

**BERNARDO OSCAR BROITMAN ROJAS**

Bernardo Oscar Broitman Rojas

Centro de Estudios Avanzados en Zonas Áridas

Ossandon 877, Coquimbo, Chile

Office 56 51 2204378

bernardo.broitman@ceaza.cl

<http://www.broitman.cl>

[URL](#) | [ORCID](#) | [Google Scholar](#)

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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

**Research & Academic positions**

- 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, 2006-2012. Center for Advanced Studies in Ecology and Biodiversity (CASEB). Pontificia Universidad Católica de Chile. Santiago, Chile

- Senior Research Fellow, 2007-present. Centro de Estudios Avanzados en Zonas Áridas (CEAZA). Coquimbo, Chile

- Executive Director, 2009-2016. Centro de Estudios Avanzados en Zonas Áridas (CEAZA). La Serena, Chile

- Visiting Professor, 2011-present. Universidad Católica del Norte. Coquimbo, Chile.
- Research Associate, 2011-2017. Núcleo Milenio Centro de Conservación Marina (CCM).
- Deputy Director, 2013-present. Núcleo Milenio Centro para el estudio de Forzantes Múltiples sobre Sistemas Marinos (MUSELS).
- Visiting Scholar, 2nd Semester, 2016. Facultad de Ciencias Ambientales - EULA, Universidad de Concepción, Chile
- Professor, 2019-present. Departamento de Ciencias, Facultad de Artes Liberales, Universidad Adolfo Ibáñez, Viña del Mar, Chile.

### **Undergraduate teaching**

- Principles of Climate Change. Department of Education, Universidad de La Serena (2014)
- 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 (2008-2009, 2011)
- 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)

Programming Tools. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. Lecturer (2011)

Applied Ecology. Dr-BEA programme, Universidad Católica del Norte. Coquimbo, Chile. Invited Lecturer (2012-2013)

Taller de Biología Computacional. Doctorado en Ciencias Ambientales – EULA, Universidad de Concepción, Chile. Lecturer (2016)

Applied Ecology. Dr-BEA programme, Universidad Católica del Norte. Coquimbo, Chile. Lecturer and course coordinator (2015-2018)

### **Student supervision**

#### **Graduated**

1 - Mauricio Cifuentes M.Sc. (2008) Marine Sciences, Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Committee member**. Main advisor: Dr. Martin Thiel  
Variación temporal en la disponibilidad de sustrato colonizable y sus efectos en la sucesión de comunidades incrustantes en la costa norte de Chile

2 - Andres Caro, Ph.D. (2009) Departamento de Ecología, Facultad de Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile. **Extramural Committee member**. Main advisor: Dr. Juan Carlos Castilla & Dr. Sergio A. Navarrete  
Efectos de la variabilidad en reclutamiento sobre la estructura comunitaria y la competencia por espacio en sistema intermareal de Chile central

3 - Galaxia Cortés, M.Sc. (2009) Marine Sciences, Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Committee member**. Main advisor: Dr. Guillermo Luna-Jorquera  
Regulación poblacional en el pingüino de Humboldt: el rol de la densidad-dependencia y forzamientos ambientales sobre la sobrevivencia de los polluelos

4 - Stella Januario, Ph.D. (2012) Departamento de Ecología, Facultad de Ciencias Biológicas. Pontificia Universidad Católica de Chile. Santiago, Chile. **Extramural Committee member**. Main advisor: Dr. Sergio A. Navarrete  
Asentamiento, canibalismo y depredación entre estadios postlarvales de dos especies de jaibas depredadoras del género *Acanthocyclus*

5 - Mauricio Oróstica, M.Sc. (2013) Marine Sciences, Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Co-Advisor** with Dr. Julio A. Vasquez  
Efecto de la herbivoría sobre la estructura espacial del reclutamiento de *Lessonia berteroa* Montagne (Laminariales, Phaeophyceae): Consecuencias para la coalescencia

6 - Evelyn Álvarez M.Sc. (2013) Facultad de Ciencias, Departamento de Biología, Universidad de La Serena, Chile. **Committee member**. Main Advisor: Dr. Angeline Bertin  
Importancia relativa del ambiente local y de la dispersión sobre la estructuración de comunidades de humedales altoandinos.

