IAN C ENOCHS

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PERSONAL

Citizenship: United States of America
Registered for Selective Service: Yes

DEGREES

- Ph.D. Marine Biology and Fisheries, Rosenstiel School of Marine and Atmospheric Science, Miami, FL (December, 2010)
  Dissertation title: Motile cryptofauna of an eastern Pacific coral reef: Biodiversity and trophic contribution. http://scholarlyrepository.miami.edu/oa_dissertations/497
- B.S. Degree in Marine Science and Biology, Cum Laude, Honors, Departmental honors, University of Miami, Coral Gables, FL (May, 2006)

PROFESSIONAL EXPERIENCE

- **Research Ecologist**, NOAA/AOML (09/19/18 – present)
- **Associate Scientist**, UM/CIMAS, NOAA/AOML (06/01/16 – 9/18/18)
  Duties and accomplishments: Manage a diverse team of scientists and technicians. Develop, fund, and conduct state of the art science and monitoring programs which comprehensively address the impacts of global change on reef ecosystems. Published two first author publications, co-edited a book, and wrote three book chapters. Co-PI on more than a million dollars worth of grants. Designed and built state of the art Future Reef Lab at the University of Miami. Received three NOAA certificates of appreciation. Conducted collaborative research with the Australian Institute of Marine Science in Papua New Guinea. Chaired a session and presented research at the International Coral Reef Symposium. Communicated research across NOAA offices and at headquarters through the invited NOAA Science Days Lecture Series, as well as to wider audiences through public talks. Mentored an undergraduate student and served on a Master's student committee.
- **Assistant Scientist**, UM/CIMAS, NOAA/AOML (01/01/2014 - 05/29/16)
  Duties and accomplishments: Conducted research, managed laboratory and field-based projects, published findings, and obtained funding. Published 10 papers (four first author). Presented research at eight workshops and international meetings. Co-PI and PI on more than two million dollars worth of grants. Led expeditions to remote Maug Island, and conducted monitoring operations throughout the Caribbean and Atlantic. Led the development and installation of state of the art coral sclerochronology and CT scanning infrastructure at AOML. Received the CIMAS Outstanding Science Award. Widely communicated research through numerous popular media outlets. Mentored an undergraduate student and served on two Master's student committees.
- **Postdoctoral Associate**, UM/CIMAS-NOAA/AOML (01/01/11 - 12/31/2013)
  Duties and accomplishments: Worked with project PI's to conduct research investigating the impacts of ocean acidification on coral reefs in the Florida Keys. Published nine papers (four first author). Helped to implement the National Coral Reef Monitoring Program in St. Croix, Saipan, and American Samoa, and participated in research expeditions to New Caledonia and French Polynesia. Presented work at four international meetings, and two workshops. Developed new methodologies to employ micro-CT to quantify bioerosion and calcification.

Associated grants and fellowships

- PI, National Coral Reef Monitoring Program: *In situ* climate and ocean acidification monitoring (NOAA CRCP, 2021-Present)

- PI, Coral performance evaluation: assessing the strengths and weaknesses of coral genotypes used in reef restoration (NOAA CRCP, 2019-present)
- PI, Evaluation of mechanisms to increase resilience of outplanted coral fragments (NOAA CRCP, 2019-present)
- PI, Laboratory-based experimental evaluation of novel disease abatement techniques (NOAA CRCP, 2019-present)
- PI, Reefs on the edge, molecular insights from corals in extreme environments (NOAA Omics, 2019-present)
- PI, Miami's urban super corals: investigating the molecular mechanisms behind resilient coral populations in marginal environments (NOAA Omics, 2018-2019)
- PI, Technology development: Subsurface Automatic Samplers (SAS) for the collection and preservation of eDNA (NOAA Omics, 2018-2019)
- PI, Laboratory-based bioerosion and calcification experiments to inform NCRMP acidification monitoring (NOAA OAP, 2018)
- PI, Ultraviolet deactivation of coral disease lesions (FDEP, 2018)
- PI, Influences of carbonate chemistry variability on Caribbean coral reefs, molecular and physiological responses (NOAA Omics, 2017-2018)
- PI, Instrument development grant for field-based ocean acidification research in shallow marine ecosystems (NOAA Technology Development, 2017-2018)
- PI, Coral restoration in natural ocean acidification refugia (NOAA CRCP, 2014-2015)
- PI, Rare reefs in an ocean acidification hotspot at Maug Island, CNMI (NOAA CRCP, 2014)
- PI Coral reef assessment associated with the Broward numeric nutrient project (FDEP, EPA, Miami-Dade Water and Sewer, 2013-2015)
- Co-PI, Coral Omics': Molecular mechanisms of reef resilience (NOAA Omics, 2016)
- Co-PI, National Coral Reef Monitoring Program: *In situ* climate and ocean acidification monitoring (NOAA CRCP, 2013-2021)
- Co-PI, Elucidating the recipe for coral reef resilience in the Florida Keys (NOAA CRCP, 2016)
- Co-PI, Coral growth and reef framework persistence of the Florida Reef Tract with accelerating ocean acidification (NOAA CRCP, 2014-2015)
- Co-PI, Atlantic ocean acidification test bed (NOAA OAP, 2012-2015)
- Co-author, supplemental grant w/ P. Glynn (NSF; 2009)
- Rowland Research Support Fellowship (University of Miami; 2009)
- Lerner-Gray Fellowship (American Museum of Natural History; 2008)

