

DOUGLAS B. RASHER

Bigelow Laboratory for Ocean Sciences | 60 Bigelow Drive | East Boothbay, Maine 04544 USA
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EDUCATION

2012 PhD, Biology Georgia Institute of Technology (Atlanta, GA, USA)
2005 BS, Zoology Michigan State University (East Lansing, MI, USA)

PROFESSIONAL APPOINTMENTS

2016-present Senior Research Scientist (PI), Bigelow Laboratory for Ocean Sciences
2016-present Research Faculty, Colby College
2013-2016 Postdoctoral Research Associate, School of Marine Sciences, University of Maine
2012-2013 Teasley Postdoctoral Fellow, School of Biology, Georgia Institute of Technology

HONORS AND AWARDS

2020 Field Biology Award, Maxwell Hanrahan Foundation
2014 George Mercer Award, Ecological Society of America
2013 PhD Thesis Award, Sigma Xi
2011 Graduate Research Excellence Award, Georgia Institute of Technology (x2)
2010 Best Student Paper Award, Science Applications International

GRANTS AND FELLOWSHIPS

2022-2023 *Phase Shifts and Feedbacks: Tracking Rapid Ecological Change in Gulf of Maine Kelp Forests.* Ingalls Family Foundation. PI - \$100,000

2022-2023 *Identifying the Genetic Diversity of Maine's Wild Kelp Forests for Habitat Conservation and Sustainable Development of Aquaculture.* The Nature Conservancy. PI - \$50,341

2022-2024 *Kelp Blue Carbon: Developing Tools and Techniques.* The Builder's Initiative. Co-PI - \$799,980

2022-2024 *Collaborative Research: EAGER: Solving Darwin's Paradox: Combining Emerging Technologies to Quantify Energy Fluxes on Coral Reefs.* US National Science Foundation. Co-PI - \$300,000

2020-2023 *Collaborative Research: RUI: Linking Physiological Thermal Thresholds to the Distribution of Lobster Settlers and Juveniles.* US National Science Foundation. Co-PI - \$872,457

2019-2024 *EPSCoR RII Track-1: Molecule to Ecosystem: Environmental DNA as a Nexus of Convergent Research for Maine's Coastal Ecosystems.* US National Science Foundation. SP - \$20,000,000

2018-2021 *The Return of Maine's Kelp Forests: Patterns, Drivers, and Implications for Industry.* Sea Grant, National Oceanic and Atmospheric Administration. PI - \$149,980

2013-2018 *Collaborative Research: Ocean Acidification: Century Scale Impacts to Ecosystem Structure and Function of Aleutian Kelp Forests.* US National Science Foundation. SP - \$574,617

2016-2017 *Effects of Climate Change on Sea Urchin Productivity and Trophic Interactions in the Aleutian Islands: Consequences for Sea Otter Recovery.* US Fish and Wildlife Service. Co-PI - \$50,000

2011-2012 *Teasley Predoctoral Fellowship.* Georgia Institute of Technology. \$11,000

2006-2008 *IGERT Predoctoral Fellowship.* US National Science Foundation. \$60,000

PEER-REVIEWED SCHOLARLY WORKS

IJ Westfield, J Gunnell, **DB Rasher**, B Williams, JB Ries. Cessation of hardground accretion by the cold-water coralline algae *Clathromorphum compactum* and *Clathromorphum nereostratum* predicted within two centuries. *Geochemistry, Geophysics, Geosystems* **23**, e2021GC009942 (2022).

JS Lefcheck, GJ Edgar, RD Stuart-Smith, AE Bates, C Waldo, SJ Brandl, S Kininmonth, SD Ling, JE Duffy, **DB Rasher**, AF Agrawal. Species richness and identity both determine the biomass of global reef fish communities. *Nature Communications* **12**, 6875 (2021).

B Williams, PTW Chan, IT Westfield, **DB Rasher**, J Ries. Ocean acidification reduces skeletal density of hardground-forming high-latitude crustose coralline algae. *Geophysical Research Letters* **48**, e2020GL091499 (2021).

