

Catherine Drew Harvell

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EDUCATION

<u>Year</u>	<u>Degree</u>	<u>Institution</u>
1985	Ph.D.	Zoology, University of Washington, Seattle
1981	M.Sc.	Zoology, University of Alberta, Edmonton
1978	B.Sc.	Zoology (with honors), University of Alberta, Edmonton

PROFESSIONAL APPOINTMENTS

<u>Year</u>	<u>Experience</u>
2015-2021	Affiliate Faculty, School of Aquatic and Fisheries Sciences, University of Washington
2017-2021	Science Board, Yersin Exploration, Institut Oceanographique Monaco
2009-2013	Environment Director, Atkinson Center for a Sustainable Future, Cornell
2007	Senior Scientist, The Kohala Center
2007	Sabbatical Fellow, The Kohala Center
2002-2008	Editorial Board, <i>Annual Review of Ecology, Evolution and Systematics</i>
2002	Vice President, American Society of Naturalists
2000-	Full Professor and Curator of Invertebrates, Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, New York
2000-2001	Sabbatical Fellow, National Center for Ecological Analysis and Synthesis
1999-2002	Board of Science Advisors, COMPASS
1994-1998	Associate Editor, <i>American Naturalist</i>
1992-1999	Associate Professor and Curator of Invertebrates, Department of Ecology and Evolutionary Biology (formerly Section of Ecology and Systematics), Cornell University, Ithaca, New York
1988	Instructor, Friday Harbor Laboratories (Trends in Benthic Ecology)
1986-1992	Assistant Professor and Curator of Invertebrates, Section of Ecology and Systematics, Division of Biological Sciences, Cornell University, Ithaca, New York

HONORS AND AWARDS

Fellow, Ecological Society of America
National Outdoor Book Award, A Sea of Glass
Rachel Carson Award, Honorable Mention, A Sea of Glass
Jasper Loftus-Hills Award, Society of American Naturalists
Young Faculty Award, DuPont Foundation
Postdoctoral Fellow, North Atlantic Treaty Organization

RECENT GRANT SUPPORT

NSF Research Coordination Network Climate Change Influences on Marine Infectious Disease: Implications for Management and Society	07/01/12 - 08/31/17
ACSF-EDF Sustaining natural ocean wealth and human livelihoods along coastlines of Myanmar	11/2015-11/2017
Global Environmental Fund Capturing Coral Reef Ecosystem Services	2014-2019
Corning Incorporated Foundation Fragile Legacy Film	2/1/14 - 2/28/15
Atkinson Center Fragile Legacy Film	7/1/13 - 6/30/14
NOAA Climate and Atmospheric Research Coral Disease Modeling: Early-warning Tools and Climate Change Scenarios for Management	9/1/13 - 8/31/15 \$179,315
NSF DEB-1201920 Ecology of Infectious Marine Disease Workshop	1/1/12 - 12/31/12
NSF-OCE-0849776 Collaborative Research Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance (with L. D. Mydlarz)	3/1/09 - 2/28/11; ext to 7/31/12
NSF OCE-1105201 Collaborative Research: Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function	12/15/10 - 11/30/12
ACSF (Academic Venture Fund) Forecasting Disease and Economic Consequences of Climate Change (with K. R. Zamudio and L. C. Harrington)	01/01/09 - 06/30/11

TEACHING AND ADVISING RESPONSIBILITIES

Current Courses (course number and name)

BIOEE 4620 Sustainable Marine Ecosystems (Fall)
BIO G 499 Independent Undergraduate Research in Biology
BIOEE3730 Marine Invertebrate Biodiversity (Fall)
BIOEE 4930 Marine Invertebrate Biodiversity (Spring)
BIOEE 4920 Research Apprenticeship in Marine Biodiversity (Spring)
BIOEE 4940 Ecology of Seagrass Beds (Spring)
BIOEE 3500 Marine Ecosystem Dynamics (Fall)
BIOEE/EAS 3510 Conservation Oceanography (w Chuck Greene)

CORNELL TEACHING 2015-18

Program Director (16 credits) Cornell Ocean Research Apprenticeship for Lynch Scholars