Awards

- US DOC Bronze Medal Award (2020)
- US DOC Silver Medal Award (2019)
- AOML Outstanding Paper Award (2018)
- AOML Certificate of Appreciation (3 awards, 2016)
- CIMAS Outstanding Scientific Performance Award (2015)
- RSMAS Fellowship (2006 – 2007)
- Bowman Foster Ashe Scholarship (2002 – 2006)
- University Honors Program (2002 – 2006)
- UM Department of Marine Science, Honors (2006)

Presentations (first author)

- Congressional Briefing, Ocean acidification and coral reefs in the southeast US (Invited panelist)
  Online (2021) Ten years of solution-driven science and monitoring of US coral reefs.

- NOAA's Coral Reef Conservation Program (Invited), Silver Spring, DC (2019). Talk title: The Impacts of Ocean acidification on coral reef ecosystems: research, technologies, and future directions at AOML.
- Louisiana State University College of the Coast & Environment as Guest Seminar Speaker (Invited), Baton Rouge, LA (2019). Talk title: Exploring the persistence of reef ecosystems in acidified oceans: incorporation of ecological and environmental complexity to understand real-world responses.
- University of Philippines Guest Seminar Speaker (Invited), Manilla, Philippines (2019). Talk title: Coral reef ecosystems in an acidified world: incorporation of ecological and environmental complexity to better understand the future of coral reefs.
- Reef Futures Conference, Key Largo, FL (2019). Talk title: The Implications of ocean acidification for the restoration and growth of *Acropora cervicornis*.
- NOAA's Ocean Acidification Working Group (Invited), Remotely presented (2018). Talk title: Subsurface Automated Samplers (SAS) for ocean acidification research.
- NOAA's National Marine Fisheries Service Ocean Acidification Group (Invited), Remotely presented (2018). Talk title: Towards environmental and ecological complexity: Application of new technologies to facilitate OA research
- CIMAS Seminar (Invited), Miami, FL (2018). Talk title: Exploring the persistence of reef ecosystems in acidified oceans: incorporation of ecological and environmental complexity to understand real-world responses.
- AOML Omics Ignite Talk, Miami, FL (2017). Talk title: The CIMAS Experimental Reef Lab: A tool for simulating dynamic future conditions on contemporary reef organisms.
- NOAA Science Days (Invited), Washington, DC (2016). Talk title: Technology meets the reefs of tomorrow: Monitoring, forecasting, and mitigating the impacts of ocean acidification.
- 13th International Coral Reef Symposium (Session chair, presenter), Honolulu, Hawaii (2016). Talk title: Micro-CT analysis of naturally acidified coral skeletons: Depression of net calcification driven by enhanced bioerosion and reduced accretion.
- University of Oregon Guest Seminar Speaker (Invited), Eugene, Oregon (2016). Talk title: Ocean acidification and the persistence of coral reefs: expanding our understanding from organisms to ecosystems.
- Fourth International Symposium on the Ocean in a High-CO_2 World, Hobart, Australia (2016). Talk title: Volcanic acidification at Maug Island correlated with spatial shift from coral to algae-dominated ecosystem.
- Ocean Sciences, New Orleans (2016). Talk title: Volcanic acidification of coral reefs at Maug Island: Influences on biological processes and ecosystem structure.
- Atlantic Oceanographic and Meteorological Laboratory Bite Size Science Lecture Series (Invited), Miami, Florida (2016). Talk title: Coral reefs in high CO_2 seas: Combining laboratory and field observations to inform conservation and management.
- Central Caribbean Marine Institute (Invited), Little Cayman, Cayman Islands (2015). Talk title: Ocean acidification and coral reefs: Background, research, natural laboratories.
- NOAA's Coral Collaboration Meeting Lecture Series (Invited), Miami, Florida (2015). Talk title: Naturally acidified coral reefs at Maug Island, CNMI.
- 2nd WESTPAC Training Workshop on Research and Monitoring of the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems (Invited), Phuket, Thailand (2015). Talk title: Bioerosion and ocean acidification: Background, monitoring, methodologies, and NCRMP.
- ASLO Aquatic Sciences Meeting, Grenada, Spain (2015). Talk title: Naturally acidified coral reefs at Maug Island: Similarities and differences with other high-CO_2 systems.
- Workshop on Evaluating Coral Traits to Enhance Restoration Success (Invited) Miami, FL (2014). Talk title: *Acropora cervicornis* and ocean acidification: Morphology and methods.