DB Rasher, RS Steneck, J Halfar, KJ Kroeker, JB Ries, MT Tinker, PTW Chan, J Fietzke, NA Kamenos, BH Konar, JS Lefcheck, CJD Norley, BP Weitzman, IT Westfield, JA Estes. Keystone predators govern the pathway and pace of climate impacts in a subarctic marine ecosystem. *Science* **369**, 1351-1354 (2020).

Outreach: *New York Times, Scientific American Magazine, Yahoo News, Star Tribune, Chicago Tribune, Baltimore Sun, Publico, Inverse Magazine, Swiss Public Radio, National Public Radio (NPR), etc.*

C Pimiento, F Leprieur, D Silvestro, JS Lefcheck, C Albouy, **DB Rasher**, M Davis, J-C Svenning, JN Griffin. Functional diversity of marine megafauna in the Anthropocene. *Science Advances* **6**, eaay7650 (2020).

Outreach: *Newsweek Magazine, Gizmodo Magazine, Science Daily, etc.*

JJ Scott, TC Adam, A Duran, DE Burkepile, **DB Rasher**. Intestinal microbes: an axis of functional diversity among large marine consumers. *Proceedings of the Royal Society B: Biological Sciences* **287**, 20192367 (2020).

Outreach: *Hakai Magazine, Science Daily, Technology Networks, etc.*

LGE Wilkins, M Leray, A O’Dea, B Yuen, R Peixoto, TJ Pereira, HM Bik, DA Coil, JE Duffy, EA Herre, H Lessios, NM Lucey, LC Mejia, **DB Rasher**, K Sharp, EM Sogin, RW Thacker, R Vega Thurber, WT Wcislo, EG Wilbanks, JA Eisen. Host-associated microbiomes drive structure and function of marine ecosystems. *PLoS Biology* **17**, e3000533 (2019).

SJ Brandl, **DB Rasher**, IM Côté, JM Casey, ES Darling, JS Lefcheck, JE Duffy. Coral reef ecosystem functioning: eight core processes and the role of biodiversity. *Frontiers in Ecology and the Environment* **17**, 445-454 (2019).

RS Steneck, SA Arnold, R Boenish, R de Leon, PJ Mumby, **DB Rasher**, MW Wilson. Managing recovery resilience in coral reefs against climate-induced bleaching and hurricanes: A 15-year case study from Bonaire, Dutch Caribbean. *Frontiers in Marine Science* **6**, 265 (2019).

JS Lefcheck, BB Hughes, AJ Johnson, BW Pfirrmann, **DB Rasher**, AR Smyth, BL Williams, MW Beck, RJ Orth. Are coastal habitats important nurseries? A meta-analysis. *Conservation Letters* **12**, e12645 (2019).

JS Lefcheck, AA Innes-Gold, SJ Brandl, RS Steneck, RE Torres, **DB Rasher**. Tropical fish diversity enhances coral reef functioning across multiple scales. *Science Advances* **5**, eaav6420 (2019).

Outreach: *Caribbean Beat Magazine, Science and Development Network, Swedish Public Radio, etc.*

ZM Topor, **DB Rasher**, JE Duffy, SJ Brandl. Marine protected areas enhance coral reef functioning by promoting fish biodiversity. *Conservation Letters* **12**, e12638 (2019).

KM Cammen, **DB Rasher**, RS Steneck. Predator recovery, shifting baselines, and the adaptive management challenges they create. *Ecosphere* **10**, e02579 (2019).

RS Steneck, PJ Mumby, C MacDonald, **DB Rasher**, G Stoyle. Attenuating effects of ecosystem management on coral reefs. *Science Advances* **4**, eaao5493 (2018).

CS Clements, **DB Rasher**, AS Hoey, VE Bonito, ME Hay. Spatial and temporal limits of coral–macroalgal competition. *Marine Ecology Progress Series* **586**, 11-20 (2018).

DB Rasher, AS Hoey, ME Hay. Cascading predator effects in a Fijian coral reef ecosystem. *Scientific Reports* **7**, 15684 (2017).