CORNELL COMMITTEES

Faculty Advisory Board, Atkinson Center for a Sustainable Future
Whittaker Award Committee, Ecology and Evolutionary Biology
Sustainable Biodiversity Fund
The Nature Conservancy, Nature Net Postdoctoral Fellowship Committee

Internet Presence/Distance Learning

Harvell Research Web Page and Blog
<http://www.eeb.cornell.edu/harvell/>
<http://www.theharvelllab.blogspot.com/>
<http://www.eeb.cornell.edu/ecologymarinedisease/>
<http://fragilelegacy.info/>

GRADUATE MAJORS

Current

Allison Tracy, E&EB, Ph.D., 2018 (expected)
Morgan Eisenlord, E&EB, Ph.D., 2019 (expected)
Olivia Graham, E&EB, Ph.D., 2021 (expected)

Total Completed

Courtney S. Couch, E&EB, Ph.D., 2013; Morgan E. Mouchka, E&EB, Ph.D., 2013;
David M. Baker, E&EB, Ph.D., 2010; Jason Andras, PhD, 2009; Krystal L. Rypien, PhD, 2008;
Jessica R. Ward, Zoology, Ph.D., 2006; Andrea L. Graham, Ph.D., 2001; Alisa P. Alker, M.S., 2000;
Laurie J. Raymundo, Ph.D., 2000; Heidi R. Schwaninger, Ph.D., 1999; Daniel F. Shapiro, Ph.D.,
1996; Jordan M. West, Ph.D., 1996; Joshua P. Nowlis, Ph.D., 1995

Current Postdoctoral Associates

Dr. Joleah Lamb

Past Postdoctoral Associates

Colleen Burge, 2010-2013; Jeffrey Maynard, 2013-2015; Laura Mydlarz, 2004-2006; John F. Bruno, 2000; Robin H. Seeley, 1999-2000; Kiho Kim, 1997-1999; Robin S. L. Taylor, 1996-1997; Daniel Grunbaum, 1993; Julia S. Miles, 1992; Anna-Mari Walls, 1991-1992; Dianna Padilla, 1989-1990

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science
American Society of Limnology and Oceanography
Ecological Society of America
International Society for Reef Studies
Society of American Naturalists

PROFESSIONAL HONORARIES and RECENT SYMPOSIA/KEYNOTES

Keynote Speaker, Centre Scientifique Monaco Conference, 2017, "Disease Outbreaks of Foundation and Keystone Species in a Changing Ocean".
Steering Committee, Yersin Explorations, Prince Albert II Foundation.
Keynote Speaker, Environmental Defense Fund Science Day, 2017, "Disease Outbreaks of Foundation and Keystone Species in a Changing Ocean".
Distinguished Speaker, 2016 "The Seastar Epidemic: An Arms Race for Biodiversity" Romburg-Tiburon Center.
Presidential Symposium Keynote Speaker, Western Society of Naturalists.
2016 Fellow, Ecological Society of America 2016
Organizer, Congressional Briefing on Marine Disease, 2015
Lead Author, US Ocean Resources Climate Change Assessment, 2013
Organizer, Coral Disease Workshop, Hasanuddin University, Indonesia, 2011
TEDx Talk, "Fragile Legacy of the Blaschkas and Marine Biodiversity", 2010
Organizer, Ecology of Marine Disease Workshop, Friday Harbor Labs Course, 2010, 2012, 2014
Plenary Speaker, Ecology of Infectious Disease Meeting, 2010
Organizer, Coral Diseases, Climate Change and a Pacific Network, Hawaii, 2009
Chair/Organizer, Coral Disease Working Group, part of a larger project run by the World Bank on Sustainability of Coral Reef Ecosystems, 2002-2009
Plenary Speaker, Coral Disease and Climate Change, International Coral Reef Society, 2008
Keynote Speaker, "Climate Change and Coral Resistance to Disease", US Coral Reef Task Force, Washington, DC, 2006
Vice President Elect, American Society of Naturalists, 2002
Organizer, NCEAS Working Group, Ecology of Marine Diseases, Santa Barbara, California, 2000-2002
Organizer, Symposium Session for AAAS, "Diseases in the Ocean: A New Environmental Challenge," Anaheim, California, 1999

