

# Stanford

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## Mark Denny

John B. and Jean De Nault Professor of Marine Science at the Hopkins Marine Station  
Biology

### Bio

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#### BIO

The field of biomechanics uses the principles of engineering and physics to understand how plants and animals function. I was raised as a biomechanic, beginning as an undergraduate at Duke University where I was recruited by two of the influential leaders of the field, Steve Wainwright and Steve Vogel. After my doctoral work at the University of British Columbia (where I explored the mechanics of gastropod locomotion with John Gosline), I began to wonder how biomechanics could be used in an ecological context, and I have been exploring this question ever since. Two years as a postdoc with Bob Paine at the University of Washington introduced me to the ecology of wave-swept shores, and it is in that uniquely stressful environment that my current research strives to advance our understanding of ecological mechanics.

#### ACADEMIC APPOINTMENTS

- Professor, Biology

#### ADMINISTRATIVE APPOINTMENTS

- Director, Hopkins Marine Station, (2017-2020)

#### LINKS

- My Lab Site: <http://web.stanford.edu/group/denny/cgi-bin/wordpress/>

### Research & Scholarship

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#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Biomechanics, ecology, and ecological physiology

### Teaching

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#### COURSES

##### 2020-21

- Introduction to Research in Ecology and Ecological Physiology: BIOHOPK 47 (Sum)
- Using Physics to Explain Biology: Mechanistic Approaches to Plankton Ecology: BIO 10N (Aut)

##### 2018-19

- Ecological Mechanics: BIOHOPK 150H, BIOHOPK 250H (Spr)
- Introduction to Research in Ecology and Ecological Physiology: BIOHOPK 47 (Spr)

## STANFORD ADVISEES

Lucas Pavan

## Doctoral Dissertation Reader (AC)

Will Gough

## GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)

## Publications

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### PUBLICATIONS

- **Effects of heat acclimation on cardiac function in the intertidal mussel *Mytilus californianus*: can laboratory-based indices predict survival in the field?** *The Journal of experimental biology*  
Moyen, N. E., Somero, G. N., Denny, M. W.  
2022
- **Rapid Range Expansion of a Marine Ectotherm Reveals the Demographic and Ecological Consequences of Short-Term Variability in Seawater Temperature and Dissolved Oxygen** *AMERICAN NATURALIST*  
Burford, B. P., Wild, L. A., Schwarz, R., Chenoweth, E. M., Sreenivasan, A., Elahi, R., Carey, N., Hoving, H. T., Straley, J. M., Denny, M. W.  
2022
- **The limits of convergence in the collective behavior of competing marine taxa.** *Ecology and evolution*  
Burford, B. P., Williams, R. R., Demetras, N. J., Carey, N., Goldbogen, J., Gilly, W. F., Harding, J., Denny, M. W.  
2022; 12 (3): e8747
- **Physiological Consequences of Oceanic Environmental Variation: Life from a Pelagic Organism's Perspective.** *Annual review of marine science*  
Denny, M. W., Dowd, W. W.  
2021
- **Wave-Energy Dissipation: Seaweeds and Marine Plants Are Ecosystem Engineers** *FLUIDS*  
Denny, M.  
2021; 6 (4)
- **Wave Dissipation by Bottom Friction on the Inner Shelf of a Rocky Shore** *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*  
Gon, C. J., MacMahan, J. H., Thornton, E. B., Denny, M.  
2020; 125 (10)
- **Long-term mechanistic hindcasts predict the structure of experimentally-warmed intertidal communities** *OIKOS*  
LaScala-Gruenewald, D. E., Denny, M. W.  
2020
- **Mussels' acclimatization to high, variable temperatures is lost slowly upon transfer to benign conditions.** *The Journal of experimental biology*  
Moyen, N. E., Somero, G. N., Denny, M. W.  
2020
- **Establishing typical values for hemocyte mortality in individual mussels (*Mytilus californianus*) using fluorescence-activated cell sorting**  
Moyen, N., Bump, P., Somero, G., Denny, M.  
WILEY.2020
- **A series of unfortunate events: characterizing the contingent nature of physiological extremes using long-term environmental records.** *Proceedings. Biological sciences*  
Dowd, W. W., Denny, M. W.  
2020; 287 (1918): 20192333
- **A single heat-stress bout induces rapid and prolonged heat acclimation in the California mussel, *Mytilus californianus*.** *Proceedings. Biological sciences*  
Moyen, N. E., Crane, R. L., Somero, G. N., Denny, M. W.