- Mote Ocean Acidification Workshop (Invited), Sarasota, Florida (2013). Talk title: Components of investigation OA on the Florida Reef Tract.
- AGU Meeting of the Americas (Invited), Cancun, Mexico (2013). Talk title: Monitoring the impacts of ocean acidification on coral reef bioerosion: Challenges, methods, recommendations.
- 12th International Coral Reef Symposium, Cairns, Australia (2012). Talk title: Biodiversity and trophic potential across a gradient of framework degradation.
- AGU, San Francisco, California (2012). Talk title: Ocean acidification refugia of the Florida Reef Tract.
- Coral Reef Ocean Acidification Monitoring Program, Ft. Lauderdale, Florida (2012). Talk title: Methods for monitoring bioerosion.
- 40th Benthic Ecology Meetings, Mobile, Alabama (2011). Talk title: Moderate levels of coral mortality promote metazoan biodiversity with a reef ecosystem.
- 11th International Coral Reef Symposium, Ft. Lauderdale, Florida (2008). Talk title: The effects of coral mortality on the community composition of cryptic metazoans associated with *Pocillopora damicornis*.

Science communication

Media

Virtual Reality: Generation Ocean: Coral Reefs **Television:** Waterways Television Series, Changing Seas Television Series (WPBT2), Hurricane (3D Documentary). **Print:** Miami Herald, Bradenton Herald, Environmental Monitor. **Audio:** German Public Radio/NDR. **Web:** AlgaeWorld.org, Archaeology News Network, AZOCleanTech.com, BioPortfolio.com, BrightSurf.com, Climate Wire, EnvironmentGuru.com, Environmental Protection, GeologyPage.com, Gizmodo.com, Hakai Magazine, HealthMedicineNetwork.com, IFLScience.com, JustMarineNews.com, Lifesciencesworld.com, Phys.org, ScienceBlog.com, ScienceDaily.com, ScienceNewsLine.com article 1, article 2, TakePart.com, TerraDaily.com, TorontoStar.com, Yahoo News

Outreach

Skype with a Scientist – Portland High School Life Sciences (2021)
Perez Art Museum Miami panel discussion and Coral City Camera reveal (2020)
Development of NCRMP photo mosaics as teach tools at LSU, contributor (2019)
Skype with Scientists – Outreach with science campers at MacArthur Beach State Park (2016, 2019)
Scientist Q&A – Classroom discussions with Conniston Middle School (2019)
STEM lesson plan development with Far Outreach, centered on ocean acidification and open source programming https://www.coral.noaa.gov/accrete/sas/outreach.html
AGARI Foundation – development of VR material and lesson plans for engaging young marine science students
Miami IMPACT (Integrated Marine Program and College Training) – Lecture on acidification and field research, collaboration with student-based laboratory experiments (2017)
Nerd Nite Miami – Public lecture series at Gramps in Wynwood (2016)
Screening of PBS Maug – Public Q&A concerning PBS2 Changing Seas Episode on Maug (2016)
Coral Nursery – Established coral nursery maintained by students at Island School in Bahamas (2015)

Mentorship

Academic mentorship

Postdoctoral associates (3), PhD Principle Advisor, University of Miami (2); PhD Committee Member, University of Miami (3); Masters of Professional Science Committee Member, University of Miami (3); Masters of Science Thesis Reader, University of the Philippines (2); Masters of Science Committee Member, University of the Virgin Islands (2); Undergraduate Departmental Honors Advisor, University of Miami (3); ACCRETE Intern program (4)

Mentorship events

RSMAS career panel (2020)

