

Luke P. Miller, Ph.D.

Curriculum Vitae

April 2020

Biology Department
San Diego State University
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Appointments

2018–present	Assistant Professor	San Diego State University
2015–2018	Assistant Professor	San José State University

Professional Preparation

2015	Postdoctoral Researcher	Loyola Marymount University
2013–2015	Research Associate	Hopkins Marine Station, Stanford University
2012–2013	Postdoctoral Researcher	Hopkins Marine Station, Stanford University
2008–2011	Postdoctoral Researcher	Marine Science Center, Northeastern University

Education

2008	Ph.D.	Hopkins Marine Station, Stanford University Studied thermal physiology and functional morphology of intertidal organisms, utilizing modeling, field experiments, and laboratory assays. Advisor: Mark Denny
2000	B.Sc.	University of California, Santa Barbara Double major: Aquatic Biology; Ecology and Evolution. Graduated with high honors and distinction in the major.

Publications

29 total. * denotes graduate student coauthor, † denotes undergraduate coauthor

2020	Pound, R. J.*, L. P. Miller , F. A. King*, & J. L. Burnaford. (2020) Temperature affects susceptibility of intertidal limpets to bird predation. <i>Journal of Experimental Biology</i> 223: 1-11. https://doi.org/10.1242/jeb.213595 Data archive: http://doi.org/10.5281/zenodo.3731787
2019	L. P. Miller & W. W. Dowd. (2019) Repeatable patterns of small-scale spatial variation in intertidal mussel beds and their implications for responses to climate change. <i>Comparative Biochemistry and Physiology - Part A</i> 236: 1-11 https://doi.org/10.1016/j.cbpa.2019.06.016 Data archive: https://doi.org/10.5061/dryad.5270k42
	L. P. Miller & W. W. Dowd. (2019) Dynamic measurements of black oystercatcher (<i>Haematopus bachmani</i>) predation on mussels (<i>Mytilus californianus</i>). <i>Invertebrate Biology</i> 138 (1): 67-73

- <http://doi.org/10.1111/ivb.12240>
Data archive: <https://doi.org/10.5061/dryad.jp33n5f>
- 2017 **L. P. Miller** & W. W. Dowd. (2017) Multimodal *in situ* datalogging quantifies inter-individual variation in thermal experience and persistent origin effects on gaping behavior among intertidal mussels (*Mytilus californianus*). *Journal of Experimental Biology* 220: 4305-4319
<http://doi.org/10.1242/jeb.164020>
Data archive: <https://doi.org/10.5061/dryad.2sd19>
- Gleason L. U., **L. P. Miller**, J. R. Winnikoff*, G. N. Somero, P. H. Yancey, D. Bratz†, & W. W. Dowd. (2017) Thermal history and gape of individual *Mytilus californianus* correlate with oxidative damage and thermoprotective osmolytes. *Journal of Experimental Biology* 220: 4292-4304
<http://doi.org/10.1242/jeb.168450>
- 2016 Helmuth, B., F. Choi, A. Matzelle, J. L. Torossian, S. L. Morello, K. A. S. Mislan, L. Yamane, D. Strickland, P. L. Szathmary, S. E. Gilman, A. Tockstein, T. J. Hilbish, M. T. Burrows, A. M. Power, E. Gosling, N. Mieszowska, C. D. G. Harley, M. Nishizaki, E. Carrington, B. Menge, L. Petes, M. 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. J. 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. D. McQuaid, J. Lathlean, C. J. Monaco, K. R. Nicastro, & G. Zardi (2016). Long-term, high frequency *in situ* measurements of intertidal mussel bed temperatures using biomimetic sensors. *Scientific Data* 3: 1-11
<http://doi.org/10.1038/sdata.2016.87>
- Early, R., B. A. Bradley, J. S. Dukes, J. J. Lawler, J. D. Olden, D. M. Blumenthal, P. Gonzalez, E. D. Grosholz, I. Ibáñez, **L. P. Miller**, C. J. B. Sorte, & A. J. Tatem (2016). Global threats from invasive alien species in the twenty-first century and national response capacities. *Nature Communications* 7: 1-9
<http://doi.org/10.1038/ncomms12485>
- LaScala-Gruenewald, D. E.*, **L. P. Miller**, M. E. S. Bracken, B. J. Allen & M. W. Denny (2016). Quantifying the top-down effects of grazers on a rocky shore: selective grazing and the potential for competition. *Marine Ecology Progress Series* 533: 49-66
<http://doi.org/10.3354/meps11774>
- 2015 **Miller, L. P.** & J. D. Long (2015). A tide prediction and tide height control system for laboratory mesocosms. *PeerJ* 3:e1442
<https://doi.org/10.7717/peerj.1442>
- Miller, L. P.**, B. J. Allen, F. A. King*, D. Chilin†, V. Reynoso†, & M. W. Denny (2015). Warm microhabitats drive both increased respiration and growth rates of intertidal consumers. *Marine Ecology Progress Series* 522: 127-143
<http://doi.org/10.3354/meps11117>
Data archive: <http://purl.stanford.edu/mz343tz6255>
- 2014 **Miller, L. P.**, C. M. Matassa*, & G. C. Trussell (2014). Climate change enhances the negative effects of predation risk on an intermediate consumer. *Global Change Biology* 20: 3834-3844
<http://doi.org/10.1111/gcb.12639>