7 - Iris Moreno B.Sc. (2014) Marine Biology, Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Main Advisor**.  
Inversión reproductiva y reclutamiento, de dos moluscos intermareales en el límite sur de su distribución geográfica

8 – Jessica Bonnicelli, Ph.D (2014) Department of Oceanography, Facultad de Ciencias Naturales y Oceanográficas, Universidad de Concepción, Chile. **Extramural Committee member**. Main Advisor: Dr. Fabian J. Tapia  
Variabilidad diurna del viento y condiciones hidrográficas como determinantes del transporte y patrones de asentamiento de larvas de invertebrados bentónicos en la Bahía de Cartagena – Chile central

9 - Alonso Vega, Ph.D. (2015) Dr-BEA. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Main Advisor**.  
Indicadores para el monitoreo de la integridad ecológica de praderas explotadas de huirales explotados del complejo *Lessonia nigrescens* en el norte de Chile

10 – Mario León, Ph.D. (2016) Dr-BEA. Facultad de Ciencias, Universidad de La Serena. Chile. **Committee member**. Main Advisor: Dr. Francisco A. Squeo  
Interacciones en plantas en una comunidad semiárida del norte-centro de Chile: El rol de la facilitación, competencia y perturbación en las plantas

11- Carlos Lara Ph.D. (2016) Dr-BEA. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Main Advisor**  
Escala-dependencia de los procesos biofísicos costeros y su rol sobre la estructura de la biodiversidad marina  
Currently: Assistant Professor, Universidad Bernardo O'Higgins

12- Cynthia Asorey Ph.D. (2017) Dr-BEA. Facultad de Ciencias del Mar, Universidad Católica del Norte. Coquimbo, Chile. **Committee member**. Main advisor: Dr. Pilar A. Haye  
Diversificación y coexistencia de Lottidae (Mollusca: Patellogastropoda) en la costa del Pacífico Suroriental

### **Postdoctoral supervision**

1- **Dr. Nelson Valdivia** (2010-2012) FONDECYT 3100014 Environmental heterogeneity may induce functional compensation and increase stability in rocky shore ecosystems.  
Currently: Assistant Professor, Universidad Austral de Chile

2- **Dr. Moises Aguilera** (2010-2013) CEAZA Marine Ecology fellow.  
Currently: Assistant Professor, Universidad Católica del Norte.

3- **Dr. Shelley MacDonell** (2010-2013) FONDECYT 3110053 Modeling glacier meltwater production in the dry Andes.

Currently: Senior Researcher, CEAZA

4- **Dr. Guillermo Aravena** (2011-2012) FONDECYT 3120163 Influence of climate variability on recruitment of intertidal communities in the central coast of Chile: an upwelling zone in the Humboldt current system.

Currently: Scientific Advisor, CONICYT, Chile

5- **Dr. Tatiana Manzur** (2014-2017) FONDECYT 3150240 Environmental regulation of non-lethal predator effects: consequences on prey populations and propagation to rocky shore community dynamics.

Currently: Independent researcher

### **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- 2015)

Sociedad de Ecología de Chile (2001-present)

American Society of Limnology and Oceanography (2005-2008)

Society of American Archaeology (2007-2011)

### **PROFESSIONAL SERVICE**

President, Sociedad de Ecología de Chile (2015-2017)

Vicepresident, Sociedad de Ecología de Chile (2013-2015)

Earth Sciences Scientific panel, Fondo Nacional de Ciencia y Tecnología (Chile), (2011-2013)

Board of Directors, Sociedad de Ecología de Chile (2006-current)

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

Webmaster, Sociedad de Ecología de Chile (2001-2010)

### **GRANTS**

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

Fondo Nacional de Ciencia y Tecnología #1090488 – Chile (2009-2011). Principal Investigator (US\$250.000)

