Turtle Symposium, Feb. 22-29, San Jose, Costa Rica.

**Zardus, J.D.\*** and M.G. Hadfield 2003 (oral). Larval development, breeding system, and host selection in a turtle barnacle: intriguing aspects of a commensal life-history. *Integrative and Comparative Biology* 43(6):1081.

Hadfield, M.G.\*, M.A.R. Koehl, and **J.D. Zardus** 2003 (oral). The affect of chemical cues on the adhesion strength of settling invertebrate larvae. *Integrative and Comparative Biology* 43(6):1080.

**Zardus, J.D.** and M.G. Hadfield\* 2002 (oral). Larval development and host selectivity in the turtle barnacle, *Chelonibia testudinaria*. Proceedings of the 5th International Larval Biology Meeting, University of Vigo, Spain, pg. 96.

**Zardus, J.D.\***. 2001 (oral). Community composition in a soft-sediment assemblage following alteration of the dominant member. 30th Benthic Ecology Meeting, Durham, New Hampshire.

**Zardus, J.D.\***, M.R. Chase, R.J. Etter and M.A. Rex 2000 (oral). Genetic variation among ocean basins in *Deminucula atacellana*, a pan-Atlantic bivalve. 9th Deep-Sea Biology Symposium, Galway, Ireland. J. W. Patching, ed., pg. 49.

**Zardus, J.D.\***, M.R. Chase, M.A. Rex and R.J. Etter 1999 (oral). Molecular zoogeography of a deep-sea protobranch bivalve, *Deminucula atacellana*. Biology and Evolution of the Bivalvia, Cambridge, U.K. Malacological Society of London, pg. 52.

**Zardus, J.D.\*** and M.P. Morse 1998 (oral). Development of the protobranch bivalve *Acila castrensis* and speculation on the relation of the pericalymma larva to molluscan evolution. World Congress of Malacology, Washington D.C. R. Bieler and P. M. Mikkelsen, eds., pg. 365.

**Zardus, J.D.\***, L.F. Braithwaite and B.A. Maurer 1991 (oral). Diet of the barnacle *Balanus nubilus* in the presence and absence of *Metridium senile*. American Zoologist 31(5):103A.

#### INVITED TALKS

Grice Marine Lab, Charleston, South Carolina, September 21, 2006 “Turtle Barnacles: the Good, the Bad, and the Beautiful.”

College of Charleston, Department of Biology, Charleston, South Carolina, Feb. 25, 2005  
“Fateful Attachments and Genetic Tracks of Vagabond Barnacles.”

Hawaii Institute of Marine Biology, Kaneohe, Hawaii, June 2, 2004  
“Where the barnacles roam: genetic tracks of a Hawaiian invader and a sea-turtle commensal.”

Claremont Colleges, Joint Science Department, Claremont, California, April 29, 2002  
“Where Have All the Larvae Gone?: Dispersal and Population Structure in Marine Benthic Systems.”

California State University, Fullerton, Department of Biological Science, February 25, 2002  
“Hitchhiking barnacles: larval development, dispersal and population genetics of invasive and commensal species.”