

BERNARDO OSCAR BROITMAN ROJAS

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Centro de Estudios Avanzados en Zonas Áridas

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BIRTHDATE: March 22, 1973; Concepción, Chile.

NATIONALITY: Chile

RUT: 8.530.081-4

EDUCATION

Ph. D. (2004) Ecology, Evolution and Marine Biology, University of California, Santa Barbara

M. A. (2002) Ecology, Evolution and Marine Biology, University of California, Santa Barbara

B. Sc. (1995) Biological Sciences, Pontificia Universidad Católica de Chile

PROFESSIONAL EMPLOYMENT

Research

- Research Assistant, 1994-1996. Departamento de Ecología, Facultad de Ciencias Biológicas.

Pontificia Universidad Católica de Chile. Santiago, Chile.

- Research Assistant, 1996-1999. Estación Costera de Investigaciones Marinas, Facultad de

Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile.

- Postdoctoral Fellow, 2004-2005. Marine Science Institute, University of California, Santa Barbara. California, USA

- Postdoctoral Fellow, 2005-2008. National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara. California, USA

- Research Associate, 2006-present. Center for Advanced Studies in Ecology and Biodiversity. Pontificia Universidad Católica de Chile. Santiago, Chile

- Research Fellow, 2007-2009. Centro de Estudios Avanzados en Zonas Áridas. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile
- Director, 2009-present. Centro de Estudios Avanzados en Zonas Áridas. La Serena, Chile

Undergraduate teaching

- Invertebrate Zoology (BIO 116) Department of Ecology, Evolution and Marine Biology, University of California. Santa Barbara, California, USA. Teaching Assistant (2003)
- Introduction to Biology (BIO 1A) Department of Molecular, Cellular & Developmental Biology, University of California. Santa Barbara, California, USA. Teaching Assistant (2001)
- Principios de Ecología y Medio Ambiente. Departamento de Ecología, Pontificia Universidad Católica de Chile. Santiago, Chile. Instructor (1994)
- Zoología de Vertebrados. Departamento de Ecología, Pontificia Universidad Católica de Chile. Santiago, Chile. Teaching Assistant (1994)
- Zoología de Invertebrados Marinos. Departamento de Ecología, Pontificia Universidad Católica de Chile. Santiago, Chile. Teaching Assistant (1993)

Graduate teaching

- Biogeografía Marina (BM9A01). Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. Guest Professor (2007)
- Taller Biología Computacional, Ecología de Poblaciones y Comunidades (ECEV 423). Instituto de Ecología y Evolución. Universidad Austral de Chile. Lecturer (2008)
- Advanced Readings in Ecology. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. Lecturer (2008)
- Ecological Indicators for Conservation and Management. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. Lecturer (2009)
- Taller Biología Computacional, Ecología de Poblaciones y Comunidades (ECEV 423). Instituto de Ecología y Evolución. Universidad Austral de Chile. Lecturer (2009)
- Advanced Readings in Ecology. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. Lecturer (2009)

Student supervision

- 1 - Mauricio Cifuentes, M.Sc. (2009) Variacion temporal en la disponibilidad de sustrato colonizable y sus efectos en la sucesion de comunidades encrustantes en la costa norte de Chile. Facultad de Ciencias del Mar, Universidad Catolica del Norte. Coquimbo, Chile. Committee member.
- 2 - Andres Caro, Ph.D. (2009) Departamento de Ecologia, Facultad de Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile. Extramural Committee member.
- 3 - Galaxia Cortes, M.Sc. (2009) Regulación poblacional en el pingüino de Humboldt: el rol de la denso-dependencia y forzamientos ambientales sobre la sobrevivencia de los polluelos. Facultad de Ciencias del Mar, Universidad Catolica del Norte. Coquimbo, Chile. Committee member.
- 4 - Stella Januario (Current Ph.D. Student) Departamento de Ecologia, Facultad de Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile. Extramural Committee member.
- 5 - Gabriela Flores (Current Ph.D. Student) Departamento de Ecologia, Facultad de Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile. Extramural Committee member.
- 6 - Alejandra Arevalo (Current Ph.D. Student) Instituto de Ecologia y Evolucion, Facultad de Ciencias, Universidad Austral de Chile. Committee member.
- 7 - Alonso Vega (Current Ph.D. Student) Dr-BEA. Facultad de Ciencias del Mar, Universidad Catolica del Norte. Coquimbo, Chile. Main Advisor.