- Implementación de una Red de Monitoreo Meteorológico como herramienta de apoyo a la toma de decisiones en el ámbito agrícola y Acuícola de la región de Coquimbo. Fondo de Innovación para la Competitividad - Chile (2011-2013). Project Director (US\$1.200.000)
- Multiscale biophysical determinants of larval arrival to benthic habitats and effects on intertidal biodiversity. Fondo Nacional de Ciencia y Tecnología #1120988 – Chile (2012-2015). Principal Investigator (US\$350.000)
- Latitudinal shift in the coupling of inner-shelf and mesoscale upwelling variability as an explanation for the ecological break observed along central-northern Chile (30-31°S). Fondo Nacional de Ciencia y Tecnología #1120896 – Chile (2012-2014) Co-Investigador, PI Fabian Tapia (UdeC) (US\$350.000)
- Millennium Nucleus Center for the Study of Multiple Drivers on Marine Socio-Ecological Systems (MUSELS). MINECON Project NC120086 (2013-2016). Deputy Director, Director Cristian Vargas (UdeC) (US\$1.200.000)
- The links among multiple dimensions of ecological stability through species dynamics, disturbances, and connectivity in rocky intertidal communities. Fondo Nacional de Ciencia y Tecnología #1141037 – Chile (2014-2017). Co-Investigador, PI Nelson Valdivia (UACH) (US\$429.000)
- Determinants of marine biogeographic breaks: The underestimated relevance of pH variation. Fondo Nacional de Ciencia y Tecnología #1140092 – Chile (2014-2017). Co-Investigador, PI Marco Lardies (UAI) (US\$417.000)
- Plataforma de Prospección Solar Región de Coquimbo: Fase I. Fondo de Innovación para la Competitividad - Chile (2014-2015). Project Director (US\$270.000)
- Desarrollo de Capacidades y Bases Tecnológicas para la Adaptación al Cambio Climático en la Acuicultura de Bivalvos. II Concurso de Centros Regionales para el Desarrollo Territorial mediante proyectos I+D 2016 – Chile (2017-2019). Project Director (US\$150.000)
- Millennium Nucleus Center for the Study of Multiple Drivers on Marine Socio-Ecological Systems (MUSELS). MINECON Project NC120086 (2017-2019). Deputy Director, Director Cristian Vargas (UdeC) (US\$1.000.000)
- Multiple stressors and the functional diversity of coastal ecosystems. Fondo Nacional de Ciencia y Tecnología #1181300 – Chile (2018-2021). Principal Investigator (US\$415.000)

### PEER-REVIEW

**Journals:** 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; Journal of Biogeography; Ciencias Marinas; Journal of Biogeography; Revista Chilena de Historia Natural; Journal of the Marine Biological Association UK; Aquaculture; Scientific Reports; Ecology and Society; Frontiers in Ecology and Evolution; Phycologia; Frontiers in Marine Science.

**National Research Commissions:** The National Science Foundation (NSF - USA), Fondo Nacional de Ciencia y Tecnología (FONDECYT - Chile), Instituto Antártico Chileno (INACH - Chile), Sociedad Chilena de Ciencias del Mar (SCCM – Chile)

**Associate Editor:** Ciencias Marinas (Mexico, 2010 - 2014), Editor-in-chief Walter Daessle, Revista Chilena de Historia Natural (Chile, 2011 - present), Editor-in-chief Patricio Ojeda.

**Academic Commissions:** Comisión Nacional de Acreditación – Par evaluador Postgrado (CNA – Chile).

### PUBLICATIONS

(Citations in Google scholar as of June 20, 2018, total: 3657)

1. M. Barahona, **B.R. Broitman**, S. Faugeron, L. Jaugeon, A. Ospina-Alvarez, D. Véliz, and S.A. Navarrete. Environmental and demographical factors influence the spatial genetic structure of an intertidal barnacle in central-northern Chile. **Marine Ecology Progress Series** *accepted*
2. D.A.Narváez, **B.R. Broitman**, C.A. Vargas, C. Lara, C. Segura, F.J. Tapia, L.A. Cuevas and S. Garcia-Loyola. Dominant scales of subtidal variability in coastal hydrography of the Northern Chilean Patagonia. **Journal of Marine Systems** *accepted*