EDITORIAL BOARDS and REVIEWING

Associate Editor, *American Naturalist*, 1994-1998

2016 CURRICULUM VITAE - C. Drew Harvell

Editorial Board, *Annual Review of Ecology, Evolution and Systematics*, 2002-2008

Reviewer, *Science*, *American Naturalist*, *Biological Bulletin*, *Ecology*, *Evolution*, *Marine Ecology Progress Series*, *Diseases of Aquatic Organisms*, *PLoS Bio*, *PLoS One*, *Proc National Academy Sciences*, *Limnology and Oceanography*, *Nature*, *Ecology Letters*

PUBLICATIONS

In Preparation. 2019. Ocean Outbreak: Inside the Ocean Hot Zone. University of California Press.

IN press w revision. J. Lamb, E. Fiorenza, B. Willis, C. Couch, D. Harvell et al. Plastic debris levels on coral reefs promotes disease in structure-building corals. *Science*

In press w revision. A. Tracy, E. Weil, D. Harvell. Octocoral co-infection as a balance between host immunity and host environment. *Oecologia*

2018 Caldwell, J.M., M.J. Donahue and C.D. Harvell. Host size, proximity to diseased neighbors, and time drive the spread of a coral disease outbreak in Hawaii. *Proceedings of the Royal Society, Proc B*.

2017 Lamb, J., Jeroen A.J.M. van de Water, David G. Bourne, Craig Altier, Margaux Y. Hein, Nur Abu, Jamaluddin Jompa, and C. Drew Harvell. Seagrass ecosystems reduce exposure to bacterial pathogens of humans, fishes and invertebrates. *Science* 355: 731-733.

2016 Harvell, C.D. *A Sea of Glass*. University of California Press. 218 pp.

Montecino-Latorre, Diego, Morgan E. Eisenlord, Margaret Turner, Reyn Yoshioka, C. Drew Harvell, Christy V. Pattengill Semmens, Janna D. Nichols, Joseph K. Gaydos. 2016 Devastating transboundary impacts of seastar wasting disease on subtidal asteroids. *Plos One* <http://dx.doi.org/10.1371/journal.pone.0163190>

Eisenlord, Morgan E., Maya L. Groner, Reyn M. Yoshioka, Joel Elliott, Jeffrey Maynard, Steven Fradkin, Margaret Turner, Katie Pyne, Natalie Rivlin, Ruben van Hooijdonk and C. Drew Harvell. 2016. Ochre star mortality during the 2014 wasting disease epizootic: role of population size structure and temperature. *Philosophical Transaction B of the Royal Society V 371: (1689): 0212*

Groner, M.L., Maynard, R Breyta, R. Carnegie, A. Dobson, C. Friedman, B. Froelich, M. GArren, F. Gulland, S. Heron, R. Noble, C. Revie, J. Shields, R Vanderstichel, E. Weil, S, Wylie-Echeverria, D. Harvell. Managing Marine Disease Emergencies in a era of rapid change. *Philosophical Transactions B 371 (1689): 0364*

Maynard, J, R van Hooijdonk, C. D Harvell, C. M. Eakin, G Liu, B L. Willis, G J. Williams, M. Groner, A Dobson, S F. Heron, R Glenn, K Reardon and J D. Shields. Improving marine

disease surveillance through sea temperature monitoring, outlooks and projections. *Philosophical Transactions B of the Royal Society 371 (1689): 0208*.

2016 CURRICULUM VITAE - C. Drew Harvell

Groner ML, Burge CA, Kim CJS, Rees EE, Van Alstyne K, Yang S, Wyllie-Echeverria S, Harvell CD. Plant characteristics associated with widespread variation in eelgrass wasting. *Diseases of Aquatic Organisms* 118: 159-168.

Yoshioka, R., C. Kim, and D. Harvell. Coral Disease facilitated by sewage in Puako, Hawaii. *Marine Pollution Bulletin*. 104: 313-321

2015 Fuess, L., M. Eisenlord, C. Closek, A. Tracy, R. Mountz, S. Gignoux-Wilfsohn, M. Moritsch, R. Yoshioka, C. Burge, C.D. Harvell, C.S. Friedman, I. Hewson, P.K. Hershberger, and S.B. Roberts. Up in Arms: Immune and Nervous System Response to Sea Star Wasting Disease. *PLoS One* doi: 10.1371/journal.pone.0133053

Maynard, J., R. Hoodonk, M. Eakin, M. Puotinen, S. Heron, M. Garren, J. Lamb, G. Williams, E. Weil, B. Willis, and C. Harvell. Climate projections of conditions that increase coral disease susceptibility and pathogen virulence. *Nature Climate Change* 5:688-695.