Teaching experience

- Guest lecturer - Ecology and Physiology of Coral Reefs, University of Miami, RSMAS (2009, 2011, 2013, 2015, 2018-2021)
- Guest lecturer – Nova Southeastern University (2020)
- Guest lecturer - UM Marine Science Honor Society, University of Miami (2009)
- Guest lecturer - UM Undergraduate Marine Biology, University of Miami (2007)
- Teaching assistant - Ecology and Physiology of Coral Reefs, University of Miami, RSMAS (2009),
- Teaching assistant, lecturer - Introduction to Invertebrate Zoology Lab, University of Miami, RSMAS (2008)
- Teaching assistant, lecturer - Marine Biology Lab, University of Miami (2007)

Committees and editorial roles

- DARPA Reefense Scientific Review Board (2021)
- Iconic Reefs Restoration Monitoring and Research Working Group (2021)
- Gulf of Mexico Regional Collaboration Team (2021)
- Core Planning Team NOAA's SCTLD Implementation Plan (2021)
- Guest editor, Coral Reefs Special Issue: Coral Reefs in a Changing World: Insights from Extremes (2021)
- Ocean acidification PI meeting steering committee (2020)
- Ocean acidification research plan: region lead (2020)

Journal reviewer

ASLO eLectures, Aquatic Geochemistry, Bulletin of Marine Science, Coral Reefs, Ecology, Ecological Monographs, Frontiers in Marine Science, Geochemistry Geophysics Geosystems, Global Change Biology, HardwareX, Hydrobiologia, ICES Marine Science, Integrative Organismal Biology, Journal of Experimental Marine Biology and Ecology, Journal of Geophysical Research, Limnology and Oceanography, Marine Biology, Marine Ecology Progress Series, Marine Environmental Research, Marine and Freshwater Research, Nature Communications, Neotropical Ichthyology, Oecologia, PeerJ, Proceedings of the Royal Society of London B, Scientific Reports, Science of the Total Environment

Field experience

American Samoa (2013); Dry Tortugas, Florida (2015); Florida Keys (2010-2016); Flower Garden Banks (2015); Galapagos Islands, Ecuador (2009); Gambier Island Group, French Polynesia (2013); Mabini, Philippines (2019); Maug, Commonwealth of the Northern Mariana Islands (2014); Mayreau, Grenadines (2018, 2019); New Caledonia (2013); Panamá (2006, 2007, 2008, 2010, 2011); Papua New Guinea (2016); Puerto Rico (2011, 2015); Saipan, Commonwealth of the Northern Mariana Islands (2013); St. Croix, USVI (2013, 2014); St. Thomas, USVI (2014)

Relevant skills and qualifications

NOAA authorized diver (100 ft), AAUS authorized scuba diver (100ft, 10 years), circuit design and physical programming (LabVIEW, Arduino IDE), statistics and database design (R, Matlab, PRIMER, MS Access); 3D modeling and analysis (Amira, Autodesk Inventor, Google Sketchup, Meshlab, FlexScan3D, Leios2), spatial analysis (ArcGIS); image analysis (ImageJ, CoralXDS, CPCe), carbonate chemistry analysis (DIC, Apollo SciTech AS-C3; TA, Apollo SciTech AS-ALK2; pCO_2, LI-COR 820, Pro Oceanus CO_2-Pro CV; pH, Satlantic SeaFET, Sunburst SAMI-pH, Honeywell Durafet), figure preparation (Adobe Illustrator, Adobe Photoshop)

PEER-REVIEWED PUBLICATIONS

(RG Score, 32.21; Google Scholar h-index, 23; Google Scholar Citations, 1742)

Enochs IC, Toth LT, Kirkland A, Manzello DP, Kolodziej G, Morris JT, Holstein DM, Schlenz A, Randall CJ, Maté JL, Leichter JJ, Aronson RB (2021) Upwelling and the persistence of coral-reef frameworks in the eastern tropical Pacific. Ecological Monographs.

Mayfield AB, Aguilar C, Kolodziej G, **Enochs IC**, Manzello DP (2021) Shotgun proteomic analysis of thermally challenged reef corals. Frontiers in Marine Science – Aquatic Physiology

Olinger L, Chaves-Fonnegra A, **Enochs IC**, Brandt ME (2021) Three competitors in three dimensions: Photogrammetry reveals rapid overgrowth of coral during multispecies competition with sponges and algae. Marine Ecology Progress Series 657:109-121. doi: 10.3354/meps13579. https://www.int-res.com/abstracts/meps/v657/p109-121

Kealoha AK, Shamberger KEF, DiMarco SF, Thyng KM, Hetland RD, Manzello DP, Slowey NC, **Enochs IC** (2020) Surface Water CO_2 variability in the Gulf of Mexico (1996–2017). Scientific Reports 10, 12279. doi: 10.1038/s41598-020-68924-0. https://www.nature.com/articles/s41598-020-68924-0

