

DANIELLE CLAIRE ZACHERL

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EDUCATION

1995-2002 University of California, Santa Barbara. Ph.D. Ecology, Evolution and Marine Biology. Advisor: Dr. Steven Gaines
Spring 1996 Friday Harbor Laboratories, University of Washington. Comparative Invertebrate Embryology semester program. Professor: Dr. Richard Strathmann
1985-1989 Brown University. B.A. Biology. Sigma Xi Honor Society.

RESEARCH AND TEACHING EXPERIENCE

Associate Professor California State University Fullerton, CA. 2010-present.
Assistant Professor California State University Fullerton, CA. 2003-2010.
Instructor for Marine Ecology; Invertebrate Zoology; Evolution and Biodiversity; Problems in Environmental Biology; Marine Biology for non-majors; Graduate seminar: Classic Readings in Ecology; Graduate seminar: Dispersal in Marine and Terrestrial Systems; Professional Aspects of Biology: Teaching

Postdoctoral Research University of California, Los Angeles, CA. 2002- 2003.
Worked on a project entitled “Larval pathways and population connectivity in near shore marine organisms” funded by a two year grant from the Coastal Environmental Quality Initiative (CEQI). Examined metal uptake into calcified structures of molluscs. Advisors: Cheryl Ann Zimmer and Dick Zimmer

Ph.D. Research University of California, Santa Barbara, CA. 1995-2002.
Developed analytical techniques to identify source populations of marine invertebrates using natural chemical tags in larval calcified structures. Explored the biogeography and ecology of a marine gastropod, *Kelletia kelletii*, which experienced a recent northward range expansion. Examined predator-prey relationships of kelp forest invertebrates as a function of temperature and season.

Teaching Assistant University of California, Santa Barbara, CA. Fall 1999 and 2000.
Laboratory instructor for Invertebrate Zoology; Winter 1996 and 1997, discussion section instructor for Applied Marine Ecology.

Research Assistant Darling Marine Lab, Walpole, ME. Summer 1989.
Used field survey techniques and SCUBA to assist Dr. Phillip Yund and Dr. Steven Gaines in rocky intertidal and subtidal ecological research. Examined aspects of

fertilization success in hydroids and the role of thermal stress in determining local distributional patterns in whelks and mussels.

Teaching Assistant

Brown University, Providence, RI. Spring 1989.
Led weekly discussion section for Evolutionary Biology.

Teacher

Isidore Newman School, New Orleans, LA. 1991- 1995.
Developed curricula and taught courses in Environmental Science (senior elective), and Life Science (middle school). Taught Freshman Biology. Worked as outdoor instructor on Newman's mountaineering program for high school students (Colorado Alpine Adventures). Coached cross-country running.

Teacher

Friends Academy, Locust Valley, NY. 1990 -1991.
Developed curriculum and taught course in Environmental Science (senior elective). Taught Freshman Biology. Supervised work program, Advised Environmental Committee. Freshman Advisor.