2020; 287 (1940): 20202561

- **Mussels' acclimatization to high, variable temperatures is lost slowly upon transfer to benign conditions.** *The Journal of experimental biology*  
Moyen, N. E., Somero, G. N., Denny, M. W.  
2020
- **Establishing typical values for hemocyte mortality in individual California mussels, *Mytilus californianus*.** *Fish & shellfish immunology*  
Moyen, N. E., Bump, P. A., Somero, G. N., Denny, M. W.  
2020
- **Performance in a variable world: using Jensen's inequality to scale up from individuals to populations** *CONSERVATION PHYSIOLOGY*  
Denny, M.  
2019; 7: coz053
- **PISCO ADVANCES MADE THROUGH THE FORMATION OF A LARGE-SCALE, LONG-TERM CONSORTIUM FOR INTEGRATED UNDERSTANDING OF COASTAL ECOSYSTEM DYNAMICS** *OCEANOGRAPHY*  
Menge, B. A., Milligan, K., Caselle, J. E., Barth, J. A., Blanchette, C. A., Carr, M. H., Chan, F., Cowen, R. K., Denny, M., Gaines, S. D., Hofmann, G. E., Kroeker, K. J., Lubchenco, et al  
2019; 32 (3): 16–25
- **Impact of heating rate on cardiac thermal tolerance in the California mussel, *Mytilus californianus*.** *The Journal of experimental biology*  
Moyen, N. E., Somero, G. N., Denny, M. W.  
2019
- **Sensory perception plays a larger role in foraging efficiency than heavy-tailed movement strategies** *ECOLOGICAL MODELLING*  
LaScala-Gruenewald, D. E., Mehta, R. S., Liu, Y., Denny, M. W.  
2019; 404: 69–82
- **Survival in spatially variable thermal environments: Consequences of induced thermal defense** *INTEGRATIVE ZOOLOGY*  
Denny, M. W.  
2018; 13 (4): 392–410
- **The importance of wave exposure on the structural integrity of rhodoliths** *JOURNAL OF EXPERIMENTAL MARINE BIOLOGY AND ECOLOGY*  
Melbourne, L. A., Denny, M. W., Harniman, R. L., Rayfield, E. J., Schmidt, D. N.  
2018; 503: 109–19
- **Survival in Spatially Variable Thermal Environments: Consequences of Induced Thermal Defense.** *Integrative zoology*  
Denny, M.  
2018
- **"Internal tide pools" prolong kelp forest hypoxic events** *LIMNOLOGY AND OCEANOGRAPHY*  
Leary, P. R., Woodson, C., Squibb, M. E., Denny, M. W., Monismith, S. G., Micheli, F.  
2017; 62 (6): 2864–78
- **Coral larvae are poor swimmers and require fine-scale reef structure to settle.** *Scientific reports*  
Hata, T., Madin, J. S., Cumbo, V. R., Denny, M., Figueiredo, J., Harii, S., Thomas, C. J., Baird, A. H.  
2017; 7 (1): 2249-?
- **John Moffit Gosline, BA, PhD, FRSC (1943-2016).** *journal of experimental biology*  
Shadwick, R. E., Denny, M. W.  
2017; 220: 334-335
- **The fallacy of the average: on the ubiquity, utility and continuing novelty of Jensen's inequality** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M.  
2017; 220 (2): 139-146
- **Long-term, high frequency in situ measurements of intertidal mussel bed temperatures using biomimetic sensors.** *Scientific data*  
Helmuth, B., Choi, F., Matzelle, A., Torossian, J. L., Morello, S. L., Mislán, K. A., Yamane, L., Strickland, D., Szathmáry, P. L., Gilman, S. E., Tockstein, A., Hilbish, T. J., Burrows, et al  
2016; 3: 160087-?

