

CURRICULUM VITAE

BRIAN HELMUTH

CONTACT INFORMATION

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EXPERTISE

My research centers on forecasting the likely ecological and socioeconomic impacts of global climate change on coastal marine ecosystems, and on the creation and testing of products and indicators that are scientifically accurate, understandable, impactful, and useful by a diverse array of stakeholders. I am active in science communication and stakeholder engagement, focused on climate change impacts and societal adaptation to climate change. I also serve as a member of the National Sea Grant Advisory Board, and am interested in the development of national and international environmental policy.

EDUCATION

Post Doctoral Researcher, Stanford University, Hopkins Marine Station, (Mark Denny, supervisor) 1997-1999.
Ph.D 1997 University of Washington; Zoology (Thomas Daniel, PhD supervisor)
M.S. 1991 Northeastern University; Biology (Marine Biology; Kenneth Sebens, MS supervisor)
B.S. 1989 Cornell University; Biology (Ecology and Evolution; C. Drew Harvell, research supervisor)

EMPLOYMENT HISTORY

Professor, Department of Marine and Environmental Sciences and School of Public Policy and Urban Affairs (joint appointment), Northeastern University, Boston, MA Jan 2013-Present
Affiliated faculty, Department of Civil and Environmental Engineering, Northeastern University, 2016-present
Adjunct Professor, State Key Lab of Marine Environmental Science, Xiamen University, China, 2013-present.
Director, Masters program in Environmental Science and Policy, Northeastern University, July 2018-present.
Director, Sustainability Science and Policy Initiative, Northeastern University Jan 2013-Dec 2015.
Director, Environment and Sustainability Program, University of South Carolina 2011-2012.
Special Advisor on Sustainability, Office of the Vice President for Research, University of South Carolina, 2011-2012.
Professor, University of South Carolina, Columbia, May 2009-Dec 2012.

Associate Professor, University of South Carolina, Columbia, July 2004-May 2009.
Assistant Professor, University of South Carolina, Columbia, June 1999-July 2004.
Instructor, Three Seas Marine Biology Program, Panama, 2003-present

AWARDS, HONORS, AND FELLOWSHIPS

Google Science Communications Fellow (Climate Change), 2011
Ray Lankester Fellow, Marine Biological Laboratory, Plymouth England, 2007
Explorers Club, Fellow National, 2007
Aldo Leopold Leadership Fellow, 2005
Marine Educator of the Year, South Carolina Marine Educators Association, March 2003.

PEER-REVIEWED PUBLICATIONS * indicates student authors, 8363 citations, h index 49; i10 index 92

2019

92. Duwan*, E., F. Choi and **B. Helmuth**. 2019. Assessing the use of virtual reality technology in teaching marine ecological concepts. *Journal of STEM Outreach*, 2: 1-11.
91. Canonico, G., P.L. Buttigieg, E. Montes, C. A. Stepien, D. Wright, A. Benson, **B. Helmuth**, M. J. Costello, F. E. Muller-Karger, I. S. Pinto, H. Saeedi, J. A. Newton, W. Appeltans, N. Bednaršek, L. Bodrossy, B. D. Best, A. Brandt, K. Goodwin, K. Iken, A. Marques, P. Miloslavich, M. Ostrowski, W. Turner, E. Achterberg, T. Barry, O. Defeo, G. Bigatti, L. Henry, B. R. Sanchez, P. D. Muñoz, M. Mar Sacau Cuadrado, T. Morato, M. Roberts, A. G. Garcia-Alegre, B. J. Murton. 2019. Global observational needs and resources for marine biodiversity *Frontiers in Marine Science* 6: doi: 10.3389/fmars.2019.00367 (Journal IF: 3.09)
90. Choi, F., T. C. Gouhier, F. Lima, G. Rilov, R. Seabra, and **B. Helmuth**. 2019. Mapping Physiology: Biophysical mechanisms define scales of climate change impacts. *Conservation Physiology* 7, doi: 10.1093/conphys/coz028.
89. Rilov, G. A.D. Mazaris, V. Stelzenmüller, **B. Helmuth**, M. Wahl, T. Guy-Haim, N. Mieszkowska, J.-B. Ledoux, and S. Katsanevakis. 2019. Adaptive marine conservation planning in the face of climate change: What can we learn from physiological, ecological and genetic studies? *Global Ecology and Conservation* 17: e00566. (Cited 2 times, Journal IF: 2.75)

2018

88. Judge*, R., F. Choi and **B. Helmuth**. 2018. Recent advances in data logging for intertidal ecology. *Frontiers in Ecology and Evolution*, doi: 10.3389/fevo.2018.00213.
87. Zhou, X., X. Ji, B. Wang, Y. Cheng, Z. Ma, F. Choi, **B. Helmuth** and W. Xu. 2018. Pido: Predictive delay optimization for intertidal wireless sensor networks. *Sensors*, 18, 1464. Doi: 10.3390/s18051464 (Cited 6 times, Journal IF: 2.5)
86. Connell, S.D., Z.A. Doubleday, N.R. Foster, S.B. Hamlyn, C.D.G. Harley, **B. Helmuth**, B.P. Kelaher, I. Nagelkerken, K.L. Rodgers, G. Sarà and B.D. Russell. 2018. The duality of disturbance:

ocean acidification as both a resource and a stressor drives a shift in ecosystem state. *Ecology*, 99(5):1005-1010. (Cited 11 times, Journal IF: 4.6)

2017

85. Harley, C.D.G., S.D. Connell, Z.A. Doubleday, B. Kalaher, B.D. Russell, G. Sará and **B. Helmuth**. 2017. Conceptualizing ecosystem tipping points within a physiological framework. *Ecology and Evolution* DOI: 10.1002/ece3.3164. (Cited 14 times, Journal IF: 2.5)
84. Dong, Y., X. Li, F.M.P. Choi, G.A. Williams, G.N. Somero and **B. Helmuth**. 2017. Untangling the roles of microclimate and physiological polymorphism in governing vulnerability of intertidal snails to heat stress. *Proc. Royal Society London B.*, 284, 20162367. (Cited 11 times, Journal IF: 5.7)
83. Connell, S.D., Z.A. Doubleday, S.B. Hamlyn, N.R. Foster, C.D.G. Harley, **B. Helmuth**, B.P. Kelaher, I. Nagelkerken, G. Sarà and B.D. Russell. 2017 How ocean acidification can benefit calcifiers. *Current Biology*, 27(3), 95-96. (Cited 30 times. Journal IF: 8.9)
82. Colvard*, N. and **B. Helmuth**. 2017. Nutrients influence the thermal ecophysiology of an intertidal macroalga: Multiple stressors or multiple drivers? *Ecological Applications*, 27(2), 669-681. doi: 10.1002/eap.1475 (Cited 4 times, Journal IF: 4.3)