AWARDS

- 2010 Orange County Parks Contract, \$18,368, Restoration of native oysters, *Ostrea lurida*, in Newport Bay
- 2010 CSU Special Fund for Research, Scholarship, and Creative Activity, \$5,000, Home again, home again? Do California Grunion, *Leuresthes tenuis*, return to their natal beach to spawn?
- 2009 California State University Missions and Goals Initiative, \$12,000, Effects of changes in environmental conditions on the performance of native and non-native oysters in Newport Bay, CA, with co-PI Jennifer Burnaford (CSUF)
- 2009 Newport Bay Naturalists and Friends Research Grant, \$1000, Effects of Habitat Modification on the Performance of Native and Non-native Oysters in Newport Bay, CA
- 2009 CSU Special Fund for Research, Scholarship, and Creative Activity, \$5,000, Do Olympia oysters, *Ostrea lurida*, settle and reproduce at their birth location?
- 2008 Outstanding Untenured Faculty Member, College of Natural Sciences and Mathematics, CSU Fullerton
- 2008 California Sea Grant Program Development Award, \$28,853, Can California Grunion Otoliths Act as Natal Tags to Determine Population Connectivity? With co-PI Karen Martin (Pepperdine)
- 2007 Nomination by the Department of Biological Science for the College of NSM Award for Outstanding Untenured Faculty Member
- 2007 CSU Fullerton General Faculty Research Award, \$2,667, Factors influencing population persistence of the Olympia oyster, *Ostrea conchaphila*
- 2007 CSU Fullerton Faculty-Undergraduate Student Support Initiative: Research and Creative Activity Grant, \$500, Larval vertical migration behavior in the marine snail *Kelletia kelletii* in the laboratory and field
- 2006 CSU Special Fund for Research, Scholarship, and Creative Activity, \$5,000, Assessing population connectivity of the west coast native oyster, *Ostrea conchaphila*
- 2005 CSU Fullerton Faculty-Undergraduate Student Support Initiative: Research and Creative Activity Grant, \$1,000, Effect of Conspecific Density and Season on Settlement of the Native Oyster, *Ostrea conchaphila*

2004-2008 National Science Foundation Award #OCE-0351860, \$232,778, Collaborative Research: Tracking Larval Invertebrate Dispersal Trajectories Using Calcified Structures, with co-PIs Bob Warner (UCSB) and Steve Gaines (UCSB)

2003-2004 CSU Special Fund for Research, Scholarship, and Creative Activity, \$4,500, Tracking invertebrate larval dispersal pathways using calcified structures

2001 Best Student Paper, 82nd meeting of Western Society of Naturalists, Ventura, CA

2001 University of California, Santa Barbara, Ecology, Evolution, and Marine Biology Departmental Block Grant – Winter 2001

1995–2000 National Science Foundation Graduate Research Training Fellowship (GRT)

1998, 1999 Houston Underwater Club Research Scholarship, \$3,000

1998 Lerner Gray Fund for Marine Research, \$1,000

1998 Sigma Xi Grants in Aid of Research, \$600

1997, 1998 Wrigley Institute for Environmental Studies Graduate Summer Scholarship

1996 Friday Harbor Laboratories (University of Washington) Training Scholarship

INVITED PRESENTATIONS

2009 Departmental Seminar, Moss Landing Marine Labs

2007 Departmental Seminar, Hopkins Marine Station, Stanford

2006 Departmental Seminar, Biology, University of Southern California

2006 Biol 422 guest lecture, CSU Fullerton

2006 ENST 500 guest lecture, CSU Fullerton

2004 Departmental Seminar, Marine Biology, Scripps Institute of Oceanography

2004 Departmental Seminar, Biology, San Diego State University

2004 Invited speaker, CEA CREST, (NSF Funded Centers of Research Excellence in Science and Technology), CSU Los Angeles

2003 Invited speaker, CEA CREST, CSU Los Angeles

2003 Symposium speaker, Western Society of Malacologists

2003 Departmental Seminar, Biological Science, California State University Fullerton

2003 Departmental Seminar, Ecology and Evolutionary Biology, University of Los Angeles

PUBLICATIONS (**BOLD** INDICATES STUDENT FIRST AUTHOR)

White C, Selcoe KA, Watson J, Siegel DA, Zacherl DC and Toonen RJ. 2010. Ocean currents help explain population genetic structure. *Proceedings of the Royal Society, B: Biological Sciences* 277: 1685-1694. First published online 4 February 2010, doi: 10.1098/rspb.2009.2214.

Polson M and DC Zacherl. 2009. Current geographic distribution and intertidal population status for the Olympia oyster, *Ostrea lurida*, from Alaska, USA to Baja California, Mexico. *Journal of Shellfish Research* 28: 69-77.

