

## CURRICULUM VITAE

### PERSONAL

Name: Justin B. Ries, Ph.D.  
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### EDUCATION

Ph.D.	2005	Biogeochemistry	The Johns Hopkins University
M.A.	2002	Biogeochemistry	The Johns Hopkins University
B.A. (abroad)	1996	Geosciences	Edinburgh University
B.A.	1998 (GPA 3.87/4.00)	Geosciences/Studio Art	Franklin and Marshall College
		Magna cum Laude	

### PROFESSIONAL EXPERIENCE

2013-present: *Associate Professor*, Northeastern University  
2015-2016: *Visiting Scientist*, Leibniz Zentrum für Marine Tropenökologie  
2013: *Associate Professor*, The University of North Carolina – Chapel Hill  
2008-2013: *Assistant Professor*, The University of North Carolina – Chapel Hill  
2007-2008: *Postdoctoral Scholar*, The Woods Hole Oceanographic Institution  
2006: *Postdoctoral Fellow*, The California Institute of Technology  
2005-2006: *Postdoctoral Fellow*, The Johns Hopkins University  
2005-2006: *Visiting Scientist*, The University of Maryland Center for Marine Biotechnology  
2004-2006: *Teaching Fellow*, The Johns Hopkins University  
2000-2004: *Teaching Assistant*, The Johns Hopkins University  
1999-2000: *Financial Analyst*, Constellation Power Source (Goldman Sachs/CEG joint venture)

### AWARDS AND HONORS

2017-2018 Nominated for and inducted into Northeastern ReDI Leadership Program  
2015-2016 Hanse Fellowship, Hanse-Wissenschaftskolleg (Delmenhorst, Germany)  
2013 Tenure, Northeastern University  
2013 Tenure, University of North Carolina at Chapel Hill  
2013 Nominated for the Max Planck Research Award (Alexander von Humboldt Foundation)  
2011 Appointed to editorial board of AGU journal *Global Biogeochemical Cycles*  
2010 2009 *Geology* paper “Marine calcifiers exhibit mixed responses to CO<sub>2</sub>-induced ocean acidification” recognized by Thomson Reuters News Agency as one of most cited papers of 2010 (“Hot new paper” designation)  
2010 RJ Reynolds/UNC-CH Junior Faculty Development Award  
2007 – 2008 WHOI Ocean and Climate Change Postdoctoral Scholar Fellowship  
2004 – 2005 Howard Hughes Teaching Fellowship  
2003, 2001 J. Brien Key Award  
2002 Sigma Xi Award

1998 Phi Beta Kappa Honor Society  
1998 Nancy Juerges Geomorphology Award  
1994 – 1998 John Marshall Scholar  
1996 – 1997 Dana Scholar

## **BIBLIOGRAPHY (2002 – present, \*indicates student or postdoc)**

### **Articles in refereed journals**

\*Anagnostou, E., Williams, B., \*Westfield, I., Foster, G.L., **Ries, J.B.**, Calibration of the pH- $\delta^{11}\text{B}$  and temperature-Mg/Li proxies in the long-lived high-latitude crustose coralline red alga *Clathromorphum compactum* via controlled laboratory experiments, *Geochimica et Cosmochimica Acta*, *in review*.

Baumann, J., **Ries, J.B.**, Rippe, J., \*Courtney, T, Aichelman, H., \*Westfield, I., Castillo, K.D., Nearshore corals on the Mesoamerican Barrier Reef System on pace to cease growing as soon as year 2110, *Scientific Reports*, *in review*.

Liu, Y.-W., Eagle, R.A., Aciego, S.M., Gilmore, R.E., **Ries, J.B.**, 2018, A coastal coccolithophore maintains pH homeostasis and switches carbon sources in response to ocean acidification, *Nature Communications* 9: 2857. doi: 10.1038/s41467-018-04463-7

\*Davies S.W., **Ries J.B.**, Marchetti, A. Castillo, K.D., 2018, Symbiodinium functional diversity in the coral *Siderastrea siderea* is influenced by thermal stress and reef environment, but not ocean acidification, *Frontiers in Marine Science* 5: 150. doi: 10.3389/fmars.2018.00150