- **Life in an extreme environment: Characterizing wave-imposed forces in the rocky intertidal zone using high temporal resolution hydrodynamic measurements** *LIMNOLOGY AND OCEANOGRAPHY*  
Jensen, M. M., Denny, M. W.  
2016; 61 (5): 1750-1761
- **Quantifying the top-down effects of grazers on a rocky shore: selective grazing and the potential for competition** *MARINE ECOLOGY PROGRESS SERIES*  
LaScala-Gruenewald, D. E., Miller, L. P., Bracken, M. E., Allen, B. J., Denny, M. W.  
2016; 553: 49-66
- **The extraordinary joint material of an articulated coralline alga. II. Modeling the structural basis of its mechanical properties** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., King, F. A.  
2016; 219 (12): 1843-1850
- **The extraordinary joint material of an articulated coralline alga. I. Mechanical characterization of a key adaptation** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., King, F. A.  
2016; 219 (12): 1833-1842
- **Ecological Mechanics: Principles of Life's Physical Interactions**  
Denny, M. W.  
Princeton University Press.2016
- **Intertidal** *ECOSYSTEMS OF CALIFORNIA*  
Blanchette, C. A., Denny, M. W., Engle, J. M., Helmuth, B., Miller, L. P., Nielsen, K. J., Smith, J., Mooney, H., Zavaleta, E.  
2016: 337-57
- **Experimental determination of the hydrodynamic forces responsible for wave impact events** *JOURNAL OF EXPERIMENTAL MARINE BIOLOGY AND ECOLOGY*  
Jensen, M. M., Denny, M. W.  
2015; 469: 123-130
- **Thermal variation, thermal extremes and the physiological performance of individuals** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Dowd, W. W., King, F. A., Denny, M. W.  
2015; 218 (12): 1956-1967
- **Thermal variation, thermal extremes and the physiological performance of individuals.** *journal of experimental biology*  
Dowd, W. W., King, F. A., Denny, M. W.  
2015; 218: 1956-1967
- **Warm microhabitats drive both increased respiration and growth rates of intertidal consumers** *MARINE ECOLOGY PROGRESS SERIES*  
Miller, L. P., Allen, B. J., King, F. A., Chilin, D. R., Reynoso, V. M., Denny, M. W.  
2015; 522: 127-143
- **United We Fail: Group versus Individual Strength in the California Sea Mussel, *Mytilus californianus*** *BIOLOGICAL BULLETIN*  
Cole, A., Denny, M.  
2014; 227 (1): 61-67
- **United we fail: Group versus individual strength in the California sea mussel, *Mytilus californianus*.** *Biological bulletin*  
Cole, A., Denny, M.  
2014; 227 (1): 61-67
- **Aperture effects in squid jet propulsion** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Staaf, D. J., Gilly, W. F., Denny, M. W.  
2014; 217 (9): 1588-1600
- **Indefatigable: an erect coralline alga is highly resistant to fatigue.** *journal of experimental biology*  
Denny, M., Mach, K., Tepler, S., Martone, P.  
2013; 216: 3772-3780