3. C. Lara, G.S. Saldías, B. Cazelles, P.A. Haye, M.M. Rivadeneira and **B.R. Broitman**. Coastal biophysical processes and the biogeography of intertidal species along the Southeastern Pacific coast. **Journal of Biogeography** *early view* doi:10.1111/jbi.13492
4. M.A. Aguilera, N. Valdivia, S. Jenkins, S.A. Navarrete and **B.R. Broitman**. Asymmetric competitive effects during species range expansion: an experimental assessment of interaction strength between 'equivalent' grazer species at their range overlap. **Journal of Animal Ecology** *early view* doi:10.1111/1365-2656.12917
5. D. Sznycer, D. Xygalatas, E. Agey, S. Alami, X-F. An, K.I. Ananyeva, **B.R. Broitman**, T.J. Conte, C. Flores, S. Fukushima, H. Hitokoto, A.N. Kharitonov, C.N. Onyshi, I.E. Onyshi, P.P. Romero, J.M. Schrock, L.S. Sugiyama, K. Takemura, C. Townsend, J-Y. Zhuang, A. Aktipis, L. Cronk, L. Cosmides and J. Tooby. (2018) Cross-cultural invariances in the architecture of shame. **Proceedings of the National Academy of Sciences** 115(39):9702-9707 doi.org/10.1073/pnas.1805016115
6. **B.R. Broitman**, M.A. Aguilera, N.A. Lagos and M.A. Lardies. (2018) Phenotypic plasticity at the edge: contrasting population-level responses at the overlap of the leading and rear edge of the geographic distribution of two *Scurria* limpets. **Journal of Biogeography** 45(10):2314-2325 doi:10.1111/jbi.13406
7. C. Lara, G.S. Saldías, A.L. Paredes, B. Cazelles and **B.R. Broitman**. (2018) Temporal variability of MODIS phenological indices in the temperate rainforest of northern Patagonia. **Remote Sensing** 10(6):956 doi.103390/rs10060956
8. C.F. Flores, **B.R. Broitman**, D. Salazar and E. Gayó. (2018)  $\delta^{18}\text{O}$  of *Fissurella maxima* as a proxy for reconstructing Early Holocene sea surface temperatures in the coastal Atacama desert (25°S). **Palaeogeography, Palaeoclimatology, Palaeoecology** 499:22-34 doi:10.1016/j.palaeo.2018.03.031



9. T. Manzur, A. Gonzalez and **B.R. Broitman**. (2018) Scales of predator detection behavior and escape in *Fissurella limbata*: a field and laboratory assessment. *Marine Ecology* 39:e12492 doi:10.1111/maec.12492
10. M.A. Freilich, E. Wieters, **B.R. Broitman**, P.A. Marquet and S.A. Navarrete. (2018) Species co-occurrence networks: can they reveal trophic and non-trophic interactions in ecological communities? *Ecology* 99(3):690-699 doi:10.1002/ecy.2142 **citations: 1**
11. T.M. Smith, P.H. York, **B.R. Broitman**, M. Thiel, G.C. Hays, E. van Sebille, N.F. Putman, P.I. Macreadie and C.D.H. Sherman. (2018) Rare long distance dispersal of a marine angiosperm across the Pacific Ocean. *Global Ecology and Biogeography* 27(4):487-496 doi:10.1111/geb.12713
12. G.M. Parada, E.A. Martínez, M.A. Aguilera, M.H. Oróstica and **B.R. Broitman**. (2017) Interactions between kelp spores and encrusting and articulated coralline algae: recruitment challenges for *Lessonia spicata*. *Botanica Marina* 60(6):619-625 doi:10.1515/bot-2017-0010
13. C. Lara, G.S. Saldías, T.K. Westberry, M.J. Behrenfeld and **B.R. Broitman**. (2017) First assessment of MODIS satellite ocean color products (OC3 and nFLH) in the Inner Sea of Chiloé, northern Patagonia. *Latin American Journal of Aquatic Research* 45(4): 822-827 doi:10.3856/vol45-issue4-fulltext-18
14. C.A. Vargas, N.A. Lagos, M.A. Lardies, C. Duarte, P.H. Manríquez, V.M. Aguilera, **B.R. Broitman**, S. Widdicombe and S. Dupont. (2017) Species specific responses to ocean acidification should account for local adaptation and adaptive plasticity. *Nature Ecology & Evolution* 1:0084 doi: 10.1038/s41559-017-0084 **citations: 18**
15. Valdivia, V. Segovia, E. Fica, C. Campos, M. A. Aguilera and **B.R. Broitman**. (2017) Context-dependent functional dispersion across similar ranges of trait space covered by intertidal rocky shore communities. *Ecology and Evolution* doi: 10.1002/ece3.2762

16. **B.R. Broitman**, B.S. Halpern, S. Gelcich, M.A. Lardies, C.A. Vargas, F. Vásquez-Lavín, S. Widdicombe and S.N.R. Birchenough. (2017) Dynamic interactions among boundaries and the expansion of sustainable aquaculture. *Frontiers in Marine Science* 4(15) doi: 10.3389/fmars.2017.00015 **citations: 4**
  