Outreach: *Scientific American Magazine, Discover Magazine, Gizmodo Magazine, Science & Avenir News*

JA Estes, M Heithaus, DJ McCauley, **DB Rasher**, B Worm. Megafaunal impacts on structure and function of ocean ecosystems. *Annual Review of Environment and Resources* **41**, 83-116 (2016).

DB Rasher, EP Stout, S Engel, TL Shearer, J Kubanek, ME Hay. Marine and terrestrial herbivores display convergent chemical ecology despite 400 million years of independent evolution. *Proceedings of the National Academy of Sciences USA* **112**, 12110-12115 (2015).

Outreach: *AAAS News, Chemical and Engineering News, Hakai Magazine, etc.*

DB Rasher, ME Hay. Competition induces allelopathy but suppresses growth and anti-herbivore defense in a chemically rich seaweed. *Proceedings of the Royal Society B: Biological Sciences* **281**, 20132615 (2014).

DB Rasher, AS Hoey, ME Hay. Consumer diversity interacts with prey defenses to drive ecosystem function. *Ecology* **94**, 1347-1358 (2013).

Outreach: *National Science Foundation, Thomson-Reuters News, American Museum of Natural History, Consortium for Ocean Leadership, Coral Reef Alliance, etc.*

Accolades: George Mercer Award, Ecological Society of America

TL Shearer, **DB Rasher**, TW Snell, ME Hay. Gene expression patterns of the coral *Acropora millepora* in response to contact with macroalgae. *Coral Reefs* **31**, 1177-1192 (2012).

DB Rasher, S Engel, V Bonito, GJ Fraser, JP Montoya, ME Hay. Effects of herbivory, nutrients, and reef protection on algal proliferation and coral growth on a tropical reef. *Oecologia* **169**, 187-198 (2012).

RS Lasley-Rasher, **DB Rasher**, ZH Marion, RB Taylor, ME Hay. Predation constrains host choice for a marine mesograzer. *Marine Ecology Progress Series* **434**, 91-99 (2011).

DB Rasher, EP Stout, S Engel, J Kubanek, ME Hay. Macroalgal terpenes function as allelopathic agents against reef corals. *Proceedings of the National Academy of Sciences USA* **108**, 17726-17731 (2011).

Outreach: *National Geographic Magazine, Time Magazine, Wired Magazine, AAAS Science Now! (Science), NBC News, Chemical and Engineering News, BBC Radio, ABC Radio, Fiji Radio, etc.*

Hay ME, **Rasher DB**. Coral reefs in crisis: reversing the biotic death spiral. *FI000 Biology Reports* **2**, 71 (2010).

DB Rasher, ME Hay. Seaweed allelopathy degrades the resilience and function of coral reefs. *Communicative and Integrative Biology* **3**, 564-566 (2010).

DB Rasher, ME Hay. Chemically rich seaweeds poison corals when not controlled by herbivores. *Proceedings of the National Academy of Sciences USA* **107**, 9683-9688 (2010).

Outreach: National Science Foundation, Discover Magazine, National Geographic Magazine, R&D Magazine, MSNBC News, Yahoo News, Sydney Morning Herald, Times of Malta, Telegraph UK, Fiji Sun, Bionieuws Netherlands, San Diego Times, National Public Radio (NPR), CBC Radio, etc.

BOOK CHAPTERS AND TECHNICAL REPORTS

DE Burkepile, **DB Rasher**, TC Adam, AS Hoey, ME Hay. 2018. Functional Variation Among Parrotfishes: Are they Complementary or Redundant? in *Biology of Parrotfishes* (AS Hoey and RM Bonaldo, eds.) 1st Edition (CRC Press). Pages 134-160.

RS Steneck, SN Arnold, R de Leon, **DB Rasher**. 2015. *Status and Trends of Bonaire's Coral Reefs: Slow but Steady Signs of Resilience*. STINAPA Government Report, 93 pages plus Appendices.

RS Steneck, SN Arnold, **DB Rasher**. 2015. *Status and Trends of Bonaire's Coral Reefs: Causes for Optimism*. STINAPA Government Report, 98 pages plus Appendices.