- **Interaction of waves and currents with kelp forests (*Macrocystis pyrifera*): Insights from a dynamically scaled laboratory model** *LIMNOLOGY AND OCEANOGRAPHY*  
Rosman, J. H., Denny, M. W., Zeller, R. B., Monismith, S. G., Koseff, J. R.  
2013; 58 (3): 790-802
- **Natural intrusions of hypoxic, low pH water into nearshore marine environments on the California coast** *CONTINENTAL SHELF RESEARCH*  
Booth, J. A., McPhee-Shaw, E. E., Chua, P., Kingsley, E., Denny, M., Phillips, R., Bograd, S. J., Zeidberg, L. D., Gilly, W. F.  
2012; 45: 108-115
- **Biophysics, environmental stochasticity, and the evolution of thermal safety margins in intertidal limpets** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., DOWD, W. W.  
2012; 215 (6): 934-947
- **Biophysics, bioenergetics and mechanistic approaches to ecology** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M.  
2012; 215 (6): 871
- **The fine art of surfacing: Its efficacy in broadcast spawning** *JOURNAL OF THEORETICAL BIOLOGY*  
Molacek, J., Denny, M., Bush, J. W.  
2012; 294: 40-47
- **Scaling Up in Ecology: Mechanistic Approaches** *ANNUAL REVIEW OF ECOLOGY, EVOLUTION, AND SYSTEMATICS, VOL 43*  
Denny, M., Benedetti-Cecchi, L.  
2012; 43: 1-22
- **Anchor Ice and Benthic Disturbance in Shallow Antarctic Waters: Interspecific Variation in Initiation and Propagation of Ice Crystals** *BIOLOGICAL BULLETIN*  
Denny, M., Dorgan, K. M., Evangelista, D., Hettlinger, A., Leichter, J., Ruder, W. C., Tuval, I.  
2011; 221 (2): 155-163
- **Grand Opportunities: Strategies for Addressing Grand Challenges in Organismal Animal Biology** *INTEGRATIVE AND COMPARATIVE BIOLOGY*  
Stillman, J. H., Denny, M., Padilla, D. K., Wake, M. H., Patek, S., Tsukimura, B.  
2011; 51 (1): 7-13
- **Importance of Behavior and Morphological Traits for Controlling Body Temperature in Littorinid Snails** *BIOLOGICAL BULLETIN*  
Miller, L. P., Denny, M. W.  
2011; 220 (3): 209-223
- **Failure by fatigue in the field: a model of fatigue breakage for the macroalga *Mazzaella*, with validation** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Mach, K. J., Tepler, S. K., Staaf, A. V., Bohnhoff, J. C., Denny, M. W.  
2011; 214 (9): 1571-1585
- **An inexpensive instrument for measuring wave exposure and water velocity** *LIMNOLOGY AND OCEANOGRAPHY-METHODS*  
Figurski, J. D., Malone, D., Lacy, J. R., Denny, M.  
2011; 9: 204-214
- **Spreading the risk: Small-scale body temperature variation among intertidal organisms and its implications for species persistence** *JOURNAL OF EXPERIMENTAL MARINE BIOLOGY AND ECOLOGY*  
Denny, M. W., Dowd, W. W., Bilir, L., Mach, K. J.  
2011; 400 (1-2): 175-190
- **Preference Versus Performance: Body Temperature of the Intertidal Snail *Chlorostoma funebris*** *BIOLOGICAL BULLETIN*  
Tepler, S., Mach, K., Denny, M.  
2011; 220 (2): 107-117
- **Anchor Ice and Antarctic Benthic Ecology: The Role of Interspecific Variation in Ice Nucleation**  
Denny, M., Dorgan, K., Evangelista, D., Hettlinger, A., Leichter, J., Ruder, W., Tuval, I.  
OXFORD UNIV PRESS INC.2011: E33
- **Diatom sinking speeds: Improved predictions and insight from a modified Stokes' law** *LIMNOLOGY AND OCEANOGRAPHY*

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- Miklasz, K. A., Denny, M. W.  
2010; 55 (6): 2513-2525
- **Aperture size effects in paralarval squid swimming**  
Staaf, D. J., Denny, M. W., Gilly, W. F.  
OXFORD UNIV PRESS INC.2010: E168
  - **Currents and turbulence within a kelp forest (*Macrocystis pyrifera*): Insights from a dynamically scaled laboratory model** *LIMNOLOGY AND OCEANOGRAPHY*  
Rosman, J. H., Monismith, S. G., Denny, M. W., Koseff, J. R.  
2010; 55 (3): 1145-1158
  - **Organismal climatology: analyzing environmental variability at scales relevant to physiological stress** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Helmuth, B., Broitman, B. R., Yamane, L., Gilman, S. E., Mach, K., Mislán, K. A., Denny, M. W.  
2010; 213 (6): 995-1003
  - **Marine Ecomechanics** *ANNUAL REVIEW OF MARINE SCIENCE*  
Denny, M. W., Gaylord, B.  
2010; 2: 89-114
  - **Confronting the physiological bottleneck: A challenge from ecomechanics** *INTEGRATIVE AND COMPARATIVE BIOLOGY*  
Denny, M., Helmuth, B.  
2009; 49 (3): 197-201
  - **On the prediction of extreme ecological events** *ECOLOGICAL MONOGRAPHS*  
Denny, M. W., Hunt, L. J., Miller, L. P., Harley, C. D.  
2009; 79 (3): 397-421
  - **The role of temperature and desiccation stress in limiting the local-scale distribution of the owl limpet, *Lottia gigantea*** *FUNCTIONAL ECOLOGY*  
Miller, L. P., Harley, C. D., Denny, M. W.  
2009; 23 (4): 756-767
  - **Can the giant snake predict palaeoclimate?** *NATURE*  
Denny, M. W., Lockwood, B. L., Somero, G. N.  
2009; 460 (7255): E3-E4
  - **Thermal stress and morphological adaptations in limpets** *FUNCTIONAL ECOLOGY*  
Harley, C. D., Denny, M. W., Mach, K. J., Miller, L. P.  
2009; 23 (2): 292-301
  - **Discovery of Lignin in Seaweed Reveals Convergent Evolution of Cell-Wall Architecture** *CURRENT BIOLOGY*  
Martone, P. T., Estevez, J. M., Lu, F., Ruel, K., Denny, M. W., Somerville, C., Ralph, J.  
2009; 19 (2): 169-175
  - **Limits to running speed in dogs, horses and humans** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W.  
2008; 211 (24): 3836-3849
  - **Flow Forces on Seaweeds: Field Evidence for Roles of Wave Impingement and Organism Inertia** *BIOLOGICAL BULLETIN*  
Gaylord, B., Denny, M. W., Koehl, M. A.  
2008; 215 (3): 295-308
  - **To bend a coralline: effect of joint morphology on flexibility and stress amplification in an articulated calcified seaweed** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Martone, P. T., Denny, M. W.  
2008; 211 (21): 3421-3432
  - **To break a coralline: mechanical constraints on the size and survival of a wave-swept seaweed** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Martone, P. T., Denny, M. W.  
2008; 211 (21): 3433-3441