17. B. Helmuth, F. Choi, A. Matzelle, J. Torossian, S. Morello, K.A.S. Mislán, L. Yamane, D. Strickland, P.L. Szathmary, S. Gilman, A. Tockstein, T. Hilbish, M. Burrows, A.M. Power, E. Gosling, N. Mieszkowska, C. Harley, M. Nishizaki, E. Carrington, B. Menge, L. Petes, M. Foley, A. Johnson, M. Poole, M. Noble, E. Richmond, M. Robart, J. Robinson, J. Sapp, J. Sones, **B.R. Broitman**, M. Denny, K. Mach, L. Miller, M. O'Donnell, P. Ross, G. Hofmann, M. Zippay, C. Blanchette, J.A. Macfarlan, E. Carpizo-Ituarte, B. Ruttenberg, C. Peña Mejía, C. McQuaid, J. Lathlean, C. Monaco, K. Nicastro and G. Zardi. (2016) Long-term, high frequency in situ measurements of intertidal mussel bed temperatures using biomimetic sensors. *Scientific Data* 3:160087 DOI: 10.1038/sdata.2016.87 **citations: 11**
  
18. N.A. Lagos, S. Benitez, C. Duarte, M.A. Lardies, **B.R. Broitman**, C. Tapia, P. Tapia, S. Widdicombe and C.A. Vargas. (2016) Effects of temperature and ocean acidification on shell characteristics of *Argopecten purpuratus*: implications for scallop aquaculture in an upwelling-influenced area off northern Chile. *Aquaculture Environment Interactions* 8:357-370 doi: 10.3354/aei00183 **citations: 6**
  
19. M.A. Aguilera, M. Thiel and **B.R. Broitman**. (2016) Artificial breakwaters as garbage bins: structural complexity enhances anthropogenic litter accumulation in marine intertidal habitats. *Environmental Pollution* 214:737-747 **citations: 11**
  
20. C. Lara, G.S. Saldías, F.J. Tapia, J.L. Iriarte and **B.R. Broitman**. (2016) Interannual variability in temporal patterns of Chlorophyll-a and their potential influence on the supply of mussel larvae to inner waters in northern Patagonia (41-44°S). *Journal of Marine Systems* 155:11-18 doi: 10.1016/j.jmarsys.2015.10.010 **citations: 12**

21. M.A. Aguilera, N. Valdivia and **B.R. Broitman**. (2015) Facilitative effect of a generalist herbivore on the recovery of a perennial alga: consequences for persistence at the edge of their geographic range. *PLoS ONE* 10(12): e0146069 doi: 10.1371/journal.pone.0146069 **citations: 4**
22. N. Valdivia, M.A. Aguilera, S.A. Navarrete and **B.R. Broitman**. (2015) Disentangling the effects of propagule supply and environmental filtering on the spatial structure of a rocky shore metacommunity *Marine Ecology Progress Series* 538:67-69 doi: 10.3354/meps1 **citations: 5**
23. M.A. Aguilera, N. Valdivia and **B.R. Broitman**. (2015) Herbivore-alga interaction strength influences spatial heterogeneity in a kelp-dominated intertidal community *PLoS ONE* 10(9): e0137287 doi:10.1371/journal.pone.0137287 **citations: 7**
24. S. Aswani, C.F. Flores and **B.R. Broitman**. (2015) Human harvesting impacts on managed areas: ecological effects of socially-compatible shellfish reserves. *Reviews in Fish Biology and Fisheries* DOI 10.1007/s11160-014-9376-4 **citations: 12**
25. M.A. Aguilera, **B.R. Broitman** and M. Thiel. (2014) Spatial variability in community composition on a granite breakwater versus natural rocky shores: lack of microhabitats suppresses intertidal biodiversity. *Marine Pollution Bulletin* DOI: 10.1016/j.marpolbul.2014.07.046 **citations: 21**
26. M.H. Orostica, M.A. Aguilera, G.A. Donoso, J.A. Vasquez and **B.R. Broitman**. (2014) Effect of grazing on distribution and recovery of harvested kelp stands of *Lessonia berteroana* in northern Chile. *Marine Ecology Progress Series* 511:71-82 doi: 10.3354/meps10931 **citations: 15**
27. G.H. Aravena, **B.R. Broitman** and N.C. Stenseth. (2014) Twelve years of change in coastal upwelling along the central-northern coast of Chile: spatially heterogeneous responses to climatic variability. *PLoS ONE* 9(2): e90276. doi:10.1371/journal.pone.0090276 **citations: 34**