Polson M, Hewson WE, Eernisse DJ, Baker PK and DC Zacherl. 2009. You say *conchaphila*, I say *lurida*: Molecular evidence for restricting the Olympia oyster to temperate western North America. *Journal of Shellfish Research* 28: 11-21.

Seale E and DC Zacherl. 2009. Seasonal settlement of *Ostrea lurida* larvae in southern California estuaries. Journal of Shellfish Research 28: 113-120.

Zacherl DC, Morgan SG, Swearer SE, Warner RR. 2009. A shell of its former self. Can *Ostrea lurida* larval shells reveal information about a recruit's natal source? Journal of Shellfish Research 28:23-32.

Lloyd DC, Zacherl DC, Paradis G, Sheehy M, and RR Warner. 2008. Effects of temperature, natal site and seawater chemistry on statolith element incorporation in *Kelletia kelletii* larvae. Marine Ecology Progress Series 353: 115-130.

Thorrold S, Zacherl DC, and L Levin. 2007. Quantifying population connectivity via larval dispersal in benthic marine populations using geochemical signatures in calcified structures. Oceanography 20(3): 32-41.

Zacherl DC. 2007. Measurement of Dispersal In: Encyclopedia of Tide Pools, M. W. Denny and S. D. Gaines editors. Pp. 183-186.

Zacherl DC. 2005. Spatial and temporal variation in statolith and protoconch trace elements as natural tags to track larval dispersal. Marine Ecology Progress Series 290: 145-163.

Zacherl DC, Manríquez PH, Paradis G, Day RW, Castilla JC, Warner RR, Lea DW, Gaines SG. 2003. Trace elemental fingerprinting of gastropod statoliths to study larval dispersal trajectories. Marine Ecology Progress Series 248: 297-303.

Zacherl DC, Paradis G, Lea DW. 2003. Barium and strontium uptake in larval protoconch and statolith of the marine neogastropod *Kelletia kelletii*. Geochimica et Cosmochimica Acta 67: 4091-4099.

Zacherl DC, Gaines S, Lonhart S. 2003. The limits to biogeographical distributions: Insights from the northward range extension of the marine snail, *Kelletia kelletii* (Forbes, 1852) Journal of Biogeography 30:913-924.

MANUSCRIPTS IN PREPARATION (BOLD INDICATES STUDENT AUTHOR)

Walker KM, Kelley S, Romero M, Hoese WJ and DC Zacherl (in preparation for Veliger) Diel vertical migration of marine gastropod *Kelletia kelletii* larvae.

Koch SE, Kinlan B, Paradis GL, Warner RR, and DC Zacherl (in preparation for Ecological Applications) Geospatial statistics strengthen use of statoliths as natural tags to estimate population connectivity across a species range

Koch SE, Kinlan B, Paradis GL, Warner RR, and DC Zacherl (in preparation for Limnology and Oceanography) Immigration in the ocean: statoliths as larval passports.

CONTRIBUTED PRESENTATIONS (BOLD INDICATES STUDENT AUTHOR)

2010 **Polson MP**, Hewson WE, Eernisse DJ, Baker PK and DC Zacherl. You say *conchaphila*, I say *lurida*. Molecular evidence for restricting the Olympia oyster to temperate western North America. Aquaculture 2010, World Aquaculture Society, San Diego, CA, contributed talk

Zacherl, DC. We'll make their bed; will they lie in it? Plans for restoration of an *Ostrea lurida* population in Newport Bay, CA. Aquaculture 2010, World Aquaculture Society, San Diego, CA, contributed talk

2009 **Casillas E**, and DC Zacherl. Metal uptake into body tissues and statoliths of the marine gastropod *Kelletia kelletii*. SCERP symposium, CSU Fullerton, CA. Poster.

Koch SE, Kinlan BP, Warner RR, and DC Zacherl. Building empirical estimates of larval dispersal and population connectivity in a kelp forest species. Western Society of Naturalists, Monterey, CA, Contributed talk.