Groner, M. R. Breyta, A. Dobson, C. Friedman, M. Garren, F. Gulland, J. Maynard, S. Wyllie-Echeverria, and D. Harvell. A new response to disease outbreaks in the ocean. *Science* 347(6227):1210-1211.

Pinzon, J., E. Weil, D. Harvell, B. Hanna, M. Medina, C. Burge, and L. Mydlarz. Whole transcriptome analysis reveals changes in expression of immune related genes during and after bleaching in a reef-building coral. *Proceedings of the Royal Society, Open Sci* 2(4):140214.

Tracy, A., O. Koren, N. Douglas, E. Weil, and D. Harvell. Persistent shifts in Caribbean coral microbiota are linked to the 2010 warm temperature anomaly. *Environmental Microbiology Reports* 7(3):471-479.

Lafferty, K.D., C.D. Harvell, J. M. Conrad, C.S. Friedman, M. L. Kent, A.M. Kuris, E.N. Powell, D. Rondeau, and S. M. Saksida. Infectious Diseases Affect Marine Fisheries and Aquaculture Economics. *Annual Review of Marine Science* 7:11.1-11.26
doi:10.1146/annurev-marine-010814-015646

2014 Hewson, I., J.B. Button, B.M. Gudenkauf, B. Miner, A.L. Newton, J.K. Gaydos, J. Wynne, C.L. Groves, G. Hendler, M. Murray, S. Fradkin, M. Breitbart, E. Fashbender, K.D. Lafferty, A.M. Kilpatrick, C.M. Miner, P. Raimondi, L. Lahner, C.S. Friedman, S. Daniels, M. Haulena, J. Marliave, C.A. Burge, M.E. Eisenlord, and C.D. Harvell. Densovirus associated with sea star wasting disease and mass mortality. *Proceedings of the*

National Academy of Sciences of the United States of America 111(48):17278-17283.
doi: 10.1073/pnas.1416625111

Groner, M.L., C.A. Burge, C.S. Couch, C.J.S. Kim, G-F. Siegmund, S. Singhal, S. Smoot, A. Jarrell, J.K. Gaydos, C.D. Harvell, and S. Wylie-Echeverria. Host demography influences the prevalence and severity of eelgrass wasting disease. *Diseases of Aquatic Organisms* 108:165-175.

Burge, C.A., C. M. Eakin, C.S. Friedman, B. Froelich, P.K. Hershberger, E.E. Hofmann, L.E. Petes, K. C. Prager, E.W. Weil, B.L. Willis, S.E. Ford, and C.D. Harvell. Climate Change Influences on Marine Infectious Diseases: Implications for Management and Society. *Annual Review of Marine Sciences* 6:1.1-1.29.

- 2013 Altizer, S., R.S. Ostfeld, P.T. Johnson, S. Kutz, and C.D. Harvell. Climate Change and Infectious Diseases: From Evidence to a Predictive Framework. *Science* 341:514-519.

Couch, C., E. Weil, D. Harvell. Temporal Dynamics and Plasticity in the cellular immune response of the sea fan coral (*Gorgonia ventalina*). *Marine Biology*. DOI 10.1007/s00227-013-2240-6

Burge, C.A., M.E. Mouchka, C.D. Harvell, and S. Roberts. Immune response of the Caribbean sea fan, *Gorgonia ventalina* exposed to an *Aplanochytrium* parasite as revealed by transcriptome sequencing. *Frontiers in Physiology* 4:180 doi: 10.3389/fphys.2013.00180

Burge, C.A., C.J.S. Kim, J.M. Lyles, and C.D. Harvell. Special Issue Oceans and Humans Health: The Ecology of Marine Opportunists. *Microbial Ecology* 65:869-879.