AWARDS

Graduate Student Award, Coastal Environmental Quality Initiative, 2002-2003

Graduate Student Travel Award. University of California, Santa Barbara, 2004

PROFESSIONAL MEMBERSHIPS

Ecological Society of America (1999-2001)

Sociedad de Ecología de Chile (2001-present)

American Society of Limnology and Oceanography (2005-present)

Society of America Archaeology (2007-present)

PROFESSIONAL SERVICE

Director, Sociedad de Ecología de Chile (2006-2010)

Alternate Research Member, Channel Island National Marine Sanctuary Advisory Council (2007-2008)

Webmaster Sociedad de Ecología de Chile (2001-present)

GRANTS

Multiple interacting mechanisms determine the geographic range edge of intertidal species.

Fondo Nacional de Ciencia y Tecnología – Chile (2009-2011). Principal Investigator (US\$250.000)

PEER-REVIEWER

Journals: Revista Chilena de Historia Natural; Oecologia; Global Ecology and Biogeography; Marine Ecology Progress Series; Coastal, Estuarine and Shelf Science; Ecology; Trends in Ecology and Evolution; Journal of Animal Ecology; Journal of Experimental Marine Biology and Ecology; Oikos; Ecography; Conservation Biology; Revista de Biología Marina y Oceanografía, Population Ecology.

National Research Commissions: The National Science Foundation (USA) and Fondo Nacional de Ciencia y Tecnología (Chile).

PUBLICATIONS

1. B. Helmuth, **B.R. Broitman**, L. Yamane, S. Gilman, K. Mach, K.A.S. Mislan and M.W. Denny. (2010) Organismal climatology: analyzing environmental variability at scales relevant to physiological stress. *Journal of Experimental Biology in press*
2. F.J. Tapia, S.A Navarrete, M. Castillo; B. A. Menge, J.C. Castilla, J. Largier, E.A Wieters, **B.R. Broitman** and J.A. Barth. (2009) Thermal indices of upwelling effects on inner-shelf habitats. *Progress in Oceanography* doi:10.1016/j.pocean.2009.07.035
3. C.A. Blanchette, D.R. Schiel, E.A.Wieters, **B.R. Broitman** and B.P. Kinlan. (2009) Trophic structure and diversity in rocky intertidal upwelling ecosystems: A comparison of community patterns across California, Chile, South Africa and New Zealand. *Progress in Oceanography* doi:10.1016/j.pocean.2009.07.038

4. E.A. Wieters, **B.R. Broitman**, G.M. Branch. (2009) Benthic community structure and spatio-temporal thermal regimes in two upwelling ecosystems: Comparisons between South Africa and Chile. **Limnology and Oceanography** 54:1060-1072
5. F. Bozinovic, J.M. Rojas, **B.R. Broitman** and R. Vasquez. (2009) Basal metabolism is correlated with habitat productivity among populations of degus. **Comparative Biochemistry and Physiology A** 152: 560-564 doi:10.1016/j.cbpa.2008.12.015
6. **B.R. Broitman**, L. Szathmary, K.A.S. Mislán, C.A. Blanchette and B. Helmuth. (2009) Predator-prey interactions under climate change: the importance of habitat vs. body temperature. **Oikos** 118:219-224 doi:10.1111/j.2008.0030-1299.17075.x
7. **B.R. Broitman**, N. Mieszkowska, B. Helmuth and C.A. Blanchette. (2008) Assessing climate effects on recruitment of rocky shore intertidal invertebrates in the Eastern North Atlantic. **Ecology** 89:S81-S90
8. J.R. Wilson, **B.R. Broitman**, J.E. Caselle and D.E. Wendt. (2008) Recruitment of coastal fishes and oceanographic variability in central California. **Estuarine, Coastal and Shelf Science** doi:10.1016/j.ecss.2008.05.001
9. C.A. Blanchette, C.M. Miner, P.T. Raimondi, D. Lohse, K.E.K. Heady and **B.R. Broitman** (2008) Biogeographic patterns of rocky intertidal communities along the Pacific coast of North America. **Journal of Biogeography** 35:1593-1607
10. **B.R. Broitman**, C.A. Blanchette, B.A. Menge, J. Lubchenco, C. Krenz, M. Foley, P.A. Raimondi, D. Lohse and S.D. Gaines. (2008) Spatial and temporal variability in the recruitment of intertidal invertebrates along the west coast of the USA. **Ecological Monographs** 78:403-421
11. S.A. Navarrete, **B.R. Broitman** and B.A. Menge (2008) Interhemispheric comparison of recruitment to rocky intertidal communities: pattern persistence and scales of variation. **Ecology** 89:1302-1322