Dellinger, M., West, A.J., Paris, G., Adkins, J.F., von Strandmann, P.P., Ullman, C.V., Eagle, R.A., Freitas, P., Bagard, M-L., **Ries, J.B.**, Corsetti, F.A., Perez-Huerta, A., Kampf, A.R., 2018, The Li isotope composition of marine biogenic carbonates: patterns and mechanisms, *Geochimica et Cosmochimica Acta* 236: 315–335. doi: 10.1016/j.gca.2018.03.014

Fowell, S., Foster, G.L, **Ries, J.B.**, Castillo, K.D., de la Vega, E., Tyrrell, T., Donald, H.K., Chalk, T.B., 2018, Historical trends in pH and carbonate biogeochemistry on the Belize Mesoamerican Barrier Reef System, *Geophysical Research Letters* 45: 3228–3237. doi: 10.1002/2017GL076496

Sutton, J.N., Liu, Y.-W., **Ries, J.B.**, Guillermic, M., Ponzevera, E., Eagle, R.A., 2018,  $\delta^{11}\text{B}$  as monitor of calcification site pH in divergent marine calcifying organisms, *Biogeosciences* 15: 1447-1467. doi: 10.5194/bg-15-1447-2018.

Donald, H.K., **Ries, J.B.**, Stewart, J.A., Fowell, S.E., Foster, G.L., 2017, Boron isotope sensitivity to seawater pH change in a species of *Neogoniolithon* coralline red alga. *Geochimica et Cosmochimica Acta* 217: 240-253. doi: 10.1016/j.gca.2017.08.021

Fowell, S.E., Sandford, K., Stewart, J. A., Castillo, K.D., **Ries, J.B.**, Foster, G.L., 2016, Intrareef variations in Li/Mg and Sr/Ca sea surface temperature proxies in the Caribbean reef-building coral *Siderastrea siderea*. *Paleoceanography* 31: PA002968. doi: 10.1002/2016PA002968.

Lebrato, M., Andersson, A.J., **Ries, J.B.**, Aronson, R.B., Lamare, M.D., Koeve, W., Oschlies, A., Iglesias-Rodriguez, M.D., Thatje, S., Amsler, C., Vos, S.C., Jones, D.O.B., Ruhl, H.A., Gates, A.R., McClintock, J.B., 2016, Benthic marine calcifiers coexist with CaCO<sub>3</sub>-undersaturated seawater worldwide. *Global Biogeochemical Cycles* 30: 1038–1053. doi: 10.1002/2015GB005260.

Edmunds, P.J., Comeau, S., Lantz, C., Andersson, A., Briggs, C., Cohen, A., Gattuso, J-P, Grady, J., Gross, K., Johnson, M., Muller, E., **Ries, J.B.**, Tambutté, S., Tambutté, E., Venn, A., Carpenter, R.C., 2016, Integrating the effects of ocean acidification across functional scales on tropical coral reefs. *BioScience* 66: 350–362. doi: 10.1093/biosci/biw023

\*Davies S.W., Marchetti, A., **Ries J.B.**, Castillo, K.D., 2016, Thermal and pCO<sub>2</sub> stress elicit divergent transcriptomic responses in a resilient coral. *Frontiers in Marine Science* 3: 112. doi: 10.3389/fmars.2016.00112

**Ries, J.B.**, \*Ghazaleh, M.N., \*Connolly, B., \*Westfield, I., Castillo, K.D., 2016, Impacts of ocean acidification and warming on the dissolution kinetics of whole-shell biogenic carbonates. *Geochimica et Cosmochimica Acta* 192: 318–337. doi: 10.1016/j.gca.2016.07.001

\*Horvath, K.M., **Ries, J.B.**, \*Castillo, K.D., \*Westfield, I.T., \*Armstrong, P., \*Courtney, T., 2016, Next-century ocean acidification and warming both reduce calcification rate, but only acidification alters skeletal morphology of reef-building coral *Siderastrea siderea*. *Scientific Reports* 6: 29613. doi: 10.1038/srep29613

Tripathi, A.K., Hill, P.S., Eagle, R.A., Mosenfelder, J.L., Tang, J., Schauble, E.A., Eiler, J.M., Zeebe, R.E., Uchikawae, J., Coplen, T.B., **Ries, J.B.**, Henry, D., 2015, Beyond temperature: Clumped isotope signatures in dissolved inorganic carbon species and the influence of solution chemistry on carbonate mineral composition. *Geochimica et Cosmochimica Acta* 166: 344–371. doi: 10.1016/j.gca.2015.06.021