- Chu, N. D.*, **L. P. Miller**, S. T. Kaluziak*, G. C. Trussell, & S. V. Vollmer (2014). Thermal stress and predation risk trigger distinct transcriptomic responses in the intertidal snail *Nucella lapillus*. *Molecular Ecology* 79(3): 397-421
<http://doi.org/10.1111/mec.12994>
- Ibáñez, I., J. M. Diez, **L. P. Miller**, J. D. Olden, C. J. B. Sorte, D. M. Blumenthal, B. A. Bradley, C. M. D'Antonio, J. S. Dukes, R. I. Early, E. D. Grosholz, & J. J. Lawler (2014). Integrated assessment of biological invasions. *Ecological Applications* 24(1): 25-37
<http://doi.org/10.1890/13-0776.1>
- 2013 Sorte, C. J. B., I. Ibáñez, D. M. Blumenthal, N. A. Molinari, **L. P. Miller**, E. D. Grosholz, J. M. Diez, C. M. D'Antonio, J. D. Olden, S. J. Jones, & J. S. Dukes (2013). Poised to prosper? A cross-system comparison of climate change effects on native and non-native species performance. *Ecology Letters* 16(2): 261-270
<http://doi.org/10.1111/ele.12017>
- Miller, L. P.** (2013). The effect of water temperature on drilling and ingestion rates of the dogwhelk *Nucella lapillus* feeding on *Mytilus edulis* mussels in the laboratory. *Marine Biology* 160: 1489-1496
<http://doi.org/10.1007/s00227-013-2202-z>
- 2012 Diez, J. M., C. M. D'Antonio, J. S. Dukes, E. D. Grosholz, J. D. Olden, C. J. B. Sorte, D. M. Blumenthal, B. A. Bradley, R. Early, I. Ibáñez, S. J. Jones, J. J. Lawler, & **L. P. Miller** (2012). Will extreme climatic events facilitate biological invasions? *Frontiers in Ecology and the Environment* 10(5): 249-257
<http://doi.org/10.1890/110137>
- Bradley, B. A., D. M. Blumenthal, R. Early, E. D. Grosholz, J. J. Lawler, **L. P. Miller**, C. J. B. Sorte, C. M. D'Antonio, J. M. Diez, J. S. Dukes, I. Ibáñez & J. D. Olden (2012). Global change, global trade, and the next wave of plant invasions. *Frontiers in Ecology and the Environment* 10(1): 20-28
<http://doi.org/10.1890/110145>
- 2011 Sorte, C. J. B., S. J. Jones, & **L. P. Miller** (2011). Geographic variation in temperature tolerance as an indicator of potential population responses to climate change. *Journal of Experimental Marine Biology and Ecology* 400(1): 209-217
<http://doi.org/10.1016/j.jembe.2011.02.009>
- Miller L. P.** & M. W. Denny. (2011) Importance of behavior and morphological traits for controlling body temperature in littorinid snails. *The Biological Bulletin* 220(3): 209-223
<https://doi.org/10.1086/BBLv220n3p209>
- 2009 **Miller, L. P.**, C. D. G. Harley, & M. W. Denny. (2009) The role of temperature and desiccation stress in limiting the local-scale distribution of the owl limpet, *Lottia gigantea*. *Functional Ecology* 23(4): 756-767
<http://doi.org/10.1111/j.1365-2435.2009.01567.x>
- Denny, M. W., L. J. H. Hunt, **L. P. Miller**, & C. D. G. Harley. (2009) On the prediction of extreme ecological events. *Ecological Monographs* 79(3): 397-421
<http://doi.org/10.1890/08-0579.1>