- 2012 Andras, J., N. L. Kirks, and D. Harvell. Range-wide population genetic structure of *Symbiodinium* associated with the Caribbean Sea fan coral, *Gorgonia ventalina*. *Molecular Ecology*. doi: 10.1111/mec.12104

Ruiz-Moreno, D. Bette L. Willis, A. Cathie Page, Ernesto Weil, Aldo Cróquer, Bernardo Vargas-Angel, Adán Guillermo Jordan-Garza, Eric Jordán-Dahlgren, Laurie Raymundo, C. Drew Harvell. Global coral disease prevalence associated with sea temperature anomalies and local factors. *Dis Aq Org* 100:249-261

Muller, E. B. Willis, L. Raymundo, M. Syafyuddin, J. Wilson, D. Harvell. Baseline levels of coral disease in Sulawesi, Indonesia. *Journal of Indonesian Coral Reef Biology*

Burge, CA, N. Douglas, I. Conti-Jerpe, E. Weil, S. Roberts, C.S. Friedman, C.D. Harvell. Friend or foe: the association of Labyrinthulomycetes with the Caribbean sea fan *Gorgonia ventalina*. *Diseases of Aquatic Organisms* 101: 1-12.

- Hewson I, Brown JM, Burge CA, Couch CS, LaBarre BA, Mouchka ME, Naito M, Harvell CD. Viral assemblages associated with healthy and aspergillosis-affected tissues of the *Gorgonia ventalina* holobiont. *Coral Reefs* 31:487- 491.
- 2011 Bruno, J., S. Ellner, I. Vu, K. Kim, D. Harvell. Impacts of Aspergillosis on seafan coral demography: modeling a moving target. *Ecological Monographs* 81:123-139.
- Mumby, P. J., R. Iglesias-Prieto, A. J. Hooten, P. F. Sale, O. Hoegh-Guldberg, A. J. Edwards, C. D. Harvell, E. D. Gomez, N. Knowlton, M. E. Hatzioios, M. S. Kyewalyanga, and N. Muthiga. Revisiting climate thresholds and ecosystem collapse. *Frontiers in Ecology and the Environment* 9(2):94-96.
- Aeby, G. S., G. J. Williams, E. C. Franklin, J. Haapkayla, C. D. Harvell, S. Neale, C. A. Page, L. Raymundo, B. Vargas-Angel, B. L. Willis, T. M. Work, and S. K. Davy. Growth anomalies on the coral genera *Acropora* and *Porites* are strongly associated with host density and human population size across the Indo-Pacific. *PLoS One* 6(2):e16887.
- 2010 Mydlarz, L., E. McGinty, and D. Harvell. What are the physiological and immunological responses of coral to climate change? *Journal of Experimental Biology* 213:934-945.
- Mouchka, M. E., I. Hewson, and C. D. Harvell. Coral-associated bacterial assemblages: Current knowledge and the potential for climate-driven impacts. *Integrative and Comparative Biology* 50(4):662-674.
- Mydlarz, L., C. S. Couch, E. Weil, G. Smith, and D. Harvell. Immune defenses of healthy, bleached and diseased *Montastrea faveolata* during a natural bleaching event. *Diseases of Aquatic Organisms* 87:67-78.
- Rivest, E., D. Baker, K. Rypien, and D. Harvell. Nitrogen source preference of *Aspergillus sydowii*, an infective agent associated with aspergillosis of sea fan corals. *Limnology and Oceanography* 55:386-392.
- Keesing, F., L. K. Belden, P. Daszak, A. Dobson, C. D. Harvell, R. D. Holt, P. Hudson, A. Jolles, K. E. Jones, C. E. Mitchell, S. S. Myers, T. Bogich and R. S. Ostfeld. Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature* 468:647.
- Maynard, J. A., K. R. N. Anthony, C. D. Harvell, M. A. Burgman, R. Beeden, H. Sweatman, S. F. Heron, J. B. Lamb, and B. L. Willis. Predicting outbreaks of a climate-driven coral disease in the Great Barrier Reef. *Coral Reefs* 30(2):485-495.
- Baker, D. M., E. Jordán-Dahlgren, M. A. Maldonado, C. D. Harvell. Sea fan corals provide a stable isotope baseline for assessing sewage pollution in the Mexican Caribbean. *Limnology & Oceanography* 55(5):2139-2149.