2016

81. **Helmuth, B.**, F. Choi, A. Matzelle*, J.L. Torossian*, S. Morello, K.A.S Mislan, L. Yamane, D. Strickland, P.L. Szathmary, S. Gilman, A. Tockstein, T.J. Hilbish, M.T. Burrows, A.M. Power, E. Gosling, N. Mieszkowska, C.D.G. Harley, M. Nishizaki, E. Carrington, B. Menge, L. Petes, M. Foley, A. Johnson, M. Poole, M.M. Noble, E.L. Richmond, M. Robart, J. Robinson, J. Sapp, J. Sones, B.R. Broitman, M.W. Denny, K. Mach, L.P. Miller, M. O'Donnell, P. Ross, G.E. Hofmann, M. Zippay, C. Blanchette, J.A. Macfarlan, E. Carpizo-Ituarte, B. Ruttenberg, C.E. Peña Mejía, C. McQuaid, J. Lathlean, C. Monaco, K.R. Nicastro, and G. Zardi. 2016. Long-term, high frequency *in situ* measurements of intertidal mussel bed temperatures using biomimetic sensors. *Scientific Data*, 3:160087. (Cited 25 times, Journal IF: 4.8)
80. Monaco*, C.J., D.S. Wetthey and **B. Helmuth**. 2016. Thermal sensitivity and behavior's role in driving an intertidal predator-prey interaction. *Ecological Monographs*, 86(4): 429-447. (Cited 6 times, Journal IF: 8.8)
79. Sinclair, B.J., K.E. Marshall, M.A. Sewell, D.L. Levesque, C.S. Willett, S. Slotsbo, Y. Dong, C.D.G. Harley, D.J. Marshall, **B.S. Helmuth** and R.B. Huey. 2016. Can we predict ectotherm responses to climate change using thermal performance curves and body temperatures? *Ecology Letters*, doi:10.1111/ele.12686. (Cited 140 times, Journal IF: 10.7)
78. Kish*, N., **B. Helmuth** and D.S. Wetthey. 2016. Physiologically-grounded metrics of model skill: a case study estimating heat stress in intertidal populations. *Conservation Physiology*, 4, doi10.1093/conphys/cow038. (Cited 9 times, Journal IF: 2.3)
77. Montalto, V., **B. Helmuth**, P.M. Ruti, A. Dell'Aquila, A. Rinaldi, and G. Sarà. 2016. A mechanistic approach reveals nonlinear effects of climate warming on mussels throughout the Mediterranean Sea. *Climatic Change*, 139: 293. doi 10.1007/s10584-016-1780-4. (Cited 14 times, Journal IF: 3.3)
76. Williams, G.A., **B. Helmuth**, B.D. Russell, Y. Dong, V. Thiagarajan, and L. Seuront. 2016. Meeting the climate change challenge: Pressing issues in southern China and SE Asian coastal ecosystems, *Regional Studies in Marine Science*, 8(3):373-381. (Cited 15 times, Journal IF: 0.9)
75. Kroeker, K. J., E. Sanford, J. M. Rose, C. A. Blanchette, F. Chan, F. P. Chavez, B. Gaylord, **B. Helmuth**, T. M. Hill, G. E. Hofmann, M. A. McManus, B. A. Menge, K. J. Nielsen, P. T. Raimondi, A. D. Russell, and L. Washburn. 2016. Interacting environmental mosaics drive

geographic variation in mussel performance and species interactions. *Ecology Letters*, 19:771-779. (Cited 58 times, Journal IF: 10.7)

74. **Helmuth B.**, T.C. Gouhier, S. Scyphers and J. Mocarski. 2016. Trust, tribalism and tweets: has political polarization made science a "wedge issue"? *Climate Change Responses*, 3:3. (Cited 5 times)

2015

73. Monaco, C.J., D.S. Wetthey, S. Gullledge and **B. Helmuth**. 2015. Shore level size gradients and thermal refuge use in the predatory sea star *Pisaster ochraceus*: the role of environmental stressors. *Mar. Ecol. Prog. Ser.*, 539: 191-205. (Cited 11 times, Journal IF: 2.5)
72. Marshall, D.J., E.L. Rezende, N. Baharuddin, F. Choi and **B. Helmuth**. 2015. Thermal tolerance and climate warming sensitivity in tropical snails. *Ecology and Evolution*, doi: 10.1002/ece3.1785. (Cited 26 times, Journal IF: 2.3)
71. Matzelle*, A.J., G. Sará, V. Montalto*, M. Zippay, G.C. Trussell, and **B. Helmuth**. 2015. A bioenergetics framework for integrating the effects of multiple stressors: opening a "blackbox" in climate change research. *American Malacological Bulletin*, 33:1-11 (Cited 13 times, Journal IF 1.1)

2014

70. **Helmuth, B.** B.D. Russell, S.D. Connell, Y. Dong, C.D.G. Harley, F.P. Lima, G. Sará, G.A. Williams and N. Mieszkowska. 2014. Beyond long-term averages: making biological sense of a rapidly changing world. *Climate Change Responses*, 1: 10-20. (Cited 78 times)
69. Monaco*, C. J., D.S. Wetthey and **B. Helmuth**. 2014 A dynamic energy budget (DEB) model for the keystone predator *Pisaster ochraceus*. *PLoS ONE*, 9(8): 1-19. (Cited 25 times, Journal IF 3.7)
68. Petes, L.E., J.F. Howard, **B. S. Helmuth** and E. K. Fly. 2014. Science integration into US Climate and ocean policy. *Nature Climate Change* 4(8): 671-677. (Cited 15 times, Journal IF 14.5)
67. Colvard*, N., E. Carrington and **B. Helmuth** 2014. Temperature-dependent photosynthesis in the intertidal alga *Fucus gardneri* and sensitivity to ongoing climate change. *J. Exp. Mar. Biol. Ecol.*, 458: 6-12. (Cited 20 times, Journal IF: 2.5)
66. Montalto*, V., G. Sará, P.M. Ruti, A. Dell'Aquila, and **B. Helmuth**. 2014. Testing the effects of temporal data resolution on predictions of the effects of climate change on bivalves. *Ecological Modelling*, 278: 1-8. (Cited 19 times, Journal IF: 2.4)
65. Matzelle*, A., V. Montalto*, G. Sará, M. Zippay and **B. Helmuth**. 2014. Dynamic Energy Budget model parameterization of the bivalve *Mytilus californianus*: Application of the covariation method *Journal of Sea Research*, 94:105-110. (Cited 16 times, Journal IF: 2.3)
64. Mislan*, K.A.S., **B. Helmuth** and D.S. Wetthey. 2014. Geographical variation in climatic sensitivity of intertidal mussel zonation. *Global Ecology and Biogeography*, DOI: 10.1111/geb.12160 (Cited 33 times, Journal IF: 7.2)
63. Sará, G., M. Milanese, I. Prusina, A. Sará, D.L. Angel, B. Glamuzina, T. Nitzan, S. Freeman, A. Rinaldi, V. Palmeri, V. Montalto, M. Lo Martire, P. Gianguzza, V. Arizza, S. Lo Brutto, M. De Pirro, **B. Helmuth**, J. Murray, S. De Cantis, and G.A. Williams. 2014. The impact of climate change on Mediterranean intertidal communities: losses in coastal ecosystem integrity and services. *Regional Environmental Change* 14 (Suppl 1): S5-S17. (Cited 38 times, Journal IF: 3.0)

2013

62. Woodin, S.A., T. Hilbish, **B. Helmuth**, S. Jones and D. Wetthey. 2013. Climate change, species

- distribution models and physiological performance metrics: Predicting when biogeographic models are likely to fail. *Ecology and Evolution*, DOI 10.1002/ece3.680 (Cited 82 Times, Journal IF: 2.3)
61. Burnett*, N.P., R. Seabra, M. dePirro, M.L. Zippay, C. Monaco, S. Woodin, **B. Helmuth**, D.S. Wethey, and F.P. Lima. **2013**. An improved non-invasive method for measuring heartbeat of marine and intertidal animals. *Limnology and Oceanography: Methods* 11: 91-100. (Cited 41 Times, Journal IF: 2.0)
 60. Pincebourde, S., E. Sanford, J. Casas, and **B. Helmuth**. **2013**. Survival and arm abscission are linked to regional heterothermy in an intertidal sea star. *Journal of Experimental Biology* 216: 2183-2191. (Cited 14 Times, Journal IF: 3.0)
 59. Sará, G., V. Palmeri, V. Montalto*, A. Rinaldi*, and **B. Helmuth**. **2013**. Predicting biological invasions in marine habitats through eco-physiological mechanistic models: a case study with the bivalve *Brachidontes pharaonis*. *Diversity and Distributions* 19: 1235-1247. (Cited 47 Times, Journal IF: 4.83)
 58. Ibáñez, I., E.S. Gornish, L. Buckley, B.M. Debinski, J. Hellmann, **B. Helmuth**, J. Hille Ris Lambers, A.M. Latimer, A.J. Miller-Rushing and M. Uriarte. **2013**. Moving forward in global-change ecology: capitalizing on natural variability. *Ecology and Evolution* doi: 10.1002/ece3.433 (Cited 26 Times, Journal IF: 2.3)