- Harley, C. D. G., M. W. Denny, K. Mach, & **L. P. Miller**. (2009) Thermal stress and morphological adaptations in limpets. *Functional Ecology* 23(2): 292-301
<http://doi.org/10.1111/j.1365-2435.2008.01496.x>
- 2008 Dong, Y., **L. P. Miller**, J. G. Sanders, & G. N. Somero. (2008) Heat-shock protein 70 (Hsp70) expression in four limpets of the Genus *Lottia*: interspecific variation in constitutive and inducible synthesis reflects in situ exposure to heat stress. *The Biological Bulletin*, 215, pgs. 173-181
<https://doi.org/10.2307/25470698>
- 2007 **Miller, L. P.** (2007) Feeding in extreme flows: behavior compensates for mechanical constraints in barnacle cirri. *Marine Ecology Progress Series*, 349, pgs. 227-234
<http://doi.org/10.3354/meps07099>
- Miller, L. P.** & B. Gaylord. (2007) Barriers to flow: the effects of experimental cage structures on water velocities in high-energy subtidal and intertidal environments. *Journal of Experimental Marine Biology and Ecology*, 344, pgs. 215-228
<http://doi.org/10.1016/j.jembe.2007.01.005>
- Miller, L. P.**, M. J. O'Donnell, & K. J. Mach. (2007) Dislodged but not dead: survivorship of a high intertidal snail following wave dislodgement. *Journal of the Marine Biological Association of the United Kingdom*, 87, pgs. 735-739
<http://doi.org/10.1017/S0025315407055221>
- 2006 Denny, M. & **L. Miller** (2006). Jet propulsion in the cold: mechanics of swimming in the Antarctic scallop *Adamussium colbecki*. *Journal of Experimental Biology* 209: pgs. 4503-4514
<http://doi.org/10.1242/jeb.02538>
- Denny, M. W., **L. P. Miller**, & C. D. G. Harley. (2006). Thermal stress on intertidal limpets: long-term hindcasts and lethal limits. *Journal of Experimental Biology* 209: pgs. 2420-2431
<http://doi.org/10.1242/jeb.02258>
- 2003 Denny, M. W., **L. P. Miller**, M. D. Stokes, L. J. H. Hunt, & 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): pgs. 1-8.
<http://www.jstor.org/stable/3597974>

Book Chapters

- 2016 Blanchette, C. A., M. W. Denny, J. M. Engle, B. S. T. Helmuth, **L. P. Miller**, K. J. Nielsen, & J. Smith. *Ecosystems of California: Intertidal* in *Ecosystems of California*. H. Mooney and E. Zavaleta eds. University of California Press ISBN-13: 978-0520278806