28. J.M.A. Vega, **B.R. Broitman** and J.A. Vasquez. (2014) Monitoring the sustainability of *Lessonia nigrescens* (Laminariales, Phaeophyceae) in northern Chile under strong harvest pressure. *Journal of Applied Phycology* doi: 10.1007/s10811-013-0167-4 **citations: 21**
29. S. Menzel, C.V. Kappel, **B.R. Broitman**, F. Micheli and A.A. Rosenberg. (2013) Linking human activity and ecosystem condition to inform marine ecosystem-based management. *Aquatic Conservation: Marine and Freshwater Ecosystems* doi: 10.1002/aqc.2365 **citations: 12**
30. M.A. Aguilera, S.A. Navarrete and **B.R. Broitman**. (2013) Direct and indirect effects of different grazer species on periphyton productivity and composition in a temperate rocky shore *Marine Ecology Progress Series* doi: 10.3354/meps10297 **citations: 12**
31. M.A. Aguilera, N. Valdivia and **B.R. Broitman**. (2013) Spatial niche differentiation and coexistence at the edge: co-occurrence distribution patterns in *Scurria* limpets. *Marine Ecology Progress Series* 483:185-198 doi: 10.3354/meps10293 **citations: 4**
32. N. Valdivia, A.E. González, T. Manzur and **B.R. Broitman**. (2013) Mesoscale variation of mechanisms contributing to stability in rocky shore communities. *PLoS ONE* 8(1):e54159. doi:10.1371/journal.pone.0054159 **citations: 8**
33. A. Montecinos, **B.R. Broitman**, S. Faugeron, P.A. Haye, F. Tellier and M-L. Guillemin. (2012) Species replacement along a linear coastal habitat: phylogeography and speciation in the red alga *Mazzaella laminarioides* along the South East Pacific. *BMC Evolutionary Biology* 12:97 **citations: 45**
34. M.A. Molina-Montenegro, E.E. Cleland, S.M. Watts and **B.R. Broitman**. (2012) Can a breakdown in the competition-colonization trade-offs help explain the success of exotic species in the California flora? *Oikos* 121:389-395 DOI: 10.1111/j.1600-0706.2011.18943 **citations: 12**

35. F. Tellier, J.M.A. Vega, **B.R. Broitman**, J.A. Vasquez, M. Valero and S. Faugeton. (2011) The importance of having two species instead of one in kelp management: the *Lessonia nigrescens* species complex. *Cahiers du Biologie Marine* 52:455-465 **citations: 21**
36. **B.R. Broitman**, F. Veliz, T. Manzur, E. A. Wieters, G.R. Finke, N. Valdivia, P. Fornes and S.A. Navarrete. (2011) Spatial patterns of rocky intertidal diversity of central Chile (29 – 36°S). *Revista Chilena de Historia Natural* 85:143-154 **citations: 15**
37. A.S. Mislán, C.A. Blanchette, **B.R. Broitman** and L. Washburn. (2011) Oceanic influx characteristics influence the macroecology of wave-exposed rocky shore ecosystems. *Limnology and Oceanography* 56:857-866 doi:10.4319/lo.2011.56.3.0857 **citations: 12**
38. M.C. Pfaff, G.M. Branch, E.A. Wieters, R.A. Branch, **B.R. Broitman**. (2011) Upwelling intensity and wave action determine recruitment of intertidal mussels and barnacles in the Southern Benguela upwelling region. *Marine Ecology Progress Series* 425:141-152 doi:10.3354/meps09003 **citations: 28**
39. P. Fornes, **B.R. Broitman**, M. Escobar and P. Báez. (2010) Composición de ácidos grasos en huevos y adultos de *Tigriopus angulatus* (Copepoda : Harpacticoida) *Revista de Oceanografía y Biología Marina* 45:489-495 **citations: 2**
40. R. Rosa, L. Gonzalez, **B.R. Broitman**, S. Garrido, A.M.P. Santos and M.L. Nunes. (2010) Bioenergetics of small pelagics in upwelling systems: relationship between fish condition, coastal ecosystem dynamics and fisheries. *Marine Ecology Progress Series* 410:205-218 doi: 10.3354/meps08635 **citations: 22**
41. B. Helmuth, **B.R. Broitman**, L. Yamane, S. Gilman, K. Mach, K.A.S. Mislán and M.W. Denny. (2010) Organismal climatology: analyzing environmental variability at scales relevant to physiological stress. *Journal of Experimental Biology* 213:995-1003 doi:10.1242/jeb.038463 **citations: 158**

42. 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* 83:278-287 doi:10.1016/j.pocean.2009.07.035 **citations: 32**
43. 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* 83:107-116 doi:10.1016/j.pocean.2009.07.038 **citations: 52**
44. 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 **citations: 48**
45. 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 **citations: 50**
46. **B.R. Broitman**, L. Szathmary, K.A.S. Mislan, 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 **citations: 63**
47. **B.R. Broitman**, N. Mieszkowska, B. Helmuth and C.A. Blanchette. (2008) Climate and recruitment of rocky shore intertidal invertebrates in the Eastern North Atlantic. *Ecology* 89:S81-S90 **citations: 27**
48. 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 **citations: 40**
49. 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 **citations: 129**