Burt JA, Camp EF, **Enochs IC**, Johansen JL, Morgan KM, Riegl B, Hoey AS (2020) Insights from extreme coral reefs in a changing world. Coral Reefs. doi: 10.1007/s00338-020-01966-y. https://link.springer.com/article/10.1007/s00338-020-01966-y

Enochs IC, Formel D, Manzello DP, Morris J, Mayfield AB, Boyd A, Kolodziej G, Adams G, Hendee J (2020) Coral persistence despite extreme periodic pH fluctuations at a volcanically acidified Caribbean reef. Coral Reefs. doi: 10.1007/s00338-020-01927-5. https://link.springer.com/article/10.1007/s00338-020-01927-5#citeas

Manzello DP, **Enochs IC**, Carlton R, Bruckner A, Kolodziej G, Dempsey A, Renaud P (2020) Pacific-wide pH snapshots reveal that high coral cover correlates with low, but variable pH. Bulletin of Marine Science. doi: 10.5343/bms.2019.0100i. https://www.ingentaconnect.com/content/umrsmas/bullmar/pre-prints/content-bms_9623

Enochs IC, Formel N, Shea L, Chomiak L, Piggot A, Kirkland A, Manzello D (2020) Subsurface Automated Samplers (SAS) for ocean acidification research. Bulletin of Marine Science doi: 10.5343/bms.2020.0018. https://www.ingentaconnect.com/content/umrsmas/bullmar/pre-prints/content-bms_9619

Gravinese PM, **Enochs IC**, Manzello DP, van Woesik R (2019) Ocean acidification changes the vertical movement of stone crab larvae. Biology Letters, 15(12):20190414. doi: 10.1098/rsbl.2019.0414 2019. https://royalsocietypublishing.org/doi/10.1098/rsbl.2019.0414

Enochs IC, Manzello DP, Jones P, Stamates SJ, Carsey T (2019) Seasonal carbonate chemistry dynamics on southeast Florida coral reefs: localized acidification hotspots from navigational inlets. Frontiers in Marine Science. doi: 10.3389/fmars.2019.00160

Manzello DP, Matz MV, Enochs IC, Valentino L, Carlton R, Kolodziej G, Serrano X, Towle EK, Jankulak M (2019). Role of host genetics and heat-tolerant algal symbionts in sustaining populations of the endangered coral *Orbicella faveolata* in the Florida Keys with ocean warming. Global Change Biology 25(3): 1016-1031. doi.org/10.1111/gcb.14545 https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.14545

Hu X, Nuttall MF, Wang H, Yao H, Staryk CJ, McCutcheon MR, Eckert RJ, Embesi JA, Johnston MA, Hickerson EL, Schmahl GP, Manzello D, **Enochs IC**, DiMarco S, Barbero L (2018) Seasonal variability of carbonate chemistry and decadal changes in waters of a marine sanctuary in the Northwestern Gulf of Mexico, Marine Chemistry. doi.org/10.1016/j.marchem.2018.07.006. http://www.sciencedirect.com/science/article/pii/S0304420317303213

Enochs IC, Manzello DP, Jones PJ, Aguilar C, Cohen K, Valentino L, Schopmeyer S, Kolodziej G, Jankulak M, Lirman D (2018) The influence of diel carbonate chemistry fluctuations on the calcification rate of *Acropora cervicornis* under present day and future acidification conditions. *Journal of Experimental Marine Biology and Ecology*. doi.org/10.1016/j.jembe.2018.06.007. http://www.sciencedirect.com/science/article/pii/S0022098118300327

Perry CT, … **Enochs IC**, et al. (2018). Loss of coral reef growth capacity to track future increases in sea level. *Nature*. https://www.nature.com/articles/s41586-018-0194-z

Manzello DP, **Enochs IC**, Kolodziej G, Carlton R, Valentino L (2018) Resilience in carbonate production despite three coral bleaching events in 5 years on an inshore patch reef in the Florida Keys. *Marine Biology* 165. doi: 10.1007/s00227-018-3354-7 https://link.springer.com/article/10.1007/s00227-018-3354-7

Gintert BE, Manzello DP, **Enochs IC**, Koldziej G, Carlton R, Gleason A, Gracias N (2018) Marked annual coral bleaching resilience of an inshore patch reef in the Florida Keys: A nugget of hope, aberrance, or last man standing? Coral Reefs. doi: 10.1007/s00338-018-1678-x https://link.springer.com/article/10.1007/s00338-018-1678-x