\*Courtney, T., **Ries, J. B.**, 2015, Impact of atmospheric pCO<sub>2</sub>, seawater temperature, and calcification rate on the δ<sup>18</sup>O and δ<sup>13</sup>C composition of echinoid calcite (*Echinometra viridis*). *Chemical Geology* 411: 228–239. doi: 10.1016/j.chemgeo.2015.06.030

Dodd, L.F., Grabowski, J.H., Piehler, M.F., \*Westfield, I., **Ries, J.B.**, 2015, Ocean acidification impairs crab foraging behaviour. *Proceedings of the Royal Society of London B* 282: 20150333. doi: 10.1098/rspb.2015.0333

\*Castillo K.D., **Ries J.B.**, Bruno J.F., \*Westfield I.T., 2014, The reef-building coral *Siderastrea siderea* exhibits parabolic responses to ocean acidification and warming, *Proceedings of the Royal Society of London B* 281: 20141856. doi: 10.1098/rspb.2014.1856

Lebrato, M., McClintock, J.B., Amsler, M.O., **Ries, J.B.**, Egilsdottir, H., Lamare, M., Amsler, C.D., Challener, R.C., Schram, J.B., Mah, C.L., Cuce, J., Baker, B.J., 2013, From the Arctic to the Antarctic: The major, minor, and trace elemental composition of echinoderm skeletons, *Ecology* 94: 1434.

\*Courtney, T., **Ries, J. B.**, \*Westfield, I., 2013, CO<sub>2</sub>-induced ocean acidification impairs calcification in the tropical urchin *Echinometra viridis*, *Journal of Experimental Marine Biology and Ecology* 440: 169-175. doi: 10.1016/j.jembe.2012.11.013

Eagle, R.A., Eiler, J.M., Tripathi, A.K., **Ries, J.B.**, Freitas, P.S., Hiebenthal, C., Wanamaker Jr., A.D., Taviani, M., Elliot, M., Marensi, S., Nakamura, K., Ramirez, P., Roy, K., 2013, The influence of temperature and seawater carbonate saturation state on <sup>13</sup>C-<sup>18</sup>O bond ordering in bivalve mollusks, *Biogeosciences* 10: 4591–4606.

**Ries, J.B.**, 2012, A sea butterfly flaps its wings. *Nature Geosciences* 5: 845–846. (*invited*)

\*Castillo, K. D., **Ries, J. B.**, Weiss, J. M., Lima, F. P., 2012, Decline of forereef corals in response to warming linked to history of thermal exposure, *Nature Climate Change* 2: 756-760. doi:10.1038/nclimate1577

Honisch, B., Ridgwell, A., Schmidt, D., Thomas, E., Gibbs, S., Sluijs, A., Zeebe, R., Kump, L., Martindale, R., Greene, S., Kiessling, W., **Ries, J.**, Zachos, J., Royer, D., Barker, S., Marchitto, T., Moyer, R., Pelejero, C., Ziveri, P., Foster, G., Williams, B., 2012, The geologic record of ocean acidification, *Science* 335: 1058-1063.

**Ries, J.B.**, 2011, Acid ocean cover up. *Nature Climate Change* 1: 294–295. doi:10.1038/nclimate1204 (*invited*)

**Ries, J.B.**, 2011, Skeletal mineralogy in a high-CO<sub>2</sub> world. *Journal of Experimental Marine Biology and Ecology* 403: 54-64.

**Ries, J.B.**, 2011, A physicochemical framework for interpreting the biological calcification response to CO<sub>2</sub>-induced ocean acidification. *Geochimica et Cosmochimica Acta* 75: 4053-4064.

\*Castillo, K.D., **Ries, J.B.**, Weiss, J.M., 2010, Declining coral skeletal extension for forereef colonies of *Siderastrea siderea* on the Mesoamerican Barrier Reef System, southern Belize. *PLoS ONE* 6 (2): e14615. doi:10.1371/journal.pone.0014615.

**Ries, J.B.**, Cohen, A.L., McCorkle, D.C., 2010, A nonlinear calcification response to CO<sub>2</sub>-induced ocean acidification by the coral *Oculina arbuscula*, *Coral Reefs* 29: 661-674.