- **Desiccation protection and disruption: A trade-off for an intertidal marine alga** *JOURNAL OF PHYCOLOGY*  
Hunt, L. J., Denny, M. W.  
2008; 44 (5): 1164-1170
- **DESICCATION PROTECTION AND DISRUPTION: A TRADE-OFF FOR AN INTERTIDAL MARINE ALGA(1).** *Journal of phycology*  
Hunt, L. J., Denny, M. W.  
2008; 44 (5): 1164-1170
- **Biophysics - The intrigue of the interface** *SCIENCE*  
Denny, M. W.  
2008; 320 (5878): 886-886
- **Hydrodynamic forces and surface topography: Centimeter-scale spatial variation in wave forces** *LIMNOLOGY AND OCEANOGRAPHY*  
O'Donnell, M. J., Denny, M. W.  
2008; 53 (2): 579-588
- **Discovery of secondary cell walls and lignin precursors in the joints of the articulated coralline alga calliarthron**  
Martone, P. T., Estevez, J., Ralph, J., Lu, F., Ruel, K., Denny, M., Somerville, C.  
WILEY-BLACKWELL.2007: 63-63
- **Techniques for predicting the lifetimes of wave-swept macroalgae: a primer on fracture mechanics and crack growth** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Mach, K. J., Nelson, D. V., Denny, M. W.  
2007; 210 (13): 2213-2230
- **Death by small forces: a fracture and fatigue analysis of wave-swept macroalgae** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Mach, K. J., Hale, B. B., Denny, M. W., Nelson, D. V.  
2007; 210 (13): 2231-2243
- **Ocean waves, nearshore ecology, and natural selection** *AQUATIC ECOLOGY*  
Denny, M. W.  
2006; 40 (4): 439-461
- **Jet propulsion in the cold: mechanics of swimming in the Antarctic scallop *Adamussium colbecki*** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M., Miller, L.  
2006; 209 (22): 4503-4514
- **Hot limpets: predicting body temperature in a conductance-mediated thermal system** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., Harley, C. D.  
2006; 209 (13): 2409-2419
- **Thermal stress on intertidal limpets: long-term hindcasts and lethal limits** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., Miller, L. P., Harley, C. D.  
2006; 209 (13): 2420-2431
- **Red algae respond to waves: Morphological and mechanical variation in *Mastocarpus papillatus* along a gradient of force** *BIOLOGICAL BULLETIN*  
Kitzes, J. A., Denny, M. W.  
2005; 208 (2): 114-119
- **Quantifying scale in ecology: Lessons from a wave-swept shore** *ECOLOGICAL MONOGRAPHS*  
Denny, M. W., Helmuth, B., Leonard, G. H., Harley, C. D., Hunt, L. J., Nelson, E. K.  
2004; 74 (3): 513-532
- **Limits to phenotypic plasticity: Flow effects on barnacle feeding appendages** *BIOLOGICAL BULLETIN*  
Li, N. K., Denny, M. W.  
2004; 206 (3): 121-124
- **Paradox lost: answers and questions about walking on water** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W.  
2004; 207 (10): 1601-1606