50. **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 **citations: 102**
51. 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 **citations: 86**
52. 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 **citations: 49**
53. 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 **citations: 26**
54. **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 **citations: 60**
55. 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 **citations: 287**
56. B.S. Halpern, K. Cottenie and **B.R. Broitman** (2006) Top-down vs. bottom-up effects in kelp forests – Response. *Science* 313:1738:1739 **citations: 21**
57. B.S. Halpern, K. Cottenie and **B.R. Broitman** (2006) Strong top-down control in southern California kelp forest ecosystems. *Science* 312:1230:1232 **citations: 104**

58. C.A. Blanchette, **B.R. Broitman** and S.D. Gaines (2006) Intertidal community structure and oceanographic patterns around Santa Cruz Island, California, USA. *Marine Biology* 149:689-701 **citations: 95**
59. 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 **citations: 206**
60. **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 **citations: 76**
61. 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 **citations: 421**
62. 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 **citations: 36**
63. 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 **citations: 733**
64. 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 **citations: 93**



65. **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  
**citations: 247**

66. 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 **citations: 3**

**- 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 **citations:14**

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. Aguilera M.A. et al. (2018) Chapter 46 - Chile: Environmental Status and Future perspectives. In: **World Seas: En Environmental Evaluation** . <https://doi.org/10.1016/B978-0-12-805068-2.00046-2>

2. Yañez E. et al. (2017) Chapter 10 - Impacts of Climate Change on Marine Fisheries and Aquaculture in Chile. In: **Impacts of climate change on marine fisheries, aquaculture and adaptations**. Bruce Phillips and Monica Pérez-Ramírez (eds.) Wiley, Australia

3. 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. **citations: 2**

## Outreach

1. **B.R. Broitman**, B.S. Halpern, S. Gelcich, M.A. Lardies, C.A. Vargas, F. Vásquez-Lavín, S. Widdicombe, S.N.R Birchenough and Nelson A. Lagos. (2017) Expansión sustentable de la acuicultura y las interacciones dinámicas entre sus límites. **Salmon Expert** 52(7) August 2017
2. G. Cortes-Hinojosa, **B.R. Broitman**, M.R. Rivadeneira and G. Luna-Jorquera (2017). Efecto de las variables ambientales y abundancia poblacional sobre el desarrollo de polluelos de Pinguino de Humboldt *Sphenicus humboldti*. **Revista Chilena de Ornitología** 23 (2):55-62

## 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

### 2018

Invited Speaker, **MISTI symposium**. Estación Costera de Investigaciones Marinas, **Pontificia Universidad Católica de Chile**, Las Cruces, Chile.

### 2017

Invited speaker, **Congreso del Futuro**. Intendencia Regional, La Serena, Chile

Invited speaker, **VIII Jornadas de Investigación en Salmonicultura**. Puerto Varas, Chile.

Keynote speaker, **Agenda de Iniciativas Valor Minero Coquimbo**, La Serena, Chile.

### 2016

Departamental Seminar. Facultad de Ciencias Ambientales, **Universidad de Concepción**, Chile

Departamental Seminar. Facultad de Ciencias Naturales y Oceanográficas, **Universidad de Concepción**, Chile

Invited Speaker, World Health Day. Facultad de Ciencias Veterinarias y Pecuarias, **Universidad de Chile**, Santiago, Chile

Departmental Seminar. Facultad de Ciencias, **Universidad Católica de la Santísima Concepción**, Concepción, Chile

Invited speaker. **1ª Reunião da ABECO e 5º Simpósio de Ecologia Teórica**, Gramado, Rio Grande do Sul, Brazil.

Invited Speaker. Facultad de Humanidades. **Universidad de La Serena**, La Serena, Chile

**2015**

Keynote speaker. **XIV Congreso Geológico Chileno**, La Serena, Chile

**2012**

Departmental Seminar. Centro de Biologia Marinha, Sao Sebastian, **Universidade do Sao Pablo**, Brazil

**2008**

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

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

**2007**

Departmental Seminar. Bodega Bay Marine Laboratory, **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)**

2018 72<sup>nd</sup> Annual Meeting of the Pacific Coast Shellfish Growers Association. Semiahmoo, WA, USA. Shellfish aquaculture in Chile: Learning from multiple stressors how to build up resilience across the socio-ecological system. Keynote speaker.