**Ries, J.B.**, 2010, Geological and experimental evidence for secular variation in seawater Mg/Ca (calcite-aragonite seas) and its effects on marine biological calcification. *Biogeosciences* 7: 2795–2849.

Stanley, S.M., **Ries, J.B.**, Hardie, L.A., 2010, Increased production of calcite and slower growth for the major sediment-producing alga *Halimeda* as the Mg/Ca ratio of seawater is lowered to a “calcite sea” level, *Journal of Sedimentary Research* 80: 6-16.

**Ries, J.B.**, Cohen, A.L., McCorkle, D.C., 2009, Marine calcifiers exhibit mixed responses to CO<sub>2</sub>-induced ocean acidification. *Geology* 34: 1131-1134.

**Ries, J.B.**, 2009, Effects of secular variation in seawater Mg/Ca ratio (calcite–aragonite seas) on CaCO<sub>3</sub> sediment production by the calcareous algae *Halimeda*, *Penicillus* and *Udotea* – evidence from recent experiments and the geological record. *Terra Nova* 21:323-339.

**Ries, J.B.**, Fike, D.A., Pratt, L.M, Lyons, T.W., and Grotzinger, J.P., 2009, Super-heavy pyrite ( $\delta^{34}\text{S}_{\text{pyr}} > \delta^{34}\text{S}_{\text{CAS}}$ ) in the terminal Proterozoic Nama Group, Southern Namibia: A consequence of low seawater sulfate at the dawn of animal life. *Geology* 37 (8): 743-746.

**Ries, J.B.**, 2008, Seeing changes in a changing sea. *Nature Geosciences* 1: 497-498. (*invited*)

**Ries, J.B.**, Anderson, M.A., Hill, R.T., 2008, Seawater Mg/Ca controls polymorph mineralogy of microbial CaCO<sub>3</sub>: A potential proxy for calcite-aragonite seas in Precambrian time. *Geobiology* 6: 106-119.

**Ries, J.B.**, Stanley, S.M., Hardie, L.A., 2006, Scleractinian corals produce calcite, and grow more slowly, in artificial Cretaceous seawater. *Geology* 34 (7): 525-528.

**Ries, J.B.**, 2006, Mg fractionation in crustose coralline algae: Geochemical, biological, and sedimentological implications of secular variation in the Mg/Ca ratio of seawater. *Geochimica et Cosmochimica Acta* 70: 891-900.

**Ries, J.B.**, 2006, Aragonitic algae in calcite seas: effect of seawater Mg/Ca on codiacean biomineralization. *Journal of Sedimentary Research* 76: 515-523.

**Ries, J.B.**, 2005, Aragonite production in calcite seas: effect of seawater Mg/Ca ratio on the calcification and growth of the calcareous alga *Penicillus capitatus*. *Paleobiology* 31 (3): 449-462.

Stanley, S.M., **Ries, J.B.**, Hardie, L.A., 2005, Seawater chemistry, coccolithophore population growth, and the origin of Cretaceous chalk. *Geology* 33 (7): 593-596.

**Ries, J.B.**, 2004, The effect of ambient Mg/Ca on Mg fractionation in calcareous marine invertebrates: A record of Phanerozoic Mg/Ca in seawater. *Geology* 32 (11): 981-984.

Stanley, S.M., **Ries, J.B.**, Hardie, L.A., 2002, Low-magnesium calcite produced by coralline algae in seawater of Late Cretaceous composition. *Proceedings of the National Academy of Sciences* 99 (24): 15323-15326.

### **Abstracts**

Eagle, R., Liu, Y-W, Guillermic, M., Sutton, J.N., DeCorte, I.A., Bove, C., \*Cameron, L., Misra, S., **Ries, J.B.**, 2018, Combining multiple isotope tracers and cellular biological approaches to study the biomineralizing environment of marine calcifying organisms, American Geophysical Union Annual Meeting, Washington D.C.

Ulrich, R.N., Trainer, J.S., Gentile, L.C., Bricker, H.L., Pham, C.M., Tripathi, A.K., **Ries, J.B.**, Eagle, R., 2018, Searching for Disequilibrium: Clumped Isotope and Stable Carbon and Oxygen Isotope Signatures in Cultured Biogenic Marine Carbonates, American Geophysical Union Annual Meeting, Washington D.C.