- 2009 Bourne, D. G., M. Garren, T. Work, E. Rosenberg, G. Smith, D. Harvell. Microbial diseases and the coral holobiont. *Trends in Microbiology* 17(12):554-562.
- Rypien, K. L. and D. M. Baker. Isotopic labeling and antifungal resistance as tracers of gut passage of the sea fan pathogen *Aspergillus sydowii*. *Diseases of Aquatic Organisms* 86:1-7.
- Mydlarz, L. D., C. S. Couch, E. Weil, G. Smith, and C. D. Harvell. Immune defenses of healthy, bleached and diseased *Montastraea faveolata* during a natural bleaching event. *Diseases of Aquatic Organisms* 87:67-78.
- Kirk, N., J. Andras, M. Coffroth, and D. Harvell. Population structure of Symbiodinium associated with the common sea fan *Gorgonia ventalina* in the Florida Keys. *Marine Biology* 156:1609-1623.
- Harvell, C. D., S. Altizer, I. M. Cattadori, L. Harrington, and E. Weil. Climate change and Wildlife disease: When does the host matter most? *Ecology* 90(4):912-920.
- Page, K., D. M. Baker, C. D. Harvell, Y. Golbuu, L. Raymundo, S. J. Neale, K. B. Rosell, K. L. Rypien, J. P. Andras, and B. L. Willis. Influence of marine reserves on coral disease prevalence. *Diseases of Aquatic Organisms* 87:135-150.
- Andras, J. P., N. L. Kirk, M. A. Coffroth, and C. D. Harvell. Isolation and characterization of microsatellite loci in *Symbiodinium* B1/B184, the dinoflagellate symbiont of the Caribbean sea fan coral, *Gorgonia ventalina*. *Molecular Ecology Resources* 9(3):989-993.
- Kirk, N. L., J. P. Andras, C. D. Harvell, S. R. Santos, and M. A. Coffroth. Population structure of Symbiodinium sp. associated with the common sea fan, *Gorgonia ventalina*, in the Florida Keys across distance, depth, and time. *Marine Biology* 156(8):1609-1623.
- 2008 Couch, C. S., L. D. Mydlarz, C. D. Harvell, and N. L. Douglas. Variation in measures of immunocompetence of sea fan coral, *Gorgonia ventalina*, in the Florida Keys. *Marine Biology* 155:281-292.
- Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, D. Harvell, P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthiga, R. H. Bradbury, A. Dubi, and M. E. Hatziolos. Coral adaptation in the face of climate change - Response. *Science* 320:315-316.
- Mydlarz, L. D., C. D. Harvell, S. Holthouse, and E. Peters. Cellular responses in sea fan corals: Granular amoebocytes react to pathogen and climate stressors. *PLoS One* 3(3):e1811.

- Raymundo, L. J., C. S. Couch, A. W. Bruckner, C. D. Harvell, T. M. Work, E. Weil, C. M. Woodley, E. Jordan-Dahlgren, B. L. Willis, G. S. Aeby, and Y. Sato. A Coral Disease Handbook: Guidelines for Assessment, Monitoring and Management. Coral Reef Targeted Research and Capacity Building for Management Program, Currie Communications, Melbourne. 121 pp.
- Rypien, K. L., J. P. Andras, and C. D. Harvell. Globally panmictic population structure in the opportunistic fungal pathogen *Aspergillus sydowii*. *Molecular Ecology* 17:4068-4078.
- 2007 Bruno, J. F., E. R. Selig, K. S. Casey, C. Page, B. Willis, C. D. Harvell, H. Sweatman, and A. M. Melendy. Thermal stress and coral cover as drivers of disease outbreaks. *Public Library of Science* 5(6):1220-1227.
- Douglas, N. L., K. M. Mullen, S. C. Talmage, and C. D. Harvell. Exploring the role of chitinolytic enzymes in the sea fan coral, *Gorgonia ventalina*. *Marine Biology* 150(6):1137-1144 DOI: 10.1007/s00227-006-0444-8.
- Ellner, S., L. E. Jones, L. Mydlarz, and D. Harvell. Within host disease ecology in the sea fan *Gorgonia ventalina*: modeling the spatial immunodynamics of a coral-pathogen interaction. *American Naturalist* 170:1-21.
- Harvell, C. D., E. Jordan-Dahlgren, S. Merkel, E. Rosenberg, L. Raymundo, G. Smith, E. Weil, and B. Willis. Coral disease, environmental drivers and the balance between coral and microbial associates. *Oceanography* 20:172-195.
- Hoegh-Guldberg, O., P. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, C. D. Harvell, P. R. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, M. Eakin, R. Iglesias-Prietas, N. Muthiga, R. Bradbury, A. Dubi, and M. Hatzeolus. The carbon crisis: Coral reefs under rapid climate change and ocean acidification. *Science* 318:1737.
- Mydlarz, L. D. and C. D. Harvell. Peroxidase activity and inducibility in the sea fan coral exposed to a fungal pathogen. *Comparative Biochemistry and Physiology, Part A. Molecular and Integrative Physiology* 146:54-62.
- Ward, J. R., K. Kim, and C. D. Harvell. Temperature affects coral disease resistance and pathogen growth. *Marine Ecology Progress Series* 329:115-121.
- 2006 Kim, K., A. P. Alker, K. Shuster, C. Quirolo, and C. D. Harvell. Longitudinal study of aspergillosis in sea fan corals. *Diseases of Aquatic Organisms* 69(1):95-99.