PROFESSIONAL PRESENTATIONS

Invited Departmental Seminars, Workshop Presentations, and Public Presentations

- 2022 Dept. Seminar, Dalhousie University (Halifax, NS, Canada)
- 2020 Dept. Seminar, Gulf of Maine Research Institute (Portland, ME, USA)
- 2020 Dept. Seminar, Cornell University (Isle of Shoals, ME, USA)
- 2020 Café Scientifique, Bigelow Laboratory for Ocean Sciences (East Boothbay, ME, USA)
- 2019 Dept. Seminar, NOAA/University of Washington (Seattle, WA, USA)
- 2019 Dept. Seminar, University of Florida (Gainesville, FL, USA)
- 2019 Dept. Seminar, University of Rhode Island (Kingston, RI, USA)
- 2019 Dept. Seminar, Harvard University (Cambridge, MA, USA)
- 2018 Moore Foundation Workshop, Smithsonian Tropical Research Institute (Bocas del Toro, Panama)
- 2018 Café Scientifique, Bigelow Laboratory for Ocean Sciences (East Boothbay, ME, USA)
- 2018 Smithsonian MarineGEO Education Workshop (Corpus Christi, TX, USA)
- 2018 Dept. Seminar, Northeastern University (Boston, MA, USA)
- 2018 Dept. Seminar, University of Massachusetts (Boston, MA, USA)
- 2018 Dept. Seminar, University of Maine (Orono, ME, USA)
- 2017 Dept. Seminar, Maine Maritime Academy (Castine, ME, USA)
- 2017 Dept. Seminar, Maine Department of Marine Resources (Boothbay, ME, USA)
- 2017 Innovation and Leadership Series, The Music Hall (Portsmouth, NH, USA)
- 2017 Café Scientifique, Bigelow Laboratory for Ocean Sciences (East Boothbay, ME, USA)
- 2017 The Biology Colloquium, Florida State University (Tallahassee, FL, USA)
- 2017 Dept. Seminar, Florida State University (Tallahassee, FL, USA)
- 2016 Dept. Seminar, College of William and Mary / VIMS (Gloucester Point, VA, USA)
- 2016 Dept. Seminar, University of California (Santa Barbara, CA, USA)
- 2016 Dept. Seminar, Bigelow Laboratory for Ocean Sciences (East Boothbay, ME, USA)
- 2015 Dept. Seminar, University of Michigan (Ann Arbor, MI, USA)
- 2015 Dept. Seminar, Brown University (Providence, RI, USA)
- 2015 Dept. Seminar, University of California (Santa Cruz, CA, USA)
- 2014 Dept. Seminar, University of Maine (Orono, ME, USA)
- 2013 Dept. Seminar, Darling Marine Center, University of Maine (Walpole, ME, USA)
- 2011 Dept. Seminar, University of New South Wales (Sydney, NSW, Australia)
- 2009 Dept. Seminar, University of the South Pacific (Suva, Fiji)
- 2013 European Union Global Climate Change Alliance Workshop (Koror, Palau)
- 2012 Teasley Symposium, Georgia Institute of Technology (Atlanta, GA, USA)

Guest Lectures in University Courses

- 2022 Oceanography, Maine College of Art and Design (Portland, ME, USA)
- 2021 Environmental Studies Seminar, Dartmouth College (Hanover, NH, USA)
- 2021 Marine Ecology, University of Southern Maine (Portland, ME, USA)

- 2020 Marine Biology Graduate Seminar, University of Maine (Orono, ME, USA)
- 2019 Invertebrate Zoology, University of Southern Maine (Portland, ME, USA)
- 2019 Marine Communities, Colby College (Waterville, ME, USA)
- 2019 Water and Human Rights, Colby College (Waterville, ME, USA)
- 2018 Coral Reef Methods, Colby College (Waterville, ME, USA)
- 2018 Marine Communities, Colby College (Waterville, ME, USA)
- 2017 Chemical Ecology, University of California (Davis, CA, USA)
- 2017 Marine Communities, Colby College (Waterville, ME, USA)
- 2016 The Changing Arctic, University of Maine (Orono, ME, USA)
- 2014 Introduction to Ocean Sciences, University of Maine (Walpole, ME, USA)
- 2013 Coral Reefs, University of Maine (Walpole, ME, USA)
- 2012 Chemical Ecology, Georgia Institute of Technology (Atlanta, GA, USA)
- 2011 The Pacific Program, Georgia Institute of Technology (Heron Island, QLD, Australia)
- 2009 Marine Ecology, Georgia Institute of Technology (Atlanta, GA, USA)