2012

57. Zippay, M. and **B. Helmuth** **2012**. Effects of temperature change on mussels, *Mytilus* (Linnaeus, 1798). *Integrative Zoology* 7:312-327. (Cited 29 times, Journal IF: 1.0; Editors Pick of 2012 Best Articles)
56. Pincebourde, S., E. Sanford, J. Casas, and **B. Helmuth**. **2012**. Temporal coincidence of environmental stress modulates predation rates. *Ecology Letters*, 15:680-688. (Cited 58 times, Journal IF: 10.7)
55. Iacarella*, J. and **B. Helmuth** **2012**. Body temperature and desiccation constrain the activity of *Littoraria irrorata* within the *Spartina alterniflora* canopy. *Journal of Thermal Biology* 37:15-22. (Cited 18 times, Journal IF: 1.3)
54. Kearney, M., A. Matzelle and **B. Helmuth**. **2012**. Biomechanics meets the ecological niche: the importance of temporal data resolution. *Journal of Experimental Biology*, 215:922-933. (Cited 91 times, Journal IF: 3.0)

2011

52. Wethey, D.S., L.D. Brin*, **B. Helmuth**, K.A.S. Mislan*. **2011**. Predicting intertidal organism temperatures with modified land surface models. *Ecological Modeling*, 222:3568-3576. (Cited 35 times, Journal IF: 1.8)
51. Iacarella*, J. and **B. Helmuth**. **2011**. Experiencing the salt marsh environment through the foot of *Littoraria irrorata*: behavioral responses to thermal and desiccation stresses. *Journal of Experimental Marine Biology and Ecology*, 409:143-153. (Cited 20 times, Journal IF: 1.9)
50. Sará, G., M. Kearney, and **B. Helmuth** **2011** Combining heat-transfer and energy budget models to predict thermal stress in Mediterranean intertidal mussels. *Chemistry and Ecology*, 27(2): 135-145. (Cited 49 times, Journal IF: 1.0)
49. **Helmuth, B.**, L. Yamane, S. Lalwani, A. Matzelle, A. Tockstein*, N. Gao* **2011** Hidden signals of climate change in intertidal ecosystems: what (not) to expect when you are expecting. *Journal of*

- Experimental Marine Biology and Ecology*, 400: 191-199. (invited article in special 400th volume on theme of Global Environmental Change) (Cited 60 times, Journal IF: 1.9)
48. Zardi G.I., K.R. Nicastro, C.D. McQuaid, L. Hancke and **B. Helmuth** 2011 The combination of selection and dispersal helps explain genetic structure in intertidal mussels. *Oecologia*, 165:947-958. (Cited 40 times, Journal IF: 3.5)

2010

47. Kearney, M., S.J. Simpson, D. Raubenheimer and **B. Helmuth** 2010 Modelling the ecological niche from functional traits. *Philosophical Transactions of the Royal Society Series B*, 365:3469-3483. (Cited 226 times, Journal IF: 6.1)
46. Fuller, A., T. Dawson, **B. Helmuth**, R.S. Hetem, D. Mitchell and S. K. Maloney. 2010 Physiological mechanisms of dealing with climate change. *Physiological and Biochemical Zoology* 83(5): 713-720. (Cited 96 times, Journal IF: 2.4)
45. Schneider K. R., L.E. VanThiel*, and **B. Helmuth** 2010 Interactive effects of food availability and aerial body temperature on the survival of two intertidal *Mytilus* species. *Journal of Thermal Biology* 35: 161-166. (Cited 46 times, Journal IF: 1.3)
44. **Helmuth B.**, L. Yamane, K.J. Mach*, S. Chhotray*, P. Levin and S. Woodin. 2010 All climate change is local: understanding and predicting the effects of a changing planet on marine ecosystems. *Stanford Journal of Law Science and Policy*, 2:18-35.
43. **Helmuth, B.**, B. Broitman, L. Yamane, S.E. Gilman, K. Mach*, K.A.S. Mislan* and M.W. Denny. 2010. Organismal climatology: analyzing variability at scales relevant to physiological stress. *Journal of Experimental Biology*, 213:995-1003. (Cited 175 times, Journal IF: 3.0)

2009

42. **Helmuth, B.** 2009. From cells to coastlines: how can we use physiology to forecast the impacts of climate change? *Journal of Experimental Biology*, 212: 753-760. (Cited 187 times, Journal IF: 3.0)
41. Pincebourde, S., E. Sanford and **B. Helmuth**. 2009. An intertidal seastar adjusts thermal inertia to avoid extreme body temperatures. *American Naturalist* 174 (6): 890-897. (Cited 56 times, Journal IF: 4.7)
40. Mislan*, K.A.S., Wetthey, D.S. and **B. Helmuth** 2009. When to worry about the weather: role of tidal cycle in determining patterns of risk in intertidal ecosystems. *Global Change Biology* 15:3056-3065. (Cited 55 times, Journal IF: 6.3)
39. Szathmary*, P.L., **B. Helmuth**, and D. S. Wetthey. 2009. Climate change in the rocky intertidal zone: predicting and measuring the body temperature of a keystone predator. *Marine Ecology Progress Series* 374:43-56. (Cited 42 times, Journal IF: 2.5)
38. Broitman, B.R., P.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. (Cited 71 times, Journal IF: 3.4)

2008

37. Broitman, B.R., 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. (Cited 27 times, Journal IF: 5.1)
36. Pincebourde, S., E. Sanford and **B. Helmuth**. 2008. Body temperature during low tide alters the feeding performance of a top intertidal predator. *Limnology and Oceanography* 53(4): 1562-1573. (Cited 121 times, Journal IF: 3.4)

2007

35. Jost*, J. and **B. Helmuth**. 2007. Morphological and ecological determinants of body temperature of the Atlantic ribbed mussel, *Geukensia demissa*, and their effects on mussel mortality. ***Biological Bulletin*** 213:141-151. (Cited 46 times, Journal IF: 2.5)
34. Finelli, C.M., B.S. Helmuth, N.D. Pentcheff and D.S. Wetthey. 2007. Intracolony variability in photosynthesis by corals is affected by water flow: a role for oxygen transport? ***Marine Ecology Progress Series***, 349:103-110. (Cited 16 times, Journal IF: 2.5)
33. Schneider*, KR and **B. Helmuth** 2007. Spatial variability in habitat temperature drives patterns of selection between and invasive and native mussel species. ***Marine Ecology Progress Series*** 339: 157-167. (Cited 60 times, Journal IF: 2.5)
32. Blanchette, C.A., S.D. Gaines and **B. Helmuth**. 2007. Spatial patterns of growth in the mussel, *Mytilus californianus*, across a major oceanographic and biogeographic boundary at Point Conception, California, USA. ***Journal of Experimental Marine Biology and Ecology*** 340(2): 126-148. (Cited 93 times, Journal IF: 1.9)

2006

31. Gilman, S., C.D.G. Harley, D. Strickland*, O. Vanderstraeten, M. O'Donnell, and **B. Helmuth**. 2006. Evaluation of "Effective Shore Level" as a method of characterizing intertidal wave exposure regimes. ***Limnology and Oceanography Methods***, 4:448-457. (Cited 14 times, Journal IF: 2.0)
30. **Helmuth, B.**, B.R. Broitman, C.A. Blanchette, S. Gilman, P. Halpin, C.D.G. Harley, M.J. O'Donnell, G.E. Hofmann, B. Menge, and D. Strickland. 2006. Mosaic patterns of thermal stress in the rocky intertidal zone: implications for climate change. ***Ecological Monographs*** 76(4):461-479. (Cited 352 times, Journal IF: 5.9)
29. Gilman, S.E., D.S. Wetthey and **B. Helmuth** 2006. Variation in the sensitivity of organismal body temperature to climate change over local and geographic scales. ***Proceedings of the National Academy of Sciences USA*** 103 (25): 9560-9565. (Cited 159 times, Journal IF: 9.8)
28. Leichter, J.J., **B. Helmuth**, and A. Fischer. 2006. Variation beneath the surface: quantifying complex thermal environments on coral reefs in the Caribbean, Bahamas, and Florida ***Journal of Marine Research*** 64(4): 563-588. (Cited 77 times, Journal IF: 1.5)
27. Rotjan, R.D., J.L. Dimond, D.J. Thornhill, J.J. Leichter, **B. Helmuth**, D.W. Kemp and S.M. Lewis. 2006. Chronic fish grazing impedes coral recovery after bleaching. ***Coral Reefs*** 25(3): 361-368. (Cited 58 times, Journal IF: 3.8)
26. Finelli, C.M., **B.S.T. Helmuth**, N.D. Pentcheff, and D.S. Wetthey. 2006. Water flow influences oxygen transport and photosynthetic efficiency in corals. ***Coral Reefs*** 25(1):47-57. (Cited 116 times, Journal IF: 3.8)