Williams, B., Chan, P.T.W, **Ries, J.B.**, \*Westfield, I.T., Halfar, J., Adey, W., 2018, Impact of changing environmental conditions on a high-latitude coralline algae climate proxy archive, American Geophysical Union Annual Meeting, Washington D.C.

Williams, B., Williams, S., \*Anagnostou, E., **Ries, J.B.**, \*Westfield, I., Halfar, J., Rasher, D., Adey, W., 2018, Refining the Mg/Ca-temperature proxy in crustose coralline algae: a case study in the genus *Clathromorphum*, Goldschmidt Annual Meeting, Boston, MA.

\*Anagnostou, E., Williams, B., Moffa-Sanchez, P., Foster, G.L., **Ries, J.B.**, 2018, Reconstruction of northern latitude seawater temperature and pH from the Li/Mg ratio and boron isotopic composition of the coralline alga *Clathromorphum compactum*, Goldschmidt Annual Meeting, Boston, MA.

\*Cameron, L., Grabowski, J., **Ries, J.B.**, 2018, The impacts of ocean acidification and warming on calcification and tissue condition of Atlantic Sea Scallops, Annual Meeting of the American Fisheries Society, Atlantic City, NJ

\*Gunnell, J.R., \*Westfield, I.T., \*Courtney, T., Baumann, J., Castillo, K.D., **Ries, J.B.**, 2018, Reconstructing the past century of seawater temperature across the Caribbean Mesoamerican Barrier Reef System from multi-elemental coral paleothermometry, Ocean Sciences Meeting, Portland, OR.

\*Westfield, I.T., \*Gunnell, J.R., Rasher, D.B., Williams, B., **Ries, J.B.**, 2018, Acidification and warming negatively impact calcification rate, skeletal microstructure, and strength of two ecologically important species of subarctic coralline algae (*Clathromorphum compactum*; *Clathromorphum nereostratum*), Ocean Sciences Meeting, Portland, OR.

Eagle, R., DeCorte, I.A., \*Cameron, L., Guillermic, M., Misra, S., Sadekov, A., Bove, C., **Ries, J.B.**, 2018, Combining microelectrode and geochemical approaches to study the impact of  $p\text{CO}_2$  and temperature changes on the internal pH and carbonate chemistry of corals and their relation to growth responses, Ocean Sciences Meeting, Portland, OR.

\*Cameron, L., Grabowski, J., **Ries, J.B.**, 2018, The impacts of ocean acidification and warming on Georges' Bank Atlantic Sea Scallops, Ocean Sciences Meeting, Portland, OR.

Stuhr, M., Reymond, C., Blank-Landeshammer, B., **Ries, J.B.**, Westphal, H., 2017, Combined ocean acidification and warming induce complex compartment-specific proteomic responses in photosymbiont-bearing calcifiers, European Coral Reef Symposium, Oxford, England.

\*Cameron, L., Reymond, C., Mueller-Lundin, F., \*Westfield, I., Buscher, J., Schmidt, G., Westphal, H., DeBeer, D., **Ries, J.B.**, 2017, The roles of temperature and calcification site pH in corals' calcification response to ocean acidification, European Coral Reef Symposium, Oxford, England.

\*Anagnostou, E., Williams, B., Moffa-Sanchez, P., Foster, G.L., Adey, W.H., \*Westfield, I., **Ries, J.B.**, 2017, Reconstructing Northern North Atlantic sea ice, temperature, seawater pH and carbon cycle interactions through the Common Era from Li/Mg and  $\delta^{11}\text{B}$  in long-lived coralline algae, Goldschmidt Annual Meeting.

Liu, Y-W, Eagle, R.A., Sutton, J.N., **Ries, J.B.**, 2017, Marine calcifying organisms exhibit highly differential regulation of pH at site of calcification in response to CO<sub>2</sub>-induced ocean acidification, Goldschmidt Annual Meeting.

Boulton J., Knowlton A.C., Davies, S.W., Bove, C.B., **Ries J.B.**, and Castillo, K.D., 2017, Coral and associated symbiont physiologies are resilient to changes in *p*CO<sub>2</sub> but are negatively affected by temperature stress, 46th Benthic Ecology Meeting, Coastal Carolina University, Myrtle Beach, SC.