12. N.A. Lagos, J.C. Castilla and **B.R. Broitman** (2008) Spatial environmental correlates of intertidal recruitment: a test using barnacles along the coast of northern Chile. *Ecological Monographs* 78:245-261
13. T.S. Del Sontro, I. Leifer, B.P. Luyendyk and **B.R. Broitman** (2007). Beach tar accumulation, transport mechanisms, and sources of variability at Coal Oil Point, CA. *Marine Pollution Bulletin* 54:1461-1471
14. **B.R. Broitman** and B.P. Kinlan (2006) Spatial scales of benthic and pelagic producer biomass in a coastal upwelling ecosystem. *Marine Ecology Progress Series* 327:15-25
15. B. Helmuth, **B.R. Broitman**, C.A. Blanchette, S. Gilman, P. Halpin, C.D.G. Harley, M.J. O'Donnell, G.E. Hofmann, B.A. Menge and D. Strickland (2006) Mosaic patterns of thermal stress in the Northeastern Pacific rocky intertidal zone: implications for climate change. *Ecological Monographs* 76:461-479
16. B.S. Halpern, K. Cottenie and **B.R. Broitman** (2006) Top-down vs. bottom-up effects in kelp forests – Response. *Science* 313:1738:1739
17. B.S. Halpern, K. Cottenie and **B.R. Broitman** (2006) Strong top-down control in southern California kelp forest ecosystems. *Science* 312:1230:1232
18. C.A. Blanchette, **B.R. Broitman** and S.D. Gaines (2006) Oceanographic forcing of intertidal community structure around Santa Cruz Island, California, USA. *Marine Biology* 149:689-701
19. S.A. Navarrete, E.A. Wieters, **B.R. Broitman** and J.C. Castilla (2005) Scales of benthic-pelagic coupling and the intensity of species interactions: from recruitment limitation to top down control. *Proceedings of the National Academy of Sciences, USA*. 102:18046-18051

20. **B.R. Broitman**, C.A. Blanchette and S.D. Gaines (2005) Recruitment of intertidal invertebrates and oceanographic variability at Santa Cruz Island, California. *Limnology and Oceanography*. 50:1473-1479
 21. E.T. Borer, E.W. Seabloom, J.B. Shurin, K. Anderson, C.A. Blanchette, **B.R. Broitman**, S.D. Cooper and B.S. Halpern (2005) What determines the strength of a trophic cascade? *Ecology*. 86:528–537
 22. E.T. Borer, K. Anderson, C.A. Blanchette, **B.R. Broitman**, S.D. Cooper, B.S. Halpern, E.W. Seabloom and J.B. Shurin (2002) Topological approaches to food web analyses: a few modifications may improve our insights. *Oikos*. 99:397-401
 23. J.B. Shurin., E.T. Borer, E. W. Seabloom, K. Anderson, C.A. Blanchette, **B.R. Broitman**, S.D. Cooper, B.S. Halpern (2002) A cross-ecosystem comparison of the strength of trophic cascades. *Ecology Letters*. 5:785-791
 24. S.A. Navarrete, **B.R. Broitman**, E.A. Wieters, G.R. Finke, R.M. Venegas and A. Sotomayor.(2002) Recruitment of intertidal invertebrates in the Southeast Pacific: Inter-annual variability and the 1997-1998 El Niño. *Limnology and Oceanography*. 47:791-802
 25. **B.R. Broitman**, S.A. Navarrete, F. Smith and S.D. Gaines (2001) Geographic variation of Southeastern Pacific intertidal communities. *Marine Ecology Progress Series*. 224:21-34
 26. P.A. Camus, Y.A. Andrade and **B.R. Broitman** (1999) Effects of substratum topography on species diversity and abundance in Chilean rocky intertidal communities. *Revista Chilena de Historia Natural*. 72:377-388
- In review
- H. Samaniego, **B.R. Broitman** and B.T. Milne. Analyzing Taylor’s Scaling Law: the effect of contrasting life history strategies in two Corvid species. at **Landscape Ecology**.