2005

25. Castillo*, K.D. and **B.S.T. Helmuth**. 2005. Influence of thermal history on response of *Montastraea annularis* to short-term temperature exposure. ***Marine Biology*** 148(2): 261-270. (Cited 108 times, Journal IF: 2.0)
24. Schneider*, K. R., D. S. Wetthey, **B. Helmuth**, and T. J. Hilbish. 2005. Implications of movement behavior on mussel dislodgement: exogenous selection in a *Mytilus* spp. hybrid zone. ***Marine Biology*** 146: 333-343. (Cited 56 times, Journal IF: 2.0)

2004

23. Fitzhenry*, T., P.M. Halpin and **B. Helmuth**. 2004. Testing the effects of wave exposure, site, and behavior on intertidal mussel body temperatures: Applications and limits of temperature logger design. *Marine Biology* 145(2):339-349. (Cited 87 times, Journal IF: 2.0)
22. Denny, M.W. **B. Helmuth**, G.L. Leonard, C.D.G. Harley, L.Hunt and E. Nelson. 2004. Quantifying scale in ecology: lessons from a wave-swept shore. *Ecological Monographs* 74(3):513-532. (Cited 124 times, Journal IF: 5.9)

2003

21. Harley, C.D.G. and **B.S.T. Helmuth**. 2003. Local and regional scale effects of wave exposure, thermal stress, and absolute vs. effective shore level on patterns of intertidal zonation. *Limnology and Oceanography* 48: 1498-1508. (Cited 237 times, Journal IF: 3.4)
20. **Helmuth, B.** and M.W. Denny. 2003. Predicting wave exposure in the rocky intertidal zone: do bigger waves always lead to larger forces? *Limnology and Oceanography* 48: 1338-1345. (Cited 101 times, Journal IF: 3.4)
19. Denny, M.W., L.P. Miller, M.D. Stokes, L.J.H. Hunt, and **B.S.T. Helmuth**. 2003. Extreme water velocities: Topographical amplification of wave-induced flow in the surf zone of rocky shores. *Limnology and Oceanography* 48: 1-8. (Cited 76 times, Journal IF: 3.4)
18. Sebens, K.P., **B. Helmuth**, E. Carrington and B. Agius. 2003. Effects of water flow on growth and energetics of the scleractinian coral *Agaricia tenuifolia*, in Belize. *Coral Reefs* 22(1): 35-47. (Cited 89 times, Journal IF: 3.8)

2002

17. **Helmuth, B.**, C.D.G. Harley, P. Halpin, M. O'Donnell, G.E. Hofmann and C. Blanchette. 2002. Climate change and latitudinal patterns of intertidal thermal stress. *Science* 298:1015-1017. (Cited 586 times, Journal IF: 31.4)
16. **Helmuth B.** 2002. How do we measure the environment? Linking intertidal thermal physiology and ecology through biophysics. *Integrative and Comparative Biology* 42(4): 837-845. (Cited 164 times, Journal IF: 3.0)
15. Tomanek, L. and **B. Helmuth**. 2002. Physiological ecology of rocky intertidal organisms: a synergy of concepts. *Integrative and Comparative Biology* 42(4): 771-775. (Cited 164 times, Journal IF: 3.0)

2001

14. **Helmuth B.** and GE Hofmann. 2001. Microhabitats, thermal heterogeneity and physiological gradients of stress in the rocky intertidal zone. *Biological Bulletin* 201:374-384. (Cited 408 times, Journal IF: 2.5)

Prior to 2000:

13. **Helmuth B.** 1999. Thermal biology of rocky intertidal mussels: quantifying body temperatures using climatological data. *Ecology* 80(1): 15-34. (Cited 121 times, Journal IF: 5.1)
12. Denny M.W., B. Gaylord, **B. Helmuth** and T.L. Daniel. 1998. The menace of momentum: dynamic forces on flexible organisms. *Limnology and Oceanography* 43:955-968. (Cited 110 times, Journal IF: 3.4)
11. **Helmuth B.S.T.** 1998. Intertidal mussel microclimates: Predicting the body temperature of a sessile invertebrate. *Ecological Monographs* 68 (1):29-52. (Cited 272 times, Journal IF: 5.9)

10. Sebens K.P., S.P. Grace, **B. Helmuth**, E.A. Maney, Jr. and J.S. Miles **1998**. Water flow and prey capture by three scleractinian corals, *Madracis mirabilis*, *Montastrea cavernosa* and *Porites porites* in a field enclosure. *Marine Biology* 131:347-360. (Cited 156 times, Journal IF: 2.0)
9. Daniel TL, **BS Helmuth**, WB Saunders, and PD Ward. **1997**. Septal complexity in ammonoid cephalopods increased mechanical risk and limited depth. *Paleobiology*, 23:470-481. (Cited 73 times, Journal IF: 3.0)
8. **Helmuth B.S.T.**, K.P. Sebens and T.L. Daniel. **1997**. Morphological variation in coral aggregations: branch spacing and mass flux to coral tissues. *Journal of Experimental Marine Biology and Ecology* 209: 233-259. (Cited 79 times, Journal IF: 1.9)
7. **Helmuth B.S.T.**, E.F. Stockwell and D.R. Brumbaugh. **1997**. Morphological and environmental determinants of mass flux to corals, *Proceedings of the 8th International Coral Reef Symposium, Panama* 2:1103-1108.
6. **Helmuth B.S.T.**, B.E.H. Timmerman, and K.P. Sebens. **1997**. Interplay of host morphology and symbiont microhabitat in coral aggregations. *Marine Biology* 130:1-10. (Cited 56 times, Journal IF: 2.0)
5. Sebens K.P., J. Witting, and **B. Helmuth**, **1997**. Effects of water flow and branch spacing on particle capture by the reef coral *Madracis mirabilis* (Duchassaing and Michelotti). *Journal of Experimental Marine Biology and Ecology* 211:1-28. (Cited 153 times, Journal IF: 1.9)
4. Holberton R.L., **B. Helmuth** and J.C. Wingfield. **1996**. The corticosterone stress response in Gentoo and King penguins during the non-fasting period. *Condor* 98: 850-854. (Cited 44 times, Journal IF: 1.3)
3. Padilla D.K., C.D. Harvell, J. Marks and **B. Helmuth**. **1996**. Inducible aggression and intraspecific competition for space in a marine bryozoan, *Membranipora membranacea*. *Limnology and Oceanography* 41(3): 505-512. (Cited 16 times, Journal IF: 3.4)
2. **Helmuth B.**, R.R. Veit and R. Holberton. **1994**. Long-distance dispersal of a subantarctic brooding bivalve (*Gaimardia trapesina*) by kelp rafting. *Marine Biology* 120: 421-426. (Cited 227 times, Journal IF: 2.0)
1. **Helmuth B.** and K.P. Sebens. **1993**. The influence of colony morphology and orientation to flow on particle capture by the scleractinian coral *Agaricia agaricites* (Linnaeus). *Journal of Experimental Marine Biology and Ecology* 165: 251-278. (Cited 102 times, Journal IF: 1.9)

NON-PEER REVIEWED ARTICLES (* indicates student authors)

