Stanford



Mark Denny

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

Bio

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

- Emeritus Faculty, Acad Council, Hopkins Marine Station

ADMINISTRATIVE APPOINTMENTS

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

LINKS

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

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Biomechanics, ecology, and ecological physiology

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Hannah Clayton

Publications

PUBLICATIONS

- **Intertidal microcosms of wave-swept rocky shores: ecological and physiological insights from a uniquely stressful environment.** *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*
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- **Stanford's Hopkins Marine Station: insights into the purpose, promise and peril of field stations.** *The Journal of experimental biology*
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- **The importance of fine-scale refugia and behavioral thermoregulation in the resilience of intertidal limpet populations.** *Ecology*
  Virgin, S. D., Denny, M. W., Schiel, D. R.
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- **Vertical Distribution of Rocky Intertidal Organisms Shifts With Sea-Level Variability on the Northeast Pacific Coast.** *Global change biology*
  Kaplanis, N. J., Denny, M. W., Raimondi, P. T.
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- **Hindcasted Body Temperatures Reveal Underestimated Thermal Stress Faced by Intertidal Species** *GLOBAL ECOLOGY AND BIOGEOGRAPHY*
  Ma, L., Wang, J., Denny, M. W., Dong, Y.
  2024
- **Rip Currents Off Rocky-Shore Surge Channels** *JOURNAL OF GEOPHYSICAL RESEARCH-OCEANS*
  MacMahan, J., Thornton, E., Patria, N., Gon, C., Denny, M.
  2023; 128 (8)
- **Wave damping by giant kelp, Macrocystis pyrifera.** *Annals of botany*
  Elsmore, K., Nickols, K. J., Miller, L. P., Ford, T., Denny, M. W., Gaylord, B.
  2023
- **A bendable biological ceramic.** *Science (New York, N.Y.)*
  Crane, R. L., Denny, M. W.
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- **Elevated Salinity Rapidly Confers Cross-Tolerance to High Temperature in a Splash-Pool Copepod** *INTEGRATIVE ORGANISMAL BIOLOGY*
  Denny, M. W., Dowd, W.
  2022; 4 (1): obac037
- **Bivalves maintain repair when faced with chronically repeated mechanical stress** *JOURNAL OF EXPERIMENTAL BIOLOGY*
  Crane, R. L., Denny, M. W.
  2022; 225 (10)
- **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.
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- **Mussels' acclimatization to high, variable temperatures is lost slowly upon transfer to benign conditions.** *The Journal of experimental biology*
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- **Establishing typical values for hemocyte mortality in individual mussels (<it>Mytilus</it> <it>californianus</it>) 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.
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- **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.
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- **Mussels' acclimatization to high, variable temperatures is lost slowly upon transfer to benign conditions.** *The Journal of experimental biology*
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  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.
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- **PISCO ADVANCES MADE THROUGH THE FORMATION OF A LARGE-SCALE, LONG-TERM CONSORTIUM FOR INTEGRATED UNDERSTANDING OF COASTAL ECOSYSTEM DYNAMICS** *OCEANOGRAPHY*
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- **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*

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2018; 503: 109–19

- **Survival in Spatially Variable Thermal Environments: Consequences of Induced Thermal Defense.** *Integrative zoology*
  Denny, M.
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  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*
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- **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.
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- **United We Fail: Group versus Individual Strength in the California Sea Mussel, Mytilus californianus** *BIOLOGICAL BULLETIN*
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- **Preference Versus Performance: Body Temperature of the Intertidal Snail Chlorostoma funebralis** *BIOLOGICAL BULLETIN*
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  Staaf, D. J., Denny, M. W., Gilly, W. F.
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- **Organismal climatology: analyzing environmental variability at scales relevant to physiological stress** *JOURNAL OF EXPERIMENTAL BIOLOGY*
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  Li, N. K., Denny, M. W.
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