Fredell AW, Martin K, and DC Zacherl. Out of the sand and into the surf: Determining philopatry and population connectivity in the California grunion, *Leuresthes tenuis* (Atherinopsidae). Southern California Academy of Sciences, Marymount College, San Pedro, CA. Contributed talk.
Received Best Student Paper in Ecology and Evolution.

Fredell AW, Martin K, and DC Zacherl. Out of the sand and into the surf: Can we examine self-recruitment in the California grunion, *Leuresthes tenuis*, using natural geochemical tags? 4th International Otolith Symposium, Monterey, CA. Poster.

Fredell AW, Martin K, and DC Zacherl. Out of the sand and into the surf: Can we examine self-recruitment in the California grunion, *Leuresthes tenuis*, using natural geochemical tags? Western Society of Naturalists, Monterey, CA, Contributed talk.

Sam LA, and DC Zacherl. The settlement of *Ostrea lurida* as a function of tidal height. May 2009. Southern California Academy of Sciences (SCAS). Marymount College, San Pedro, CA. Contributed talk.

Kelley SL and DC Zacherl. Are all larvae created equal? Lipid variation in *Kelletia kelletii* larvae across their geographic range. Southern California Academy of Sciences (SCAS). Marymount College, San Pedro, CA. Contributed talk.

2008 **Koch SE**, Paradis G, Gaines S, Warner R and DC Zacherl. Exploring the use of statoliths as natural tags to estimate population across a species' range. Larval Biology Symposium, Lisbon, Portugal. Contributed talk.

Sam LA and DC Zacherl. Settlement of *Ostrea conchaphila* as a Function of Tidal Height. Southern California Academy of Sciences, Dominguez Hills, CA. Contributed talk.

Walker K, Hoese, BJ, and DC Zacherl. The light's on but nobody's home: Negative phototactic response of *Kelletia kelletii* larvae to light intensity and wavelength. Southern California Academy of Sciences, Dominguez Hills, CA. Poster.

2007 **Kelley SL**, Cortez, CJ, Walker, KM, Zacherl, DC, and BJ Hoese. Effects of light and column height on diel vertical migration of the marine gastropod *Kelletia kelletii*. Western Society of Naturalists, Ventura, CA. Poster.

Koch SE, Paradis G, Gaines SD, Warner RR, and DC Zacherl. Immigration in the ocean: statoliths as larval passports. Southern California Academy of Sciences, Fullerton, CA, contributed talk

Polson MP, Hewson WE, Eernisse DJ, Baker PK and DC Zacherl. You say *conchaphila*, I say *lurida*. West Coast Native Oyster Workshop, Shelton, WA, contributed talk

Raith, MR and DC Zacherl. Feeding preferences of the marine gastropod *Aplysia vaccaria*. Southern California Academy of Sciences, Fullerton, CA, poster

Raith MR and DC Zacherl. Feeding preferences of the marine gastropod *Aplysia vacarria*. Western Society of Naturalists, Ventura, CA, poster

Raith MR and DC Zacherl. Feeding preferences of the marine gastropod *Aplysia vacarria*. Southern California Animal Behavior Symposium, Long Beach CA, contributed talk

Sam LA and DC Zacherl. Settlement of *Ostrea conchaphila* as a Function of Tidal Height. Western Society of Naturalists. Ventura, Ca, poster

Sam, LA and DC Zacherl. Temporal and spatial variation in settlement of *Ostrea conchaphila* in Newport Bay, CA. Southern California Academy of Sciences, Fullerton, CA, poster

Seale E and DC Zacherl. To settle or not to settle: seasonal settlement of oyster larvae, *Ostrea conchaphila*, in two southern California estuaries. Southern California Academy of Sciences, Fullerton, CA, contributed talk, **received Best Student Paper Award in Ecology and Evolution**

Walker K, Hoese, BJ, and DC Zacherl. The light's on but nobody's home: Negative phototactic response of *Kelletia kelletii* larvae to light intensity and wavelength. Western Society of Naturalists. Ventura, Ca, poster