S.Menzel, C.V. Kappel, **B.R. Broitman**, F Micheli, A.A. Rosenberg. Linking human activity and ecosystem condition to inform marine ecosystem-based management. at **Journal of Applied Ecology**.

- Conference Proceedings

1. C.A. Blanchette, D.V. Richards, J.M. Engle, **B.R. Broitman** and S.D. Gaines. (2005) Regime shifts, community change and population booms of keystone predators at the Channel Islands. *Proceedings of the 6th California Islands Symposium*. pp. 435-441
2. C.A. Blanchette, P.A. Raimondi and **B.R. Broitman**. (2008) Spatial patterns of intertidal community structure across the California Channel Islands and links to ocean temperature. *Proceedings of the 7th California Islands Symposium in press*

- Book chapters

1. Flores C.F., **B.R. Broitman**, and P. Rivas (2008) Changes in the subsistence strategy of prehistoric intertidal gathering: The pre-ceramic and ceramic coastal hunter-gatherers of Reloncaví Sound, Chile. In: **Comparative Perspectives on the Archaeology of Coastal South America**, Robyn Cutright, Enrique López-Hurtado, and Alexander Martin (eds.) University of Pittsburgh Latin American Publications.

- In preparation

B.R. Broitman, F. Veliz, T. Manzur, E. A. Wieters, G.R. Finke, N. Valdivia, P. Fornes and S.A. Navarrete. Spatial patterns of rocky intertidal diversity of central Chile (29 – 36°S). For Revista Chilena de Historia Natural

B.R. Broitman, S.A Navarrete, C.A Blanchette, S.D. Gaines, M. Pfaff and G.M Branch. Invertebrate recruitment to intertidal habitats in California, South Africa and Chile: Relationships with satellite ocean temperature. For Limnology and Oceanography

B.R. Broitman, C.A. Blanchette and P.A. Raimondi. Rocky intertidal community structure and regulation across the Northeast Pacific. For Ecology

POSTDOCTORAL TRAINING

2007

Ecoinformatics Training for Ecologists. University of New Mexico. Albuquerque, NM, USA.

2006

Multivariate Analysis of Complex Experimental Designs. National Center for Ecological Analysis and Synthesis. University of California, Santa Barbara. Santa Barbara, CA, USA.

INVITED PRESENTATIONS

2008

Departmental Seminar. **Universidad de La Serena**, La Serena, Chile

Taller Procesos Estocásticos **Universidad de La Serena**, La Serena, Chile

2007

Departmental Seminar. **University of California, Davis**, CA, USA

Departmental Seminar. **Universidad Austral de Chile**, Valdivia, Chile

2006

Departmental Seminar. **University of Connecticut at Avery Point**, CT, USA

Departmental Seminar. **University of Rhode Island**, RI, USA

Departmental Seminar. **Santa Clara University**, CA, USA

2004

Departmental Seminar. **Universidad Austral de Chile**, Valdivia, Chile

SCIENTIFIC CONFERENCES (first author only)

2009 XVIII Reunión Anual de la Sociedad de Ecología de Chile, Valdivia, Chile. Múltiples mecanismos determinan el borde del rango en 4 especies intermareales. Oral presentation and Symposium organizer (Entre Tongoy y Los Molles (32-30°S): una zona de transición biogeográfica difusa en la costa de Chile central.).

2008 Eastern Boundary Upwelling Symposium, Las Palmas de Gran Canaria, Spain. Dynamics of larval arrival to intertidal habitats in California, Chile and South Africa. Oral presentation.

2008 Society of American Archaeology Annual Meeting, Vancouver, Canada. Spatial distribution of shellfish and shellfish harvesting on Santa Cruz Island: an Ecological and archaeological perspective. Oral presentation.