- Bates, A.E., **B. Helmuth**, M.T. Burrows, M.I. Duncan, J. Garrabou, T. Guy-Haim, F. Lima, A.M. Queiros, R. Seabra, R. Marsh, J. Belmaker, N. Bensoussan, Y. Dong, A.D. Mazaris, D. Smale, M. Wahl and G. Rilov. **2018**. Biologists ignore ocean weather at their peril. *Nature* 560: 299-301. (Cited 9 times)
- Torossian*, J., R. Kordas and **B. Helmuth**. **2016**. Cross-scale approaches to forecasting biogeographic responses to climate change. *Advances in Ecological Research*, 55:371-433. (Cited 9 times)
- Howard, J., E. Babij, R. Griffis, **B. Helmuth**, A. Himes-Cornell, P. Niemier, M. Orbach, L. Petes. et al. **2013** Oceans and Marine Resources in a Changing Climate. *Oceanography and Marine Biology Annual Review* 51:71-192. (Cited 25 times).
- Monaco*, C. and B. Helmuth. **2011**. Tipping points, thresholds, and the forgotten role of physiology in climate change research. *Advances in Marine Biology* 60: 123-162. (Cited 75 times, Journal IF: 2.1)

- Denny M. and **B. Helmuth**. 2009. Confronting the Physiological Bottleneck: a challenge from ecomechanics. *Integrative and Comparative Biology* 49(3): 197-201. (Cited 65 times, Journal IF: 3.0)
- Helmuth, B.** 2007. Forecasting the impacts of climate change on coastal ecosystems: how do we integrate science and policy? *Southeast Environmental Law Journal* 16(1):207-219.
- Helmuth, B.** 2007. Intertidal life as experienced through a powerful lens (Review of M.Koehl, "Wave-swept shore: the rigors of life on a rocky coast." *Ecology* 88(1):264-265.
- Helmuth, B.** N. Mieszkowska, P. Moore and S.J. Hawkins. 2006. Living on the edge of two changing worlds: forecasting the responses of rocky intertidal ecosystems to climate change. *Annual Review of Ecology Evolution and Systematics* 37: 373-404. (Cited 522 times, Journal IF: 10.4)
- Helmuth, B.**, J.G. Kingsolver and E. Carrington, 2005. Biophysics, physiological ecology, and climate change: Does mechanism matter? *Annual Review of Physiology*, 67: 177-201. (Cited 422 times, Journal IF: 19.5)
- Helmuth B.**, R.R. Veit and R. Holberton. 1994. Dispersal of benthic invertebrates in the Scotia Arc by kelp rafting. *Antarctic Journal of the U.S.*, 29(5): 145-147.

BOOKS AND BOOK CHAPTERS (* indicates student authors)

- Cryan*, A., **B. Helmuth** and S. Scyphers. 2019. Ecological Design for Urban Coastal Resilience. In **Handbook on the Resilience of Socio-technical Systems.**, edited by M. Ruth and S.G. Reisemann, Edward Elgar Publishing.
- Geller, G.N., P.N. Halpin, **B. Helmuth**, E.L. Hestir, A. Skidmore, M.J. Abrams, N. Aguirre, M. Blair, E. Botha, M. Colloff, T. Dawson, J. Franklin, N. Horning, C. James, W. Magnusson, M.J. Santos, S.R. Schill and K. Williams. 2017. Remote sensing for Biodiversity. Ch. 8 in **The GEO Handbook on Biodiversity Observation Networks**, edited by M. Walters and R.J. Scholes. Springer, pp. 187-210.
- Blanchette, C.A., M.W. Denny, J.M. Engle, **B. Helmuth**, L.P. Miller, K.J. Nielsen and J. Smith. 2016. Intertidal, Chapter 18 (pp. 337-357) in H.A. Mooney and E. Zavaleta, eds, *Ecosystems of California*, University of California Press.
- Weissburg, M., **B. Helmuth** and J. Witman. 2013. Physical drivers of marine communities. Ch. 2 in **Marine Community Ecology and Conservation**, edited by M. Bertness, J. Bruno, B. Silliman and J. Stachowicz. Sinauer, pp. 11-36.
- Griffis, R., J. Howard, J., E. Babij, **B. Helmuth**, A. Himes-Cornell, P. Niemier, M. Orbach, L. Petes et. al. 2013. *Oceans and Marine Resources in a Changing Climate: A technical input to the 2013 National Climate Assessment*. Island Press.
- Lima, F.P. N. P. Burnett*, **B. Helmuth**, K. Aveni-Deforge, N. Kish* and D. S. Wetthey 2011. Monitoring the intertidal environment with bio-mimetic devices. Chapter 18 in **Advances in Biomimetics** ISBN 978-953-7619-X-X. INTECH publishing. (Cited 22 times).
- Mislan*, K.A.S. and **B. Helmuth**. 2008. "Microclimate" In **Encyclopedia of Ecology**, Edited by S.E. Jørgensen and B. Fath. Elsevier, Oxford. pp. 2389-2393.

- Jost*, J. and **B. Helmuth** 2007. "Measurement of Temperature" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 580-583.
- Schneider*, K.R. and **B. Helmuth** 2007. "Patterns of Heat and Temperature" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 263-266.
- Szathmary*, P.L. and **B. Helmuth** 2007. "Temperature Change" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 578-580.
- Kaandorp J., J. Kubler et al. 2001. **The algorithmic beauty of seaweeds, sponges and corals.** Springer, New York.
- Timmerman, B. and **B. Helmuth**. 1998. Marine Life. Chapter 9 in L. Beletsky, *The Ecotravellers' Wildlife Guide to Belize and Northern Guatemala*. Academic Press.

MANUSCRIPTS IN REVIEW

- Wang*, W., J. Wang, F.P. Choi, P. Ding, X. Li, G. Han, M. Ding, M. Guo, X. Huang, W. Duan, Z. Cheng, S.J. Hawkins, Y. Jiang, **B. Helmuth** and Y. Dong. Global warming and armored shorelines reshape seashore biogeography. *Proceedings of the National Academy of Sciences of the US*
- Sittenfeld*, D., M. Farooque, **B. Helmuth**, E. Hostetler, F. Choi, N. Weller, K. Todd, I. Bennett and D. Cavalier. Citizen Science, civics, and resilient communities: Informing community resilience policies through local knowledge, community values, and citizen-created data. *Citizen Science: Theory and Practice*
- Duwan*, E., **B. Helmuth** and F. Choi. Assessing the use of Virtual Reality technology in teaching marine ecological concepts. *Journal of STEM Outreach*

INVITED PRESENTATIONS

International

- Climate Change and Fisheries International Workshop (Environmental Defense Fund with Chinese Academy of Fisheries Science), Qingdao, **China**, November 2018
- Marine Biodiversity Observation Network Pole to Pole, Centro de Biologia Marinha, São Sebastião, **Brazil**, August 2018
- Society for Experimental Biology, Florence, **Italy**, July 2018.
- American Society of Limnology and Oceanography, Victoria **Canada**, June 2018.
- Xiamen University, Lingfeng Forum, Xiamen University, **China**, April 2018
- MARCONS, Israel Oceanographic and Limnological Research, Haifa, **Israel**. March 2018.
- US Department of State Visiting Scholar lecture series, University of Basrah, **Iraq**. January 2018.
- Dongshan Marine Station, Xiamen University, **China**, May 2017.
- United Nations General Assembly, High level meeting on climate change and sustainability. March 2017.

Batsheva de Rothschild Seminar: Environmental Science and Policy- Challenges in the South Eastern Mediterranean, Mt. Carmel, **Israel**, November 2015 (Invited keynote)

Aquatic Biodiversity and Ecosystems, Liverpool **U.K.**, September 2015 (Invited plenary)

Second XMAS Conference, Xiamen, **China**, January 2015

ICUBE Workshop: Gastropod thermal biology and climate change in the tropics, **Brunei**, December 2014

EUROMED conference, Naples, **Italy**, November, 2014

HETEROCLIM: The response of organisms to climate change in heterogeneous environments, Loches, **France** June 2014

North Pacific Marine Science Organization (Invited speaker, Science Board Symposium); Nanaimo, British Columbia **Canada** October 2013

Marine Ecocivilization Conference (Invited speaker), Wenzhou **China**, September 2013

World Congress of Malacology (Invited symposium speaker), Azores, **Portugal** July 2013

University of **Hong Kong**, January 2013.