- **Cyberkelp: an integrative approach to the modelling of flexible organisms** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*  
Denny, M. W., Hale, B. B.  
2003; 358 (1437): 1535-1542
- **Predicting wave exposure in the rocky intertidal zone: Do bigger waves always lead to larger forces-9** *LIMNOLOGY AND OCEANOGRAPHY*  
Helmuth, B., Denny, M. W.  
2003; 48 (3): 1338-1345
- **Modulation of wave forces on kelp canopies by alongshore currents** *LIMNOLOGY AND OCEANOGRAPHY*  
Gaylord, B., Denny, M. W., Koehl, M. A.  
2003; 48 (2): 860-871
- **Extreme water velocities: Topographical amplification of wave-induced flow in the surf zone of rocky shores** *LIMNOLOGY AND OCEANOGRAPHY*  
Denny, M. W., Miller, L. P., Stokes, M. D., Hunt, L. J., Helmuth, B. S.  
2003; 48 (1): 1-8
- **Revised estimates of the effects of turbulence on fertilization in the purple sea urchin, *Strongylocentrotus purpuratus*** *BIOLOGICAL BULLETIN*  
Denny, M. W., Nelson, E. K., Mead, K. S.  
2002; 203 (3): 275-277
- **Blade motion and nutrient flux to the Kelp, *Eisenia arborea*** *BIOLOGICAL BULLETIN*  
Denny, M., Roberson, L.  
2002; 203 (1): 1-13
- **The mechanics of wave-swept algae** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M., Gaylord, B.  
2002; 205 (10): 1355-1362
- **The rewards of chance** *NATURAL HISTORY*  
Denny, M.  
2001; 110 (4): 72-76
- **Consequences of transient fluid forces for compliant benthic organisms** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Gaylord, B., Hale, B. B., Denny, M. W.  
2001; 204 (7): 1347-1360
- **Hydrodynamics, shell shape, behavior and survivorship in the owl limpet *Lottia gigantea*** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., Blanchette, C. A.  
2000; 203 (17): 2623-2639
- **Limits to optimization: Fluid dynamics, adhesive strength and the evolution of shape in limpet shells** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W.  
2000; 203 (17): 2603-2622
- **Are there mechanical limits to size in wave-swept organisms?** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M.  
1999; 202 (23): 3463-3467
- **The menace of momentum: Dynamic forces on flexible organisms** *LIMNOLOGY AND OCEANOGRAPHY*  
Denny, M., Gaylord, B., Helmuth, B., Daniel, T.  
1998; 43 (5): 955-968
- **Celestial mechanics, sea-level changes, and intertidal ecology** *BIOLOGICAL BULLETIN*  
Denny, M. W., Paine, R. T.  
1998; 194 (2): 108-115
- **Flow and flexibility - II. The roles of size and shape in determining wave forces on the bull kelp *Nereocystis luetkeana*** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M. W., Gaylord, B. P., Cowen, E. A.



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- 1997; 200 (24): 3165-3183
- **Flow and flexibility - I. Effects of size, shape and stiffness in determining wave forces on the stipitate kelps *Eisenia arborea* and *Pterygophora californica*** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Gaylord, B., Denny, M. W.  
1997; 200 (24): 3141-3164
  - **A biomechanical hypothesis explaining upstream movements by the freshwater snail *Elimia*** *FUNCTIONAL ECOLOGY*  
Huryn, A. D., Denny, M. W.  
1997; 11 (4): 472-483
  - **A conjecture on the relationship of bacterial shape to motility in rod-shaped bacteria** *FEMS MICROBIOLOGY LETTERS*  
Cooper, S., Denny, M. W.  
1997; 148 (2): 227-231
  - **Settlement of marine organisms in flow** *ANNUAL REVIEW OF ECOLOGY AND SYSTEMATICS*  
Abelson, A., Denny, M.  
1997; 28: 317-339
  - **Wave-induced forces on the giant kelp *Macrocystis pyrifera* (Agardh): Field test of a computational model** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Utter, B. D., Denny, M. W.  
1996; 199 (12): 2645-2654
  - **Pulsed delivery of subthermocline water to Conch Reef (Florida Keys) by internal tidal bores** *LIMNOLOGY AND OCEANOGRAPHY*  
Leichter, J. J., Wing, S. R., Miller, S. L., Denny, M. W.  
1996; 41 (7): 1490-1501
  - **Why the urchin lost its spines: Hydrodynamic forces and survivorship in three echinoids** *JOURNAL OF EXPERIMENTAL BIOLOGY*  
Denny, M., Gaylord, B.  
1996; 199 (3): 717-729
  - **PREDICTING PHYSICAL DISTURBANCE - MECHANISTIC APPROACHES TO THE STUDY OF SURVIVORSHIP ON WAVE-SWEPT SHORES** *ECOLOGICAL MONOGRAPHS*  
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