2007 III Reunión Binacional de Ecología, La Serena, Chile. Generación y mantención de patrones ecológicos en sistemas costeros. Oral presentation

- 2007 Society for Conservation Biology Annual Meeting, Port Elizabeth, South Africa. Exotic plants break competition-colonization tradeoffs in California flora. Poster presentation
- 2006 7th International Temperate Reef symposium, Santa Barbara, CA, USA. Recruitment dynamics of intertidal invertebrates in Chile and the US West coast. Oral presentation
- 2006 Ocean Sciences Meeting AGU-TAO-ASLO, Honolulu, Hawaii', USA. Recruitment of intertidal invertebrates along the US west coast and its relationship with AVHRR SST dynamics. Poster presentation.
- 2005 XIV Reunión Anual de la Sociedad de Ecología de Chile, Pucón, Chile. Variabilidad espaciotemporal en el reclutamiento de invertebrados marinos en la costa oeste de EEUU. Oral presentation.
- 2005 XXV Jornadas de las Ciencias del Mar, Coquimbo, Chile. Estructura espacial de la biomasa algal bentónica y pelágica en el sistema de surgencia costera del Oeste de Norteamérica. Oral presentation
- 2004 American Geophysical Union, Portland, Ocean Sciences Meeting, OR, USA. A coupled spatial pattern of benthic and pelagic ecosystem structure in coastal upwelling regions. Oral presentation.
- 2004 II Reunión Binacional de Ecología, Bariloche, Argentina. Patrones de reclutamiento y el forzamiento oceanográfico: comparando Chile central y la costa Oeste de EEUU. Invited Oral presentation
- 2004 Ecological Society of America, Portland, OR, USA Regime shifts, community change and population booms of keystone predators at the California Channel Islands. Oral presentation.
- 2004 XXIV Jornadas de las Ciencias del Mar, Coquimbo, Chile. Estructura espacial de la diversidad en el ensamble intermareal de Chile central. Invited Oral presentation.
- 2003 Eastern Pacific Ocean Conference, Catalina, CA, USA. A coupled spatial model of benthic and pelagic structure in coastal ecosystems. Oral presentation.
- 2003 Eastern Pacific Ocean Conference, Catalina, CA. Recruitment variability at Santa Cruz Island, California USA. Poster presentation.
- 2003 6th International Temperate Reef Symposium, Christchurch, New Zealand. Recruitment dynamics of intertidal invertebrates in the temperate East Pacific. Oral presentation.
- 2003 Western Society of Naturalists, Long Beach, CA, USA. A coupled spatial pattern of benthic and pelagic ecosystem structure in coastal upwelling regions. Oral presentation.
- 2003 Benthic Ecology Meeting, Mystic, CT, USA. Benthic-pelagic coupling and the structure of coastal metapopulations. Oral presentation.
- 2002 XII Reunión Anual de la Sociedad de Ecología de Chile, Puyehue, Chile. Escalas de regulación ambiental en procesos ecológicos. Oral presentation.
- 2002 Eastern Pacific Ocean Conference, Timberline Lodge, OR, USA. Recruitment dynamics in the Eastern Pacific: an interhemispherical comparison. Oral presentation.
- 2000 Western Society of Naturalists, Portland, OR, USA. Patterns of intertidal community structure in central Chile. Oral presentation.
- 2000 I Reunión Binacional de Ecología, Bariloche, Argentina. Estructura geográfica de comunidades intermareales del Pacífico Sureste. Oral presentation.
- 2000 5th International Temperate Reef Symposium, Cape Town, South Africa. Geographic variation of southeastern Pacific intertidal communities. Oral presentation.
- 1997 XVII Jornadas de las Ciencias del Mar, Santiago, Chile. Caracterización de la composición taxonómica y estructura trófica de comunidades intermareales rocosas en el Norte de Chile en función de la presencia/ausencia de surgencia. Poster presentation.

1996 XVII Jornadas de las Ciencias del Mar, Concepcion, Chile. Oral presentation.

1995 XXXVIII Reunión anual de la Sociedad de Biología de Chile, Viña del Mar, Chile.

Parámetros demográficos en poblaciones de *Emerita analoga*. Poster presentation.

OUTREACH

2008

Tertulias Científicas IEB – CEAZA. Bodegon Cultural Los Vilos, Los Vilos, Chile. ¿A donde van los hijos del Picoroco?

2009

Tertulias Científicas CEAZA. Cafe Terracota, La Serena, Chile. Lapas acaloradas en la Region de Coquimbo

Dia del medio Ambiente. Municipalidad de Coquimbo. UCN, Coquimbo, Chile. Entre Tongoy y Los Vilos: una zona de transicion.