Gravinese P, **Enochs IC**, Manzello DP, van Woesik R (2018) Warming and pCO_2 effects on Florida stone crab larvae. *Estuarine, Coastal and Shelf Science* 204:193-201. doi: 10.1016/j.ecss.2018.02.021 https://www.sciencedirect.com/science/article/pii/S0272771418300131

Groves SH, Holstein DM, **Enochs IC**, Kolodziej G, Manello DP, Brandt M, Smith TB (2018) Growth rates of *Porites astreoides* and *Orbicella franksi* in mesophotic habitats surrounding St. Thomas, US Virgin Islands. *Coral Reefs*. doi: 10.1007/s00338-018-1660-7. https://link.springer.com/article/10.1007/s00338-018-1660-7

Cyronak T, Andersson AJ… **Enochs IC**, … Yamamoto S (2018) Taking the metabolic pulse of the world's coral reefs. *PLos ONE* 13: e0190872. doi: 10.1371/journal.pone.0190872 http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0190872

Stanley C, Kaiser T, Gidley ML, **Enochs IC**, Jones PR, Goodwin KD, Sinigalliano CD, Sadowsky MJ, Chun CL (2017) Differential impacts of land-based sources of pollution on the microbiota of Southeast Florida coral reefs. *Applied and Environmental Microbiology*. doi:10.1128/AEM.03378-16 http://aem.asm.org/content/83/10/e03378-16.full

Kuffner IB, Bartels E, Stathakopoulos A, **Enochs IC**, Kolodziej G, Toth LT, Manzello DP (2017) Plasticity in skeletal characteristics of nursery-raised staghorn coral, *Acropora cervicornis*. *Coral Reefs*. doi: 10.1007/s00338-017-1560-2 https://link.springer.com/article/10.1007/s00338-017-1560-2

Enochs IC, Manzello DP, Kolodziej G, Noonan, SHC, Valentino L, Fabricius KE (2016) Enhanced macroboring and depressed calcification drive net dissolution at high-CO_2 coral reefs. *Proceedings of the Royal Society B* 283: 20161742. doi: dx.doi.org/10.1098/rspb.2016.1742 http://rspb.royalsocietypublishing.org/content/283/1842/20161742.article-info

Enochs IC, Manzello DP, Tribollet A, Valentino L, Kolodziej G, Donham EM, Fitchett MD, Carlton R, Price NN (2016) Elevated colonization of microborers at a volcanically acidified coral reef. *PLoS ONE* 11(7): e0159818. doi:10.1371/journal.pone.0159818; http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0159818

Camp EF, Smith DJ, Evenhuis C, **Enochs IC**, Manzello DP, Woodcock S, Suggett DJ (2016) Acclimatization to high-variance habitats does not enhance physiological tolerance of two key Caribbean corals to future temperature and pH. *Proceedings of the Royal Society B* 283: 20160442. doi: 10.1098/rspb.2016.0442; http://rspb.royalsocietypublishing.org/content/283/1831/20160442

Enochs IC, Manzello DP, Wishing HH, Carlton R, Serafy J (2015) Micro-CT analysis of the Caribbean octocoral *Eunicea flexuosa* subjected to elevated pCO_2. *ICES Journal of Marine Science* 73: 910–919. doi: 10.1093/icesjms/fsv159; http://icesjms.oxfordjournals.org/content/early/2015/09/12/icesjms.fsv159.abstract

Enochs IC, Manzello DP, Donham, EM, Kolodziej G, Okano R, *et al.* (2015) Shift from coral to macroalgae dominance on a volcanically acidified reef. *Nature Climate Change* 5: 1083-1088. doi:10.1038/nclimate2758; http://www.nature.com/nclimate/journal/v5/n12/full/nclimate2758.html

Enochs IC, Manzello DP, Carlton R, Graham DM, Ruzicka R, Colella MA (2015) Ocean acidification enhances the bioerosion of a common coral reef sponge: implications for the persistence of the Florida Reef Tract. *Bulletin of Marine Science* 91(2): 271-290. doi: 10.5343/bms.2014.1045; http://www.ingentaconnect.com/content/umrsmas/bullmar/2015/00000091/00000002/art00008

Manzello DP, **Enochs IC**, Kolodziej G, Carlton R (2015) Coral growth patterns of *Montastraea cavernosa* and *Porites astreoides* in the Florida Keys: the importance of thermal stress and inimical waters. *Journal of Experimental Marine Biology and Ecology* 471: 198-207. doi:10.1016/j.jembe.2015.06.010; http://www.sciencedirect.com/science/article/pii/S0022098115001665

Towle EK, **Enochs IC**, Langdon C (2015) Threatened Caribbean coral is able to mitigate the adverse effects of ocean acidification on calcification by increasing feeding rate. *PLoS ONE* 10(4): e0123394. doi:10.1371/journal.pone.0123394; http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0123394