Iraq Ministry of Education, Dec. 2012

University of Basrah, Basra, **Iraq**. Nov. 2012

International Union of Biological Sciences (IUBS), Suzhou, **China**, July 2012

Xiamen University, **China**, June 2012

Society of Experimental Biology, "Survival in a changing world" Awaji Island, **Japan**, August 2009.

Third International Symposium of Integrative Zoology, Chinese Academy of Sciences. Beijing, **China** (symposium keynote) July 2009.

INTERMED: The impact of climate change on Mediterranean intertidal communities: losses in coastal ecosystem integrity and services" (Keynote); Palermo, **Italy**. March 2009

Fourth International Conference in Africa for Comparative Physiology and Biochemistry. Symposium: Physiological mechanisms in coping with climate change. Masai Mara National Reserve, **Kenya**. July 2008

Fourth International Conference in Africa for Comparative Physiology and Biochemistry. Symposium: Physiological responses to temperature: Linking ecology with evolution. Masai Mara National Reserve, **Kenya**. July 2008.

Society of Experimental Biology, Symposium "Climate change: from genes to ecosystems" Marseilles, **France**. July 2008.

CSIRO Symposium (plenary speaker), "In Hot Water: preparing for climate change in Australia's coastal and marine ecosystems." State Library of Queensland, Brisbane, **Australia** November 2007.

Swire Institute of Marine Science, University of Hong Kong, International Conference on Ecophysiology of Marine Organisms, **Hong Kong**, January 2007.

Institut de Recherche sur la Biologie de l'Insecte, Université de Tours, France, December 2005.

BIOINC conference, Instituto de Estudos do Mar Almirante Paulo Moreira, Cabo Frio, **Brazil** (Keynote Address), July 2005.

Centre for Research on the Ecological Impacts of Coastal Cities, University of Sydney, **Australia**, February 2005.

Bamfield Marine Station, British Columbia, **Canada**. October 2004.

Canadian Society of Zoologists, Wolfville, NS, **Canada** (Intertidal Physiological Ecology Symposium), May 2004.

Bamfield Marine Station, British Columbia, **Canada**. October 2003.

International Temperate Reef Symposium, Christchurch, **New Zealand** (Symposium: "Climate change and temperate reef ecosystems: integrating space and time"). January 2003.

Bamfield Marine Station, British Columbia, **Canada**. November 2002.

American Society of Limnology and Oceanography, DIALOG III symposium, **Bermuda**

October 1999.

Eighth International Coral Reef Symposium, Panamá City, **Panamá**, (Symposium: “Flow and coral reefs: from micro- to meso-scale effects”) June 1996.

National

Leopold Leadership Program. Environmental Leadership Teach-In. Minneapolis, MN. June, 2018.

MultiAgency Rocky Intertidal Network (MARINE), Humboldt, CA. February, 2017. (Invited keynote).

Fourth International Sclerochronology Conference, Portland, Maine, June 2016 (Invited keynote)

Ocean Global Change Biology Gordon Research Conference, Waterville Valley, NH, July 2014

USGCRP, National Climate Assessment, Washington, D.C. March 2013

American Society of Limnology and Oceanography, New Orleans, LA, Feb. 2013. “Tick Talk: Communicating climate change”

Western Society of Naturalists, Presidential Symposium. Seaside, CA Nov 2012

GreenGov, White House Council on Environmental Quality, Washington DC, November 2011

American Association of Anatomists, (Symposium, Biological Consequences of Climate Change), April 2010.

Presidential Awards for Excellence in Math and Science Teaching (keynote), National Science Foundation, Washington, D.C., December 2010

Climate Change and Marine Systems: Managing for Resiliency. Stanford Law School, April 2009.

Estuarine Research Foundation, Providence, R.I. November 2007 (Symposium, “Evaluating climate records to understand causes and effects of climate variability in coastal systems.”

University of South Carolina School of Law, “Balancing private and public rights in the coastal zone in the era of climate change” Columbia, SC September 2007

American Academy for the Advancement of Science, Invited Speaker, San Francisco, February 2007.

Joint Workshop on NASA Biodiversity, Terrestrial Ecology, and Related Applied Sciences (Keynote address); Adelphi, MD, August 2006.

American Society of Limnology and Oceanography (Symposium, “Forecasting Biogeographic Responses to Climate Change in Coastal Ecosystems”), June 2006.

NASA Biodiversity and Ecological Forecasting meeting, Washington D.C., August 2005.

Benthic Ecology Meetings, Mobile, AL (Symposium: Three Seas East West Marine Biology 20th Anniversary) March 2004.

Western Society of Malacologists, Monterey, CA (Symposium: “Ecology of mollusks”). July 2002.

Society for Integrative and Comparative Biology, Anaheim, CA, (Co-organizer of Symposium: Physiological Ecology of Rocky Intertidal Organisms: from Molecules to Ecosystems) January 2002.

National Science Foundation, Biocomplexity P.I. Workshop. October 2001.

American Society of Limnology and Oceanography, Albuquerque, NM. (Co-organizer of Symposium: “From Molecules to Ecosystems: a Hierarchy of Mussel Biology”) February 2001.

Bodega Bay Marine Laboratory, Bodega, CA, June 2001.

Western Society of Naturalists annual meeting, (Symposium: “Biomechanics and ecology: is the marriage working?”) December 1997.

Regional/Local

University of Maryland Eastern Shore, Princess Anne, MD, May 2018.

Oregon Institute of Marine Biology, Coos Bay, OR. April 2017.

University of New England, Biddeford, ME. April, 2017.

New England Aquarium, Lowell Institute Public Lecture Series. April 2017.
 Boston Sea Rovers. March 2017.
 University of Massachusetts, Boston. School for the Environment. January, 2017.
 State University of New York, Stony Brook, Department of Ecology and Evolution and School of Marine and Atmospheric Sciences, Oct. 2016.
 Clark University, Department of Biology, Sept. 2016.
 Bentley University School of Business, Innovation for a Sustainable Sea conference, April 2015
 Salem State University Darwin Festival, April 2015
 University of Massachusetts Dartmouth, November 2014
 Woods Hole Oceanographic Institution, Department of Biology, Woods Hole, MA December 2013
 Harvard University, Department of Organismic and Evolutionary Biology, Cambridge MA, Oct 2013
 Tufts University, Department of Biology, Worcester, MA Oct 2013
 College of the Holy Cross, Worcester, MA Biology Department April 2013
 State University of New York, Stony Brook, Ecology and Evolution Department. April 2013
 Explorers Club, New York, NY March 2012.
 Northeastern University, Jan 2012.
 Caring for Creation Conference, Lake Junaluska, NC, April 2011.
 University of North Carolina Chapel Hill, Department of Biology, February 2011
 Caring for Creation Conference, Lake Junaluska, NC, April 2010.
 Duke Marine Laboratory, Beaufort, NC. October 2009.
 University of North Carolina, Wilmington, Department of Biology and Marine Biology. October, 2008
 Coker College, Hartsville, SC. Centennial Celebration lecture. September, 2008.
 Environmental Educators Association of South Carolina, Keynote Address, June 2008.
 Florida State University, Coastal and Marine Laboratory, Elise B. Newell Seminar Series, March 2008
 Auburn University, Department of Biological Sciences, January 2008.
 University of Central Florida, Florida Seagrant Elise B. Newell Seminar Series, January 2008.
 Clemson University, Department of Biological Sciences, January 2008.
 Department of Natural Resources, Charleston, SC. October, 2006.
 University of Georgia, Athens. Institute of Ecology. Athens, GA. September, 2006
 University of California Los Angeles, April 2006.
 University of New England, Maine, April 2006.
 California State University, Northridge, Department of Biology, November 2005
 Texas A&M University, Department of Oceanography, October 2005.
 Bowdoin College, Department of Biology, Maine, November 2004.
 University of Rhode Island, Department of Biology, November 2003
 University of Delaware, College of Marine Studies, Lewes, DE. October 2003
 Brown University, Department of Ecology and Evolutionary Biology, October 2003
 Ecological Society of America, Savannah, GA (Symposium: "Body size, biophysics and biological stoichiometry: from individual function to ecosystem structure"), August 2003
 University of California, Berkeley, Department of Integrative Biology. Feb. 2003.
 Western Society of Naturalists, Monterey, CA, Nov. 2002. (Symposium: "Marine Ecological Patterns at the Large Scale").
 College of Charleston, Department of Biology, Charleston, SC, Sept. 2002.
 University of Washington, Friday Harbor Laboratories, May 2002.
 South Carolina Marine Educators Association, Hunting Island, SC, March 2002. Keynote address.
 University of North Carolina, Chapel Hill, Department of Marine Sciences. January 2002.