Zacherl DC, **Lloyd DC, Koch SE**, Paradis GL, and RR Warner. Destination Unknown? What invertebrate calcified structures can tell us about where larvae go. American Fisheries Society, San Francisco, CA, contributed talk

Zacherl DC. Destination Unknown: Explorations of Larval Dispersal. American Society of Limnologists and Oceanographers, Santa Fe, NM, contributed talk

2006 **Lloyd DC**, Zacherl DC, Paradis G, Sheehy M, and RR Warner. 'But you can't take the country out of the larva': site effects in calcified structures useful for larval tracking studies. Southern California Academy of Sciences, Malibu, CA, contributed talk

Lloyd DC, Zacherl DC, Paradis G, Sheehy M, and RR Warner. 'But you can't take the country out of the larva': site effects in calcified structures useful for larval tracking studies. 7th International Temperate Reef Symposium. Santa Barbara, CA, contributed talk

Navarro MN, Paradis G, Sheehy M, Warner R, and DC Zacherl. Linking statolith chemistry of *Aplysia californica* to watershed discharge plumes in the Southern California Bight. Southern California Academy of Sciences, Malibu, CA, poster

Polson MP and DC Zacherl. Current geographic distribution and intertidal population status for the native West Coast oyster, *Ostrea conchaphila*, from Alaska to Baja. West Coast Native Oyster Workshop, San Rafael, CA, contributed talk

Romero, M and DC Zacherl. Temperature effects on growth rate and diel vertical migration of *Kelletia kelletii* larvae. Society for Advancement of Chicanos and Native Americans in Science, Tampa, FL, **received Outstanding Student Poster Award in Marine Biology**

Seale E and DC Zacherl. Seasonal settlement of native West Coast oyster larvae (*Ostrea conchaphila*) in two California estuaries. West Coast Native Oyster Workshop, San Rafael, CA, poster

Seale E and DC Zacherl. Seasonal settlement of the native West Coast oyster (*Ostrea conchaphila*). Southern California Academy of Sciences, Malibu, CA, poster

Seale E and DC Zacherl. Seasonal settlement of native West Coast oyster larvae (*Ostrea conchaphila*) in two California estuaries. Society for Advancement of Chicanos and Native Americans in Science, Tampa, FL, **received Outstanding Student Poster Award in Ecology**

Zacherl DC, Morgan SG, Swearer SE and RR Warner. A Shell of its Former Self. Can *Ostrea conchaphila* Larval Shells Reveal Information About a Recruit's Birth Location? West Coast Native Oyster Workshop, San Rafael, CA, contributed talk

Zacherl DC, Morgan SG, Swearer SE and RR Warner. Can Bivalve and Gastropod Larval Shells and Statoliths Reveal Information About a Recruit's Natal Source? Ocean Sciences Meeting, Honolulu, Hawaii, contributed talk

2005 **Lloyd DC**, Zacherl DC, Paradis G, Sheehy M, and RR Warner. Effects of temperature, natal site and seawater chemistry on statolith element incorporation in *Kelletia kelletii* larvae. Western Society of Naturalists (WSN), Monterey, CA, poster

Navarro MN, Paradis G, Sheehy M, Warner R, and DC Zacherl. Linking statolith chemistry of *Aplysia californica* to watershed discharge plumes in the Southern California Bight. Western Society of Naturalists, Monterey, CA, poster

Polson MP and DC Zacherl. The biogeography and phylogeography of the native West Coast oyster, *Ostrea conchaphila*. Western Society of Naturalists, Monterey, CA, poster

Romero, M and DC Zacherl. Temperature effects on growth rate and diel vertical migration of *Kelletia kelletii* larvae. Western Society of Naturalists, Monterey, CA, poster

Seale E and DC Zacherl. The effects of conspecific density and season on settlement of the native oyster, *Ostrea conchaphila*. Western Society of Naturalists, Monterey, CA, poster