Manzello DP, **Enochs IC,** Kolodziej G, Carlton R (2015) Recent decade of growth and calcification of *Orbicella faveolata* in the Florida Keys: an inshore-offshore comparison. *Marine Ecology Progress Series* 521: 81-89. doi:10.3354/meps11085; http://www.int-res.com/abstracts/meps/v521/p81-89/

Manzello DP, **Enochs IC,** Bruckner A, Renaud P, Kolodziej G, Carlton R, Glynn PW (2014) Galápagos coral reef persistence after ENSO warming across an acidification gradient. *Geophysical Research Letters* 41(24): 9001-9008. doi: 10.1002/2014GL062501; http://onlinelibrary.wiley.com/doi/10.1002/2014GL062501/abstract

Enochs IC, Manzello DP, Carlton R, Schopmeyer S, van Hooidonk R, Lirman D (2014) Effects of light and elevated pCO2 on the growth and photochemical efficiency of *Acropora cervicornis*. *Coral Reefs* 33(2): 477-485. doi: 10.1007/s00338-014-1132-7; http://link.springer.com/article/10.1007%2Fs00338-014-1132-7

Glynn PW, **Enochs IC**, Afflerbach JA, Brandtneris VW, Serafy JE (2014) Eastern Pacific reef fish responses to coral recovery following El Nino disturbances. *Marine Ecology Progress Series* 495: 233-247. doi: 10.3354/meps10594; http://www.int-res.com/abstracts/meps/v495/p233-247/

Manzello DP, **Enochs IC**, Musielewicz S, Carlton R, Gledhill D (2013) Tropical cyclones cause $CaCO_3$ undersaturation of coral reef seawater in a high-CO_2 world. *Journal of Geophysical Research*. 118(10): 5312-5321. doi: 10.1002/jgrc.20378; http://onlinelibrary.wiley.com/doi/10.1002/jgrc.20378/abstract

Bignami S, **Enochs IC**, Manzello DP, Sponaugle S, Cowen RK (2013) Ocean acidification alters the otoliths of a pan-tropical fish species with implications for sensory function. *Proceedings of the National Academy of Science* 110(18): 7366-7370. doi: 10.1073/pnas.1301365110; http://www.pnas.org/content/early/2013/04/10/1301365110.abstract

Enochs IC, Manzello DP (2012) Species richness of motile cryptofauna across a gradient of reef framework erosion. *Coral Reefs* 31(3): 653-661. doi: 10.1007/s00338-012-0886-z; http://www.springerlink.com/content/u0028qu2x0185120/fulltext.pdf

Enochs IC, Manzello DP (2012) Responses of cryptofaunal species richness and trophic potential to coral reef habitat degradation. *Diversity* 4(1): 94-104. doi: 10.3390/d4010094; http://www.mdpi.com/1424-2818/4/1/94/pdf

Enochs IC (2012) Motile cryptofauna associated with live and dead coral substrates: implications for coral mortality and framework erosion. *Marine Biology* 159(4): 709-722. doi: 10.1007/s00227-011-1848-7; http://www.springerlink.com/content/56373410812q7116/

Toth LT, Aronson RB, Vollmer SV, Hobbs JW, Urrengo DH, Cheng H, **Enochs IC**, Combosch DJ, van Woesik R, Macintyre IG (2012) ENSO drove 2500-year collapse of eastern Pacific coral reefs. *Science* 337(6090): 81-84. doi: 10.1126/science.1221168; http://www.sciencemag.org/content/337/6090/81

Manzello DP, **Enochs IC**, Melo N, Gledhill DK, Johns EM (2012) Ocean acidification refugia of the Florida Reef Tract. *PLoS ONE* 7(7): e41715. doi:10.1371/journal.pone.0041715; http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0041715

Enochs IC, Toth LT, Brandtneris VW, Afflerbach JA, Manzello DP (2011) Environmental determinants of motile cryptofauna on an eastern Pacific coral reef. *Marine Ecology Progress Series* 438: 105-118. doi: 10.3354/meps09259; http://www.int-res.com/articles/meps2011/438/m438p105.pdf

Glynn PW, Colley SB, Guzman HM, **Enochs IC**, Cortés J, Maté JL, Feingold JS (2011) Reef coral reproduction in the eastern Pacific: Costa Rica, Panamá and the Galápagos Islands (Ecuador). VI. Agariciidae, *Pavona clavus*. *Marine Biology* 158(7): 1601-1617. doi: 10.1007/s00227-011-1673-z; http://www.springerlink.com/content/0437704h4782243r/fulltext.pdf