Software packages for R

- 2020 **Miller, L. P.** (2020) `owh1R`: Open Wave Height Logger Data Processing In R
<https://github.com/millerlp/owh1R>
- 2019 **Miller, L. P.** & U. Neumeier (2019) `oceanwaves`: Summary statistics for ocean waves.
<https://github.com/millerlp/oceanwaves>
- 2016 Thorley, J. & **L. Miller** (2016) `rtide`: Tide Heights.
<https://CRAN.R-project.org/package=rtide>

Dissertation

- 2008 | Miller, L. P. "Life on the edge: morphological and behavioral adaptations for survival on wave-swept shores." Stanford University, 205 pp.
http://www.lukemiller.org/pubs/Miller_Luke_Thesis_2008.pdf

Funding

- 2018-2021 | Collaborative Research: Effects of multiple aspects of climate change on marine biodiversity and ecosystem functioning. C. B J. Sorte, M. E. Bracken, K. J. Kroeker, L. P. Miller. National Science Foundation Biological Oceanography Proposal 1756216. Duration: 36 months, \$99,965.
- 2017-2020 | Collaborative Research: Context-dependency of top-down vs. bottom-up effects of herbivores on marine primary producers. M. E. Bracken, A. C. Martiny, & L. P. Miller. National Science Foundation Biological Oceanography Proposal 1737065. Duration: 36 months, \$123,567

Teaching

- San Diego State University**
 2019 | *Instructor* – Analysis of Biological Data (BIOL 606)
- San José State University**
 2018 | *Instructor* – Ecological Sampling Design and Analyses (BIOL 156)
Instructor – Hypothesis Testing, Biostatistics and Experimental Design (BIOL 55 & 155)
- 2017 | *Instructor* – Hypothesis Testing, Biostatistics and Experimental Design (BIOL 55 & 155)
Instructor – Ecological Field Methods (BIOL 164)
Instructor – Advanced Topics: Practical Computing for Research Biologists (BIOL 255E)
Instructor – Functional Morphology (BIOL 114)
Instructor – Ecological Biology Lab (BIOL 20)
- 2016 | *Instructor* – Hypothesis Testing, Biostatistics and Experimental Design (BIOL 55 & 155)
Instructor – Physiological Ecology (BIOL 106)
Instructor – Principles of Biology I Lab (BIOL 30)
- 2015 | *Instructor* – Hypothesis Testing, Biostatistics and Experimental Design (BIOL 55 & 155)
Instructor – Functional Morphology (BIOL 114)
- Marine Science Center, Northeastern University**
 2009–2011 | *Instructor* – Invertebrate Zoology (BIOL 5503)
 2008 | *Guest Lecturer* – Marine Ecology
- Hopkins Marine Station, Stanford University**
 2007 | *Guest Lecturer, Teaching Assistant* – Biomechanics and Ecological Physiology of Intertidal Communities
- 2003, 2005 | *Teaching Assistant* – Intertidal Biomechanics and Ecophysiology
 2003 | *Teaching Assistant* – Biostatistics
 2002 | *Teaching Assistant* – Introductory Biology Lab
- McMurdo Station, Antarctica**
 2006 | *Teaching Assistant* – NSF Antarctic Biology Course
- University of California, Santa Barbara**
 1999, 2000 | *Teaching Assistant* – Introductory Biology Lab, Ecology and Evolution section

- 2006–2008 **Monterey Bay Aquarium**
Feeding Show Diver & Narrator – Fed fish while explaining kelp forest natural history to the public, diving on surface-supplied air.