2004 Zacherl DC, Morgan SG, Swearer SE and RR Warner. A shell of its former self. Can a bivalve or gastropod larval shell reveal information about a recruit's natal source? Benthic Ecology Meeting, contributed talk

- 2003 Zacherl DC, Morgan SG, Swearer SE and RR Warner. A shell of its former self. Can a bivalve or gastropod larval shell reveal information about a recruit's birth location? Western Society of Naturalists, Long Beach, CA, contributed talk
- 2002 Zacherl DC. Where does the escargot? Tracking marine gastropod larvae using statolith and protoconch. American Society of Limnology and Oceanography, Victoria, B.C., contributed talk
- Zacherl DC, Manriquez PH, Paradis G, Day RW, Castilla JC, Warner RR, Lea DW, and SD Gaines. Dispersal of Larval Gastropods. Could statoliths open a window on the past? XXII Congreso de Ciencias del Mar, Valdivia, Chile, contributed talk
- 2001 Zacherl DC, Gaines SG, Lea DW, and G Paradis. Where does the escargot? Tracking marine gastropod larvae using statolith and protoconch. Western Society of Naturalists, Ventura, CA, contributed talk
- 2000 Zacherl DC. A new tool for marine biogeographers? Identifying source populations using statolith microchemistry. Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), Corvallis, OR, contributed talk
- Zacherl DC. A new tool for marine biogeographers? Identifying source populations using statolith microchemistry. Western Society of Naturalists, Portland, OR, contributed talk
- 1999 Zacherl DC, Krenz C and SD Gaines. Seasonally variable impacts of the Kellet's Whelk in California kelp forest communities. Benthic Ecology Meetings, Baton Rouge, LA, contributed talk
- Zacherl DC, Krenz C and SD Gaines. The impact of Kellet's whelk on California kelp forest communities. A large scale experimental manipulation. Western Society of Naturalists, San Diego, CA, contributed talk
- 1997 Zacherl DC and SD Gaines. The Kellet's whelk: Indicator of biogeographic change? Western Society of Naturalists, Monterey, CA, contributed talk

SYNERGISTIC ACTIVITIES

Reviewer - NSF Biological Oceanography Program, Marine Ecology Progress Series, Canadian Journal of Fisheries and Aquatic Sciences, Ecology, Geochimica et Cosmochimica Acta, Limnology and Oceanography

Mentor – supervising research projects of three graduate students, supervising three undergraduate students completing independent research projects funded by Southern California Environmental Research Program (SCERP, California State University Fullerton)

Committee member – Undergraduate Advancement Committee, Cell Biology Search Committee, Curriculum Committee, Vehicle Committee, Ocean Science Institute (OSI) Board, OSI Dive Control Board

COLLABORATORS (PAST 5 YEARS AND CURRENT)

Karen Martin, Pepperdine University; Steven Gaines, Univ. of California, Santa Barbara; Bob Warner, Univ. of California, Santa Barbara ; Steven Morgan, Univ. of California, Davis; Steve Swearer, Univ. of Melbourne, Australia; Juan Carlos Castilla, Pontificia Universidad Católica de Chile; Steve Lonhart, Sanctuary Integrated Monitoring Network (SIMoN); Patricio Manríquez, Universidad Austral de Chile, Valdivia; David Lea, Univ. Of California, Santa Barbara; Georges Paradis, Univ. Of California, Santa Barbara; Crow White, Univ. Of California, Santa Barbara; Rob Toonen, University of Hawaii

GRADUATE STUDENTS

Diana Lloyd, M.S. 2007
Sara Koch, M.S. 2008
Michael Navarro, M.S. 2008
Maria Polson, M.S. 2008
Andrew Fredell
Meredith Raith
Kim Walker

OTHER EXPERIENCE

PADI Open Water and AAUS Research Diver SCUBA certifications, California State University and University of California boat captain, recreational hiking and wilderness camping