\*Cameron, L., Grabowski, J., and **Ries, J.B.**, 2017, Ocean acidification and warming have a synergistic negative effect on the calcification rate and mortality of Atlantic Sea Scallops. 46th Benthic Ecology Meeting, Coastal Carolina University, Myrtle Beach, SC.

Baumann J., \*Courtney T., Rippe, J.P., Aichelman, H., **Ries J.B.**, Castillo K.D., 2017, Historical decline of coral growth rates over the last century varies by reef zone in Belize. 46th Benthic Ecology Meeting, Coastal Carolina University, Myrtle Beach, SC.

Bove, C.B., **Ries J.B.**, Davies S.W., Westfield I.T., Castillo K.D., 2017, Acidification and warming impair calcification and survivorship of Caribbean corals. 46th Benthic Ecology Meeting, Coastal Carolina University, Myrtle Beach, SC.

Cobleigh, K.A., Foguel, A.D., Roycroft, M.V., Armstrong, P., Davies, S.W., **Ries, J.B.**, Castillo, K.D., 2017, Warming and acidification impact corallite morphology but backreef corals are less susceptible. 46th Benthic Ecology Meeting, Coastal Carolina University, Myrtle Beach, SC.

Foster, G.L., Fowell, S., de la Vega, E., Tyrrell, T., Castillo, K.D., **Ries, J.B.**, Donald, H.K., Chalk, T.B., 2017, Insights into the "health" of tropical coral reefs from coupled boron and carbon isotopes in coral skeleton, Goldschmidt Annual Meeting.

Cameron, L., Reymond, C., Westfield, I., Mueller-Lundin, F., Fink, A., Hardenberg, S., Westphal, H. De Beer, D., **Ries, J. B.**, 2016, A comparison of coral and mollusk calcification strategies under future ocean acidification scenarios, American Geophysical Union Annual Meeting, San Francisco, CA.

DeCorte, I., Liu, Y-W., Doss, W., **Ries, J.B.**, Eagle, R.E., 2016, A multi-proxy investigation into the biomineralization pathways of benthic invertebrate taxa, American Geophysical Union Annual Meeting, San Francisco, CA.

Garlick-Ott, K., Williams, B., Chan, P., Westfield, I., Rasher, D., **Ries, J.B.**, 2016, Response of high latitude coralline algae to *p*CO<sub>2</sub> and thermal stress, American Geophysical Union Annual Meeting, San Francisco, CA.

Cameron, L., Reymond, C., Büscher, J., Schmidt, G., Westfield, I., Mueller-Lundin, F., Hardenberg, S., Westphal, H., De Beer, D., **Ries, J.B.**, 2016, Impact of ocean acidification and warming on net calcification rate and calcifying fluid dynamics of the cold water coral *Lophelia pertusa*, 6<sup>th</sup> International Symposium on Deep-Sea Corals, Boston, Massachusetts.

**Ries, J.B.**, Gonzalez-Roubaud, C., Douville, E., Montagna, P., 2016, Seawater pH at the advent of metazoan calcification, European Geophysical Union, Vienna, Austria.

Donald, H.K., **Ries, J.B.**, Stewart, J.A., Foster, G.L., Boron isotope sensitivity to pH in coralline red algae (*Neogoniolithon* sp.), 2016, Geochemistry Group Research in Progress Meeting 2016, The Geochemistry Group of the Mineralogical Society and the Geological Society, Leeds, England.

Liu, Y-W, Tripathi, R.E., Aciego, S.M., Gilmore, R.E., **Ries, J.B.**, 2016, Combined  $\delta^{11}\text{B}$ ,  $\delta^{13}\text{C}$ , and  $\delta^{18}\text{O}$  analyses of coccolithophore calcite constrains the response of coccolith vesicle carbonate chemistry to  $\text{CO}_2$ -induced ocean acidification, European Geophysical Union, Vienna, Austria.

Bove C.B., **Ries J.B.**, Davies S.W., Westfield I.T., Castillo K.D., 2016, Effects of ocean warming and  $\text{CO}_2$ -induced acidification on calcification of four Caribbean reef-building corals. International Coral Reef Symposium, Honolulu, Hawaii.