Mullen, K., C. D. Harvell, A. P. Alker, D. Dube, E. Jordan-Dahlgren, J. Ward, and L. E. Petes. Host range and resistance to Aspergillosis in three sea fan species from the Yucatan. *Marine Biology* 149(6):1355-1364.

Mydlarz, L. D., L. E. Jones, and C. D. Harvell. Innate immunity, environmental drivers, and disease ecology of marine and freshwater invertebrates. *Annual Review of Ecology, Evolution, and Systematics* 37:251-288.

Selig, E. R., C. D. Harvell, J. F. Bruno, B. L. Willis, C. A. Page, H. Sweatman, and K. Casey. Analyzing the relationship between ocean temperature anomalies and coral disease outbreaks at broad spatial scales. In: J. Phinney, O. Hoegh-Guldberg, J. Kleypas, W. Skirving, and A. Strong (eds.), *Corals and Climate Change*, American Geophysical Union Press, pp. 111-128.

Ward J. R., K. L. Rypien, J. F. Bruno, C. D. Harvell, E. Jordan-Dahlgren, K. M. Mullen, R. E. Rodriguez-Martinez, J. Sanchez, and G. Smith. Coral diversity and disease in Mexico. *Diseases of Aquatic Organisms* 69(1):23-31.

2005 Kim, K., A. Dobson, F.M.D. Gulland, and C.D. Harvell. Diseases and the Conservation of Marine Biodiversity In: *Conservation of Marine Ecosystems*, E. Norse and L. Crowder (eds.). Island Press.

2004 Alker, A., K. Kim, D. H. Dube, and C. D. Harvell. Localized induction of a generalized response against multiple biotic agents in Caribbean sea fans. *Coral Reefs* 23(3):397-405.

Harvell, D. Ecology and evolution of host-pathogen interactions in nature. *American Naturalist* 164:S1-S5.

Harvell, D., R. Aronson, N. Baron, J. Connell, A. Dobson, S. Ellner, L. Gerber, K. Kim, A. Kuris, H. McCallum, K. Lafferty, B. McKay, J. Porter, M. Pascual, G. Smith, K. Sutherland, and J. Ward. The rising tide of ocean diseases: Unsolved problems and research priorities. *Frontiers in Ecology and the Environment* 2(7):375-382.

Kim, K. and D. Harvell. The rise and fall of a six-year coral-fungal epizootic. *American Naturalist* 164:S52-S63.

McCallum, H. I., A. Kuris, C. D. Harvell, K. D. Lafferty, G. W. Smith, and J. Porter. Does terrestrial epidemiology apply to marine systems? *Trends in Ecology and Evolution* 19(11):585-591.

Mullen, K, E. Peters, and C. D. Harvell. Coral resistance to disease. In: *Coral Health and Disease*, E. Rosenberg and Y. Loya. Springer-Verlag Press.

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