Oregon State University, Corvallis, Department of Zoology, May 2000.
 University of South Carolina, Aiken, Department of Biology and Geology, March 2000.
 National Center for Ecological Analysis and Synthesis, “Modeling sessile growth” working group. Santa Barbara, CA, Aug. 1999.
 University of South Carolina, Columbia, Department of Biology, March 1998.
 University of California, Santa Cruz, Department of Biology, Feb. 1998.
 University of California, Davis, Division of Biological Sciences, Section of Evolution and Ecology. January 1998.
 Stanford University, Hopkins Marine Station, Pacific Grove, CA. October 1997.
 University of Washington, Seattle, School of Fisheries. June 1997.

GRANTS IN SUPPORT OF RESEARCH

External Grants:

NSF - CBET: Tide gate modulation of wetland function: measurements, models, and decision support for best practices. (co-PI with Mark Patterson [PI] and Loretta Fernandez. 8/17-9/20. \$315,314 (CBET-1702618)

NSF- OCE-BSF: The effects of fine-scale temperature and desiccation variability on the distribution of marine species. Helmuth (PI) with T. Gouhier, G. Rilov and S. Filin. 9/16-8/19. \$646,147. (OCE-1635989).

NSF: Using an energetics framework to forecast the interactive effects of abiotic and biotic stressors on intertidal mussels. Helmuth (PI) with G. Trussell and M. Zippay; 2/16-1/19. \$399,508 (IBN 1557868).

NOAA: Science center public forums: Community Engagement for environmental literacy, improved resilience, and decision making. 10/15-9/18. \$39,000; Subcontract to Museum of Science, Boston (NA15SEC0080005).

Google. Class Action: Visualizing local environmental change using new media; Jan 2012-Jan 2013; \$25,000. (With Nicole Heller).

NSF CDI-TYPE I: Biologically relevant sensor networks for climate change studies in intertidal ecosystems (co-PI with Wenyan Xu) 8/11-8/14. \$447,666. Location: University of South Carolina. (GEO-1124657)

National Aeronautics and Space Administration, “Physiological impacts of climate change using remote sensing: An integrative approach to predicting patterns of species abundance and distribution and thresholds of ecosystem collapse”; 5/1/11-4/28/15; \$1,900,000; (co-PI with D.S. Wethey [PI], T.J. Hilbish, S. Woodin, and V. Lakshmi). (NNX11AP77G)

NSF: Environmental signal analysis: monitoring the impacts of climate change on rocky intertidal ecosystems across a cascade of scales. (co-PI with J. Tang); 9/1/09-8/31/14 \$737,620;

NSF: Planning visit: ecological forecasting of intertidal ecosystems in Chile 3/1/09-2/28/10. \$18,645.

National Aeronautics and Space Administration, “Viewing the world through nonhuman eyes: exploring the links between remote sensing, climate change and coastal ecosystems.” 4/07-3/10. \$44,775.

National Aeronautics and Space Administration, “Ecological forecasting and hindcasting of biodiversity responses to climate change: from MODIS to mussels.” Helmuth (PI) with D.S. Wethey, T.J. Hilbish and V. Lakshmi (USC Geology). 3/07-3/10. \$1,416,738. (NNX07AF20G)

NOAA Ecofore: Ecological forecasting: responses of ecosystem foundation species in the coastal zone to climate change (co-PI with D.S. Wethey [PI], T.J. Hilbish, S. Woodin, V. Lakshmi, and H. Power); 11/01/04-10/31/09, \$2,478,118.

National Aeronautics and Space Administration, "Climate change and intertidal biogeography: coupling remote sensing data to thermal physiology across a cascade of scales." (Helmuth [PI] with D.S. Wethey, T.J. Hilbish and V. Lakshmi) 3/04-3/07; \$1,050,000. (NNG04GE43G).

National Science Foundation, "Climate change and patterns of body temperature in intertidal ecosystems" 09/03 - 08/06; \$234,000.

National Science Foundation, "Biophysical and behavioral agents of natural selection in a hybrid zone", (co-PI with T.J. Hilbish [PI] and D.S. Wethey), 3/02 – 2/04, \$220,209.

National Geographic Society, "Latitudinal patterns in thermal stress: linking physiology, ecology and climate change (co-PI with Gretchen Hofmann), 2/02- 10/03. \$20,050. (\$11,000 to Helmuth)

National Science Foundation. "Physical Ecology of the Rocky Intertidal: predicting patterns in invertebrate body temperatures" 4/00- 3/03, \$287,000.

National Undersea Research Center, "Decoupling the effects of mass transfer, water motion and temperature on reef health." (co-PI with DS Wethey [PI] and C Finelli) 1/02 – 12/03, \$49,953.

National Science Foundation, "Symposium: Physiological ecology of rocky intertidal organisms: from molecules to ecosystems." 11/ 01 – 11/02. \$6000.

National Science Foundation. BIOCOMPLEXITY--INCUBATION ACTIVITY: Linking ecology, physiology and climate change: Influence of environmental stress on community structure in the rocky intertidal. (co-PI with G. Hofmann [PI], B. Menge and A. Kinzig) 7/00–6/01. \$61,896.

Smithsonian Institution, Caribbean Coral Reef Ecosystems program. "Uncovering the roles of environment and physiology in the alternating competitive dominance of two coral species' (Helmuth [PI] with K.P. Sebens, E. Carrington and J. Leichter) 1/01 – 12/02.

Smithsonian Institution. Quantifying the role of "physical factors" in the life history of the coral *Agaricia tenuifolia* (Helmuth [PI] with I. Macintyre and B. Timmerman). May 1998.

Smithsonian Institution. The interplay of host morphology and symbiont microhabitat: consequences of aggregation structure of the coral *Agaricia tenuifolia* (Helmuth [PI] with I. Macintyre and B. Timmerman). March 1997.

Smithsonian Institution. Consequences of aggregation structure, habitat complexity and colony morphology to mass flux in scleractinian corals (co-PI with I. Macintyre). March 1996.

Smithsonian Institution. Effects of water movement on the distribution and morphology of reef corals (co-PI with K.P. Sebens [PI]). March 1994, March 1995.

Internal Grants:

Northeastern University Office of the Provost, "Autonomous sensors and smart analytics for wetlands in urban areas" (with Mark Patterson (PI)). 7/1/14-6/30/15; \$50,000

USC Office of the Provost, Institute for STEM Enrichment, "Sensor development for the study of global climate change in intertidal ecosystems: an international workshop at USC. Helmuth (PI) with Jijun Tang and Wenyan Xu. 3/1/11-2/28/12; \$21,290.

South Carolina BRIN/EpScOR program, "Characterizing the thermal ecology of fiddler crabs" (Helmuth [PI] with R. Brodie and M. Crowe) 7/02-7/03. \$25,000.

USC FEI program. Cluster Hire in Ecological Forecasting (with J. Tang, D. Wethey, M. Fletcher and G. Carbone). \$233,000.