Davies S.W., Marchetti A., **Ries J.**, Castillo K.D., 2016, Acclimatization capacity of a coral-algal symbiotic partnership to long-term warming and acidification. International Coral Reef Symposium, Honolulu, Hawaii.

Cobleigh, K., Foguel, A., Roycroft, M., Armstrong, P., Davies, S.W., **Ries, J.B.**, Castillo, K.D., 2016, Effects of temperature and  $\text{CO}_2$ -induced ocean acidification on skeletal morphology of the reef-building coral *Siderastrea siderea*. International Coral Reef Symposium, Honolulu, Hawaii.

Dellinger, M., West, A., Adkins, J., Paris, G., Freitas, P., Bagard, M-L, **Ries, J.**, Corsetti, F., Von Strandmann, P., Ullmann, Clemens, 2015, The Li isotope composition of modern biogenic carbonates. American Geophysical Union Annual Meeting, San Francisco, CA.

Doss, W., Eagle, R., **Ries, J.**, 2015, Trace elements in calcifying marine invertebrates indicate diverse sensitivities to the seawater carbonate system. American Geophysical Union Annual Meeting, San Francisco, CA.

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Fowell S., Foster G, **Ries J**, \*Castillo K, Stewart J, 2014, Reconstruction of Caribbean sea surface temperatures using the skeletal elemental composition of the coral *Siderastrea siderea*. American Geophysical Union Annual Meeting, San Francisco, CA.

\*Courtney T., Baumann J., Foguel A.D., \*Horvath K., \*Westfield I., \*Castillo K.D., **Ries J.B.**, 2014, Characterizing 20th century growth trends of the scleractinian coral *Siderastrea siderea* throughout the Belize barrier reef and atoll system. 43rd Benthic Ecology Meeting, University of North Florida, Jacksonville, FL.

Borszcz T., **Ries J.B.**, \*Westfield, I.T, 2014, The synergies of stress: Crossed-effect experiment on echinoids reveals complexity of echinoid skeletal responses to simultaneous biotic and abiotic changes in past and future oceans. European Echinoderm Colloquium.

Wang, Z., **Ries, J.B.**, Liu, C., 2013, Novel calcite-aragonite sea transition in the terminal Proterozoic. Goldschmidt Annual Meeting.

\*Horvath K., \*Connelly B., \*Westfield I., \*Chow E., \*Castillo K., **Ries J.**, 2013, Calcification rates of the Caribbean reef-building coral *Siderastrea siderea* adversely affected by both seawater warming and  $\text{CO}_2$ -induced ocean acidification. American Geophysical Union, Meeting of the Americas Conference.

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**Ries, J.B.**, Cohen, A.L., McCorkle, D.C. 2009. The varied responses of marine biocalcifiers to *p*CO<sub>2</sub>-induced ocean acidification. Skidaway Institute of Oceanography Symposium on Chemical Oceanography, Abstract no. 10.

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**Ries, J.B.**, D. Merritts, D.J. Harbor, T. Gardner, P.A. Erickson and M. Carlson. 1998. Increased rates of fluvial bedrock incision in the Central Appalachian Mountains, Virginia. Geological Society of America Abstracts with Program 30(7):140.

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### **Patents**

Constantz, B.R., Farsad, K., Camire, C., Patterson, J., Ginder-Vogel, M., Yaccato, K., Stagnaro, J., Devenney, M., **Ries, J.B.**, 2012, US Patent No. 8,137,455, Methods and compositions using calcium carbonate (C), 103 p.

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### **Other works**

Browman, H.I., Dupont, S., Havenhand, J., Robbins, L., Beman, M., Duarte, C., Fine, M., Fossa, J.H., Hall-Spencer, J., Hallock-Muller, P., Hurst, T.P., Iglesias-Rodriguez, D., Knorr, P., Kurihara, H., Lisle, J., Manno, C., McCoy, S., Melzner, F., Munday, P., Pörtner, H.-O., **Ries, J.**, Robert, D., Runge, J., Scott, D., Skjoldal, H.R., Suzuki, K., Thingstad, F., Wootton, T., 2013, Ch. 3: Biological responses to ocean acidification *in* AMAP Assessment 2013: Arctic Ocean Acidification. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway, 99 p.