Enochs IC, Hockensmith G (2009) The effects of coral mortality on the community composition of cryptic metazoans associated with *Pocillopora damicornis*. *Proceedings of the 11th International Coral Reef Symposium*. http://www.nova.edu/ncri/11icrs/proceedings/files/m26-08.pdf

Glynn PW, **Enochs IC**, McCosker JE, Graefe AN (2008) The First Record of a pearlfish, *Carapus mourlani* (Petit, 1934), inhabiting the aplysiid opisthobranch mollusc *Dolabella auricularia* (Lightfoot, 1786). *Pacific Science* 62(4): 593-601. doi: 0.2984/1534-6188(2008)62[593:FROAPC]2.0.CO;2; http://www.bioone.org/doi/abs/10.2984/1534-6188%282008%2962%5B593:FROAPC%5D2.0.CO;2

Glynn PW, Colley SB, Maté JL, Cortés J, Guzman HM, Bailey RL, Feingold JS, **Enochs IC** (2008) Reproductive ecology of the azooxanthellate coral *Tubastraea coccinea* in the Equatorial Eastern Pacific:

Part V. Dendrophylliidae. *Marine Biology* 153(4): 529-544. doi: 10.1007/s00227-007-0827-5; http://www.springerlink.com/content/20h52hw51lq378n5/

BOOKS, CHAPTERS, TECHNICAL REPORTS

Vardi T, Rankin TL, Oliver T, Moulding A, Parrish F, Moore T, **Enochs IC**, Viehman TS, Koss JL (2020) NOAA action plan on coral interventions. NOAA Tech. Memo. NMFS-F/SPO-208, 13 p. https://doi.org/10.25923/weyp-fy32

Belter M, … **Enochs IC**, …Viehman S (2020) Coral reef condition: A status report for the Flower Garden Banks. NOAA Technical Report, Coral Reef Conservation Program. Coral reef condition: A status report for Florida's coral reef. NOAA Technical Report, Coral Reef Conservation Program.

Alvarez A, … **Enochs IC**, …Williams S (2020) Coral reef condition: A status report for Puerto Rico. NOAA Technical Report, Coral Reef Conservation Program.

Donovan C, … **Enochs IC**, …Viehman S (2020) 2020 Status report scoring methodology for Atlantic jurisdictions. NOAA Technical Report, Coral Reef Conservation Program.

Blondeau J, … **Enochs IC**, …Viehman S (2020) Coral reef condition: A status report for the US Virgin Islands. NOAA Technical Report, Coral Reef Conservation Program.

Enochs IC, Manzello DP, Towle E, Bruckner A, Tomczuk J, Edwards P (2020) Florida Keys and Caribbean region ocean acidification research. In: Jewett E, Osborne E, Wanninkhof R, DeAngelo B, Arzayus K, Osgood K (eds.) Ocean Acidification , NOAA ocean acidification research plan 2020-2029

Glynn PW, Manzello DP, **Enochs IC** (2016) Coral reefs of the eastern tropical Pacific: Persistence and loss in a dynamic environment. Springer. 931 p.

Enochs IC, Glynn PW (2016) Corallivory in the eastern Pacific. In: Glynn PW, Manzello DP, Enochs IC (eds.) Coral reefs of the eastern tropical Pacific: Persistence and loss in a dynamic environment. Springer

Enochs IC, Glynn PW (2016) Trophodynamics of eastern Pacific coral reefs. In: Glynn PW, Manzello DP, Enochs IC (eds.) Coral reefs of the eastern tropical Pacific: Persistence and loss in a dynamic environment. Springer

Cortés J, **Enochs IC**, Sibjaja-Cordero J, Hernández L, Alvarado JJ, Breedy O, Cruz-Barraza JA, Esquivel-Garrote O, Fernández-García C, Hermosillo A, Kaiser KL, Medina-Rosas P, Morales-Ramírez A, Pacheco C, Reyes-Bonilla H, Riosmena-Rodríguez R, Sánchez-Noguera C, Zapata FA, Wieters E, Pérez-Matus A (2016) Marine biodiversity of eastern tropical Pacific coral reefs. In: Glynn PW, Manzello DP, Enochs IC (eds.) Coral reefs of the eastern tropical Pacific: Persistence and loss in a dynamic environment. Springer

Glynn PW, **Enochs IC** (2010) Invertebrates and their roles in coral reef ecosystems. In: Z. Dubinsky, Stambler, N. (eds.) Coral reefs: an ecosystem in transition. Springer. pp 273-326.