Conference presentations

- 2019 Miller, L. P. & W. W. Dowd “Repeatable patterns of small-scale spatial variation in intertidal mussel beds and implications for responses to climate change.” *Western Society of Naturalists*
- 2018 Miller, L. P., M. Ponce de Leon Cerqueda, L. S. Cunningham, A. Thomasdotter, K. M. Gong, N. Patel, & M. W. Denny “Establishment of internal body temperature gradients in *Mytilus californianus* during emersion.” *Western Society of Naturalists*
 Miller, L. P. & W. W. Dowd, “A multi-modal sensor system for monitoring individual mussels in rocky intertidal habitats.” *Society for Integrative and Comparative Biology*
- 2017 Miller, L. P. & W. W. Dowd, “Valve gaping behavior and movement patterns of mussels on wave-swept rocky shores.” *Society for Integrative and Comparative Biology*
 Miller, L. P. & W. W. Dowd. “Biologging on the wave-swept shore: a monitoring system for mussel behavior and body temperature.” *Western Society of Naturalists*
- 2016 Miller, L. P. & W. W. Dowd. “Prying into private lives of mussels: Field measurements of valve gape and body posture changes in the wave-swept intertidal zone.” *Western Society of Naturalists*
 Miller, L. P. & W. W. Dowd. “Field-based measurements of behavioral and biophysical contributions to body temperature variation among intertidal mussels.” *Society for Integrative and Comparative Biology*
- 2015 Miller, L. P., B. J. Allen, & M. W. Denny. “Increased low tide temperature variation drives increased growth rates of intertidal consumers.” *Society for Integrative and Comparative Biology*
- 2014 Miller, L. P., B. J. Allen, & M. W. Denny. “Warmer weather while waiting for waves lets limpets live large.” *Western Society of Naturalists*
 Miller, L. P., B. J. Allen, & M. W. Denny. “Consequences of changing environmental variability on rocky shores: Effects of thermal variation on growth rates and energy flow” *Ecological Society of America*
 Miller, L. P., B. J. Allen, & M. W. Denny. “Changing environmental variability in a changing climate: the effects of thermal variation on growth rates and energy flow through an intertidal community.” *Society for Integrative and Comparative Biology*
- 2013 Miller L. P., B. J. Allen, & M. W. Denny. “Changing environmental variability in a changing climate: effects of thermal variation on growth rates in an intertidal community.” *Western Society of Naturalists*
- 2012 Miller L. P., M. W. Denny, M. J. O’Donnell, M. L. Boller, & A. V. Staaf. “Sensors on the seashore: measuring air and sea conditions on a wave-swept shoreline.” *U.S. International Association of Landscape Ecology*
- 2010 Miller, L. P. “Behavior, morphology, and a warming climate: Thermal stress in high intertidal grazers” *Benthic Ecology Meeting*
- 2009 Miller, L. P., M. W. Denny, & C. D. G. Harley. “Long-term reconstructions of limpet body temperatures: stress events and small-scale limpet distributions on a rocky shore.” *Society for Integrative and Comparative Biology*

- 2008 Miller, L. P. "The quandary of color and the significance of shape: temperature relations in littorine snails." *Western Society of Naturalists*
- Miller, L. P. "Morphological and behavioral adaptations for control of body temperature during aerial emersion in northeastern Pacific Littorina: a mechanistic test." *Western Society of Malacologists*
- Miller, L. P., M. W. Denny & C. D. G. Harley. "Ecomechanics meets ecophysiology: predicting the frequency of lethal and sublethal stress events for a dominant competitor for primary space in the intertidal zone, *Lottia gigantea*." *Benthic Ecology Meeting*
- 2007 Miller, L. P., M. W. Denny, & C. D. G. Harley. "Ecomechanics meets ecophysiology: predicting the frequency of lethal and sublethal stress events for a mid-shore limpet, *Lottia gigantea*." *Western Society of Naturalists*
- 2006 Miller, L. P. "Feeding is a drag: cautious cirripedes curtail cirral casting when waves wash wildly". Mini-symposium honoring Dr. Steven Vogel, *Integrative and Comparative Biology*
- Miller, L. P. "Feeding in flow: in situ measurement of barnacle feeding under breaking waves". *International Temperate Reefs Symposium*
- 2005 Miller L. P. "Pondering the purpose of precarious postures: The effect of littorine snail shell orientation on body temperature". *Western Society of Malacologists*
- 2004 Miller, L. P. "The effects of high temperature and desiccation stress on the survival of the giant owl limpet, *Lottia gigantea*." *Integrative and Comparative Biology* v 44(6): 606.
- 2003 Miller, L. P. "Functional significance of littorine snail "standing off" behavior for control of body temperature during aerial exposure." *Integrative and Comparative Biology* v 43(6): 995
- O'Donnell, M. J. & L. P. Miller. "Field measurements of mussel feeding time in the surf zone." *Integrative and Comparative Biology* v 43(6): 993
- Miller, L. P. "Quantifying cage effects on water flow and wave forces in the rocky intertidal zone" *Western Society of Naturalists*
- 2000 Miller, L. P. "Whelk predation and the potential effects on mussel species distributions around Point Conception." *Western Society of Naturalists*