2017 XXIV Reunion Anual de la Sociedad de Ecología de Chile, Puerto Varas, Chile. Plasticidad fenotípica al límite: contrastando respuestas poblacionales en la zona de sobreposición de rango geográfico en dos patellas del genero *Scurria*. Oral presentation

2016 VI Reunion binacional de Ecología, Puerto Iguazú, Misiones. Argentina. Patterns of oceanographic control of larval supply to invertebrate populations of wild and harvested species. Oral presentation

2015 Congreso Latinoamerica de Ciencias del Mar, Santa Marta, Colombia. Using persistent oceanographic variability to look into temperate rocky shore community structure in the future. Oral presentation.

2014 All-Scientists Meeting of the Americas, Valdivia, Chile. Implementando, financiando y manteniendo un sistema distribuido de informacion ambiental en la costa de Chile central. Oral presentation.

2013 V Reunión Binacional de Ecología, Puerto Varas, Chile Variación espacio-temporal en el reclutamiento de mitílidos en el Mar Interior de Chiloé: Procesos regionales o efectos locales? Oral presentation

2012 II Anual Meeting of the Association for Tropical Biology and Conservation, Bonito, MS Brasil, Ecological Science in Chile: current status and interfaces with society. Invited Symposium

2011 XIX Reunión Anual de la Sociedad de Ecología de Chile, Puerto Varas, Chile. Some observations of the ecological and evolutionary dynamics in the encounter of two biotas in a biogeographic transition zone. Invited Symposium.

2011 IX International Temperate Reef Symposium, Plymouth, UK. Consumer-resource interactions at the edge: ecological processes and biogeographic range limits in four intertidal species. Oral presentation.

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 7<sup>th</sup> 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 6<sup>th</sup> 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 5<sup>th</sup> 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, Concepción, 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.** Bodegón Cultural Los Vilos, Los Vilos, Chile. ¿A dónde van los hijos del Picoroco?

### 2009

**Tertulias Científicas CEAZA.** Café Terracota, La Serena, Chile. Lapas acaloradas en la Región de Coquimbo

**Día del medio Ambiente.** Municipalidad de Coquimbo. UCN, Coquimbo, Chile. Entre Tongoy y Los Vilos: una zona de transición.

### 2010

**Mil Científicos, Mil Aulas (EXPLORA).** Colegio Leonardo Da Vinci, Vicuna, Chile. Entre Tongoy y Los Molles: Una región de transición ecológica.

**2011**

**5ta Congreso Científico-Tecnológico,** Colegio Manatiales del Elqui, La Serena, Chile. El Clima de la Zona y su biogeografía marina.

**2012**

**Mil Científicos, Mil Aulas (EXPLORA).** Colegio Eusebio Lillo, Coquimbo, Chile. Entre Tongoy y Los Molles Una región de cambios ecológico-ambientales.

**2013**

**Mil Científicos, Mil Aulas (EXPLORA).** Colegio Lucia Godoy Alcayaga, Vicuña, Chile. Entre Tongoy y Los Molles: donde el Chiton conoció al Cochayuyo.

**2014**

**Cafe Científico CEAZA.** Cafe Centenario, La Serena, Chile. Que pasa si viene un niño a nuestras costas?

**Los Dueños de la Tarde.** Radio Montecarlo (102.7 FM), La Serena, Chile. Los Choros y los Huiros en la región de Coquimbo.

**2015**

**Los Dueños de la Tarde.** Radio Montecarlo (102.7 FM), La Serena, Chile. Los 13 años del Centro CEAZA en la región de Coquimbo.

**2016**

**Principios de oceanografía físico-química.** Liceo Marítimo Carmen Rodríguez Henríquez. Tongoy, Chile

**2017**

**Día del Medio Ambiente.** Liceo Ignacio Carrera Pinto, La Serena, Chile. La acidificación de los océanos.

**Principios de oceanografía físico-química.** Liceo Marítimo Carmen Rodríguez Henríquez. Tongoy, Chile

**2018**

**Principios de oceanografía físico-química.** Liceo Marítimo Carmen Rodríguez Henríquez. Tongoy, Chile

**Tribuna Social.** Radio Mistral (95.1 FM), La Serena, Chile. Aporte del vínculo de CEAZA con el Liceo de Tongoy y la comunidad.