TEACHING AND ADVISING

Courses Taught:

Environmental Science and Policy, Fall 2018 (10 students)

Urban Coastal Sustainability, Spring 2015 (9 students), Fall 2016 (23 students), Fall 2017 (12 students)

Introduction to Environmental Science; Spring 2014 (114 students), Spring 2016 (105 students), Spring 2017 (73 students), Spring 2018 (96 students)

Honors Biology 102: spring semesters 2001, 2002, 2003, 2004 (approximately 30 students/ semester)

Ecology and Evolution Laboratory (Fall 2004, 400 students)

Introduction to Physiological Ecology; fall semesters 2001, 2003, 2004, 2005, 2006 (approximately 20 students/semester)

Biology 102 (Introductory Biology): spring semesters of 2005, 2006, 2007, 2008, 2009, 2010, 2012 (approximately 275 students per semester)

Conservation Biology, fall semesters 2003, 2004, 2007 (approximately 10 students/semester)

Comparative Physiology; fall semesters 2009, 2010 (100 students per semester)

Graduate Students and Post Docs Advised:

Degrees awarded:

Karl Castillo (Ph.D. awarded 2008, USC Marine Science Program) Thesis title: “Effects of Elevated Seawater Temperature on the Scleractinian coral *Montastrea annularis* from the Inner and Outer Reefs of Southern Belize”

Maxine Henry (M.S. Awarded 2005, USC Marine Science Program). Thesis title: “Modeling environmental effects on body temperature of an intertidal saltmarsh snail (*Ilyanassa obsoleta* Say)”

Jennifer Jost (Ph.D. awarded 2007, USC Biological Sciences). Thesis title: “The morphological determinants of body temperature in the ribbed mussel, *Geukensia demissa* and their effects on mortality and growth rate.”

Kimberly Schneider (Ph.D. awarded Fall 2006; USC Biological Sciences). Thesis title: “The role of abiotic factors in intertidal selection: A comparison between an invader and its sibling species.”

Lauren Szathmary (M.S. awarded 2006, USC Biological Sciences). Thesis title: “Predicting direct and indirect effects of climate change on a predator-prey pair in the rocky intertidal ecosystem”

Lauren Yamane (M.S. awarded 2008, USC Marine Science Program). Thesis title: “Contrasting responses of an intertidal predator to aerial and aquatic body temperatures”

K. Allison Smith (Ph.D. awarded 2010, USC Biological Sciences). Thesis title: “Measuring and forecasting environmental conditions from the perspective of rocky intertidal organisms”

Shilpi Chhotray (MS awarded 2010, USC MEERM Program). Thesis title: “An assessment of the perceptions, level of involvement, and needs of user-groups for Marine Protected Areas in the Carolinas”

Josephine Iacarella (MS awarded 2011, USC Marine Science Program). Thesis title: “Behavioral and physiological responses of the salt marsh snail, *Littoraria irrorata*, to thermal and desiccation stresses”

Nicole Kish (MS awarded 2013, USC Marine Science Program) Thesis title: “Modeling approaches, physiological responses, and climate change: how good is “good enough?”

Cristian Monaco (Ph.D. awarded 2014, USC Biological Sciences)

Shadow Gullledge (M.S. awarded 2014, USC Master of Earth and Environmental Resources)

Nicholas Colvard (Ph.D awarded 2016, Northeastern University, Department of Marine and Environmental Sciences)

Kelsey Tuminelli (M.S. awarded 2016, Northeastern University, Three Seas Marine Biology Program)

Charlee Corra (M.S. awarded 2016, Northeastern University; Three Seas Marine Biology Program)

Emily Duwan (M.S. Awarded 2017. Northeastern University; Three Seas Marine Biology Program)

Lauren Giglio (M.S. Awarded 2018. Northeastern University; Three Seas Marine Biology Program)
Kirinne Slaughter (M.S. Awarded 2018. Northeastern University; Three Seas Marine Biology Program)
Marissa Varade (M.S. Awarded 2018, Northeastern University; Three Seas Marine Biology Program)
Allison Matzelle (Ph.D. awarded 2018, Northeastern University; Department of Marine and
Environmental Sciences)

Current students:

Jessica Torossian (Ph.D. student, Northeastern University; 2013-present)
David Sittenfeld (PhD student, Northeastern University; 2015-present)
Ashley Cryan (PhD student, Northeastern University; 2016-present)
Aubrey Foulk (PhD student, Northeastern University; 2018-present)

Postdoctoral students:

Sarah Gilman (Post Doctoral Research Associate, 2003-2005)
Sylvain Pincebourde (Post Doctoral Research Associate, 2006-2007)
Mackenzie Zippay (Post Doctoral Research Associate, 2011-2014)

Undergraduate students:

Zoe Hockenberry (2018) Physiology of marsh invertebrates
Bradley Phelps (2018) Behavioral responses of sessile prey
Mia DeSanctis (2018) Physiology of tidepool organisms
Sahana Simonetti (2017) Global fisheries education
David Stein (2017) Global fisheries education
Isabel Backman (2017) Local adaptation in intertidal gastropods
Richard Judge (2017) Intertidal logger sensor design
Lindsay Peter (2015) Thermal physiology of mussels
Anthony Lamattina (2015) Thermal ecology of Gulf of Maine Invertebrates
Megan Reilly (2015) Stories of climate change by residents of coastal communities
Tara Fitzhenry (2000-2001) Senior Thesis: Thermal biology of intertidal mussels (*resulted in first-authored publication by student in journal Marine Biology)
Nichole Moore (2000-2001) Ecology and genetics of zooxanthellae in corals
Christie Stephans (2001) Feeding biology of soft corals
Justin Tisdale (2002) Population genetics of marine mussels
Denise Strickland (2002-2003) Senior Honors thesis: Development of lesson plans examining marine ecology of intertidal ecosystems
Lisa Wickliffe (2002-2003) Physiological ecology of intertidal invertebrates
Lauren Szathmary (2002- 2004) SC Honors College Thesis: Development of a mathematical model of heat exchange for intertidal seastars
Katrina Nylund 2003 Species range boundaries of intertidal mussels
Nouran Ragaban 2004 Population genetics and biogeography of Mytilus
Crystal Welch (In service Teacher) Development of lesson plans examining population ecology and genetics
Jake Adams 2004-2005 Effects of water flow on coral physiology
Anna Marie Laura (2005) SC Honors College Thesis: Development of lesson plans examining effects of climate change on polar bears
Lindsay Watson (2005) SC Honors College Thesis: Development of lesson plans examining mechanisms of heat exchange in mammals

Lauren Van Thiel (2006-2007) Microclimatic effects on species invasions in rocky intertidal ecosystems (resulted in publication in Journal of Thermal Biology)
Alyson Tockstein (2008-2010). Intertidal thermal biology
Nicholas Burnett (2009-2012). Ecophysiology of intertidal invertebrates (resulted in book chapter)
Maggie Brillhart (2009) Development of lesson plans for middle school teachers
Rachel Harris (2010) Biomimetic sensors for intertidal seastars
Corey Scott (2011) Marsh crab thermal biology
Shadow Fockler (2011-2012) Effects of wave energy farms on intertidal organisms
Rachel Price (2012): Educational outreach using Gigapan technology
Catherine Bowler (2012): Educational outreach using Gigapan technology

PROFESSIONAL DEVELOPMENT AND SYNERGISTIC ACTIVITIES

Service to the Discipline/Profession

Member CERSAP review team for SAP 4.3 (interagency panel on climate change) 2007-08.
Contributing Editor, *Marine Ecology Progress Series* 2007-2015
Subject editor, *Coral Reefs*, 2013-2015
Section lead, National Climate Assessment Technical Input Document (Oceans Chapter); 2012-2013
Member, GEO-BON working group 5, 2012-present
Member, Marine Biodiversity Observation Network (MBON), 2016-present
National Sea Grant Advisory Board, 2015-present (Vice Chair 2017-present)
Member, International Advisory Board Dongshan Marine Station, Xiamen University, China

Service to the Community/Public

Association of Climate Change Officers, Co-chair, Adaptation Working Group, 2011-2012
Board member, South Carolina Marine Educators Association, 2001-2003
Science Committee, *The Explorers Club*

Professional Development

Google Science Communications Fellow (Climate Change), 2011
Aldo Leopold Leadership Fellow, 2005