Invited Seminars

- 2018 San Diego State University
- 2017 Moss Landing Marine Laboratories
U.C. Davis Bodega Marine Laboratory
Humboldt State University
California State University, Northridge
- 2016 Sonoma State University
Moss Landing Marine Laboratories
- 2015 San José State University
- 2014 Hopkins Marine Station, Stanford University
- 2013 California State University, Monterey Bay
- 2013 Cal Poly San Luis Obispo
- 2012 San Francisco State University, Romberg Tiburon Center
- 2011 University of New England
- 2010 University of Delaware
- 2010 Mt. Holyoke College
- 2009 Northeastern University, Marine Science Center

Professional Skills

- **Programming languages**
 - R statistical language, C, C++, MATLAB, LabVIEW, Python
- **Technical Skills**
 - Design and construction of instrumentation, sensor arrays, seawater systems, process control
 - Microcontroller and datalogger development, including temperature, hall effect, accelerometer, magnetometer, force, and wave height sensors
 - Machine shop skills including CNC mill, lathe, welding (GMAW, GTAW, & SMAW)
- **Open Source Projects**
 - Open Wave Height Logger (OWHL) – a datalogger to sample ocean wave heights (via pressure sensor) for long duration deployments. With Dr. Jarrett Byrnes, U Mass Boston.
<https://github.com/millerlp/OWHL>
 - Tide Height Control system – a self-contained tide height calculator and system to smoothly raise and lower water levels in aquaria with the changing tide. With Dr. Jeremy Long, San Diego State University.
https://github.com/millerlp/Tide_calculator
https://github.com/millerlp/Tide_controller
 - Mussel Tracker – a datalogger system to log feeding behavior, orientation, and temperature data for mussels in the rocky intertidal zone. With Dr. W. Wesley Dowd, Loyola Marymount University.
<https://github.com/millerlp/MusselTracker>

Professional Experience

AAUS Scientific Diver – certified 2004

Student Representative – Diving Control Board, Stanford University (2005–2007)

Professional Memberships

Ecological Society of America

Society for Integrative and Comparative Biology

Western Society of Naturalists

Professional Service

Reviewer for: *American Malacological Bulletin, Animal Behaviour, Aquatic Biology, Basic and Applied Ecology, Biogeography, Biological Bulletin, Biological Invasions, Biology Letters, Conservation Physiology, Ecological Modelling, Ecology, Ecology and Evolution, Estuaries and Coasts, Frontiers in Zoology, Functional Ecology, Global Ecology and Biogeography, HardwareX, Helgoland Marine Research, Hydrobiologia, ICES Journal of Marine Science, Integrative Zoology, Invertebrate Biology, Journal of Experimental Biology, Journal of Experimental Marine Biology and Ecology, Journal of the Marine Biological Association of the United Kingdom, Journal of Molluscan Studies, Journal of Phycology, Journal of Thermal Biology, Journal of Visualized Experiments, Limnology and Oceanography, Marine Biology, Marine Biology Research, Marine Ecology Progress Series, Marine Environmental Research, Methods in Ecology and Evolution, Oecologia, Oikos, PeerJ, PLoS One, Polar Research*

References

Dr. Mark W. Denny

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