Conference Presentations

- 2019 Gulf of Maine 2050 International Symposium (Portland, ME, USA)
- 2019 149th American Fisheries Society Meeting (Reno, NV, USA)
- 2018 4th World Conference on Marine Biodiversity (Montreal, QC, Canada)
- 2016 97th Western Society of Naturalists Meeting (Monterey, CA, USA)
- 2016 Gordon Research Conference on Ocean Global Change Biology (Waterville Valley, NH, USA)
- 2016 45th Benthic Ecology Meeting (Portland, ME, USA)
- 2014 95th Western Society of Naturalists Meeting (Tacoma, WA, USA)
- 2012 12th International Coral Reef Symposium (Cairns, QLD, Australia)
- 2012 41st Benthic Ecology Meeting (Norfolk, VA, USA)
- 2011 92nd Western Society of Naturalists Meeting (Vancouver, WA, USA)
- 2010 95th Ecological Society of America Meeting (Pittsburgh, PA, USA)
- 2010 39th Benthic Ecology Meeting (Wilmington, NC, USA)

TEACHING EXPERIENCE

Colby College

- 2022 Instructor of Record, *Seafood Forensics: Combating Crime in Ocean Food Systems* (ES 239, Fall)
- 2021 Instructor of Record, *Seafood Forensics: Combating Crime in Ocean Food Systems* (ES 239, Fall)
- 2020 Instructor of Record, *Seafood Forensics: Combating Crime in Ocean Food Systems* (ES 234, Fall)
- 2020 Instructor of Record, *Seafood Forensics: Combating Crime in Ocean Food Systems* (ES 239, Spring)
- 2019 Instructor of Record, *Seafood Forensics: Combating Crime in Ocean Food Systems* (ES 298, Spring)
- 2019 Co-Instructor of Record, *Coral Reef Ecosystems* (ES 297, January Term)

University of Maine

- 2013 Teaching Assistant, *Introduction to Research Diving* (SMS 491)

Georgia Institute of Technology

- 2011 Teaching Assistant, *Organismal Biology Laboratory* (BIOL 1520)
- 2011 Teaching Assistant, *Ecology and Evolution - An Australian Perspective* (BIOL 3100)

Michigan State University

- 2005 Teaching Assistant, *Organismal Biology Laboratory* (LBS 144)
- 2004 Teaching Assistant, *Organismal Biology Laboratory* (LBS 144)

MENTORSHIP

Undergraduate Students

- 2022 Allie Ouimet, Undergraduate Independent Study Intern (University of Maine)
- 2022 Phoebe Churney, Our World Underwater/AAUS Scholar (Maine Maritime Academy)
- 2022 Julie Karlsson, NSF REU Fellow (Hood College)
- 2022 Riley Fitz, NSF REU Fellow (Hood College)

2021 Hannah O’Loughlin, NSF REU Fellow (Vassar College)
 2021 Alexis Mullen, NSF REU Fellow (Bowdoin College)
 2021 Zaie Nursey, Undergraduate Independent Study Intern (Colby College)
 2020 Zaie Nursey, Undergraduate Independent Study Intern (Colby College)
 2020 Ajay Patel, NSF REU Fellow (University of Florida)
 2019 Carlin Schildge, NSF REU Fellow (Colby College)
 2019 Shane Farrell, Our World Underwater/AAUS Scholar (Lawrence University)
 2018 Colleen George, Undergraduate Independent Study Intern (Colby College)
 2018 Sydney Greenlee, Undergraduate Independent Study Intern (Colby College)
 2018 Courtney Stuart, NSF REU Fellow (Stony Brook University)
 2018 Shane Farrell, Our World Underwater/AAUS Scholar (Lawrence University)
 2017 Anne Innes-Gold, NSF REU Fellow (Vassar College)
 2017 Nicole Roberts, Senior Honors Thesis Student (Amherst College)
 2016 Grant Dickey, Capstone Thesis Student (University of Maine)
 2016 Eliza Lehner, Work Term Intern (Bennington College)

Graduate Students

2020-2024 Rene Francolini, PhD Advisee (University of Maine, Orono, ME, USA)
 2020-2024 Dara Yiu, PhD Advisee (University of Maine, Orono, ME, USA)
 2020-2024 Shane Farrell, PhD Advisee (University of Maine, Orono, ME, USA)
 2020-2024 Emily Pierce, PhD Advisee (University of Maine, Orono, ME, USA)
 2021-2024 Kyle Oliveira, PhD Thesis Committee (University of Maine, Orono, ME, USA)
 2021-2023 Emily Schutt, MSc Thesis Committee (University of New England, Biddeford, ME, USA)
 2019-2021 Ariella Danziger, MSc Thesis Committee (University of New England, Biddeford, ME, USA)
 2018-2023 Lauren Bell, PhD Thesis Committee (University of California, Santa Cruz, CA, USA)
 2017-2020 Bryce Risley, MSc Thesis Committee (University of Maine, Orono, ME, USA)
 2014-2016 Ruleo Camacho, MSc Thesis Committee (University of Maine, Orono, ME, USA)

EXTERNAL SERVICE

Peer Review Service

2010- Manuscript Reviewer for: Biological Conservation, Biology Letters, Bioscience, Coral Reefs, Current Biology, Ecology, Ecological Applications, Ecosphere, Ecology Letters, Ecology and Evolution, Frontiers in Ecology and the Environment, Frontiers in Ecology and Evolution, Functional Ecology, Global Change Biology, Journal of Animal Ecology, Journal of Ecology, Journal of Experimental Marine Biology and Ecology, Journal of Fish Biology, Journal of Phycology, Limnology and Oceanography, Marine Biology, Marine Ecology Progress Series, Marine Environmental Research, Methods in Ecology and Evolution, Nature, Nature Climate Change, Nature Ecology and Evolution, Oecologia, Oikos, PLoS One, Proceedings of the National Academy of Sciences USA, Proceedings of the Royal Society B: Biological Sciences, Restoration Ecology, Science Advances, Scientific Reports, Trends in Ecology and Evolution

2014- Grant Proposal Reviewer for: Australian Museum, National Geographic Society, NOAA Coral Reef Conservation Program, US National Science Foundation – Biological Oceanography Program, and Ocean Sciences Postdoctoral Research Fellowship Program, North Pacific Research Board, Schmidt Ocean Institute, Washington Sea Grant (NOAA)

2017-2020 Editorial Board Member, *Journal of Experimental Marine Biology and Ecology*

2019 Panel Member, Technical Review, Alaska Sea Grant (NOAA)

Disciplinary Societal Service

2020 Board Member, Regional Association for Research on the Gulf of Maine (RARGOM)

2021 Session Co-organizer, 2021 RARGOM Annual Science Meeting

- *Species interactions in oceanic and coastal ecosystems*

- 2016 Session Co-organizer, 13th International Coral Reef Symposium
- *Functional management of multispecies reef fisheries*
- 2012 Session Co-organizer, 12th International Coral Reef Symposium
- *Ecological dynamics, resilience & phase shifts*

Advisory Committee and Working Group Service

- 2022-present Global Scientific Advisory Committee, Reef Life Survey
- 2021-2022 Member, Environment and Wildlife Working Group, Offshore Wind Roadmap, Maine Governor’s Office of Energy

INSTITUTIONAL SERVICE

Bigelow Laboratory for Ocean Sciences

- 2019-present Chair, Education Committee
- 2018-present Member, IACUC Committee
- 2016-present Member, Dive Control Board
- 2019-2020 Representative to the Board, Alternate
- 2017-2019 Coordinator, Postdoctoral Training Program
- 2016-2019 Member, Education Committee
- 2016-2018 Member, Safety Committee

Georgia Institute of Technology

- 2009-2010 Treasurer, Biology Graduate Student Association
- 2007-2008 President, Biology Graduate Student Association
- 2007 Seminar Series Chair, NSF IGERT Program