**Ries, J.B.**, 2010, Shell-shocked: How different creatures deal with an acidifying ocean. *Earth Magazine*, 55 (3): 46-53.

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<http://www.bangordailynews.com/story/Opinion/Gulf-of-Maine-changing,150853>.

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**Ries, J.B.** 2005. Experiments on the effect of secular variation in seawater Mg/Ca (calcite and aragonite seas) on calcareous biomineralization. Johns Hopkins University Ph.D. dissertation thesis, 235 p.

### **CREATIVE ACTIVITY**

#### **Film**

"Researchers study coral growth in Mesoamerican barrier reef," by Rob Holliday. *UNC News*, May 2011  
(<http://www.youtube.com/watch?v=nvy7hFhiMZU>)

#### **Public Radio**

"The Mortal Sea," by Tom Ashbrook. *On Point – National Public Radio*, April 2013.

"Pollution tilts undersea arms race," by Tom Pelton. *The Environment in Focus – Maryland Public Radio*, May 2012.

"Giant lobsters from rising greenhouse gases?" by Guy Raz. *All Things Considered – National Public Radio*, December 2009.

#### **Selected popular press about my research**

"Great Barrier Reef bleaching endangers precious resources", by Thea Singer, *News @ Northeastern*, March 2017.

"Future ocean acidification to expose over half of marine calcifiers to dissolution," *Northeastern.edu*, November 2016.

"New insights into the impacts of ocean acidification," *Science Daily*, September 2016.

"As atmospheric CO<sub>2</sub> rises, crabs have harder time opening oysters," *Northeastern.edu*, February 2016.

"Changing waters complicate NC's coastal ecology," by Jared Brumbaugh, *News and Observer*, November 2015.

"Urchin isotope composition can shed light on past oceanographic conditions," *Northeastern.edu*, October 2015.

"Using living boulders to reconstruct the history of ocean acidification," *Northeastern.edu*, April 2015.

"MSC faculty member receives prestigious German fellowship," by Val Perini, *Northeastern.edu*, December 2014.

"A slightly more acidic ocean may help coral species," by Joe O'Connell, *News @ Northeastern*, November 2014.

"Deep water data," by Angela Herring, *News @ Northeastern*, September 2013.

"How corals can actually benefit from climate change effects," *Phys.Org*, November 2014.

"Acidic Chesapeake Bay Water could threaten oyster," *Fox News*, February 2014.

"Ocean acidification: Making sense of crabs and skeptics," by Joe Eaton, *Bay Nature*, October 2013.

"Crabs, supersized by carbon pollution, may upset Chesapeake's balance," by Darryl Fears. *The Washington Post*, April 2013.

"Pollution tilts undersea arms race," by Tom Pelton. *The Environment in Focus – Maryland Public Radio*, May 2012.

"Crab vs. Oyster: As Acidity Increases, Some Species May Win and Others Lose," by Jeffrey Brainard. *Chesapeake Quarterly*, March 2012

"Diving deep into coral science: UNC marine biologist explores offshore in Belize to learn why coral health has declined," by Tyler Dukes. *Raleigh News and Observer/Charlotte Observer*, April 2011

"Unexplained Explosion" by Mark Derewicz, *Endeavors Magazine (UNC)*, December 2009

"Shell game," by Roberta Kwok. *Conservation Magazine*, March 2010

"Giant lobsters from rising greenhouse gases?" by Guy Raz. *All Things Considered – National Public Radio*, December 2009.

"Ocean acidification: a risky shell game – How will climate change affect the shells and skeletons of sea life?" by Kate Madin. *Oceanus*, December 2009

"Acidic oceans may be a boon for some marine dwellers," by DeLene Beeland. *Science*, December 2009

"Consider the lobster," by Olive Heffernan. *Nature – Climate Change*, December 2009

"At Copenhagen global warming conference, alarms on ocean acidification" by Peter Spotts. *Christian Science Monitor*, December 2009.

"Climate change creates shell-size surprise," by Daniel Cressey. *Nature*, December 2009

"Some lobsters, crabs withstand ocean's CO<sub>2</sub> increases," by Dan Vergano. *USA Today*, December 2009

"Acid ocean test looks to the past," by DeLene Beeland. *Science in the Triangle*, December 2009

"Extra carbon dioxide bulks up lobsters," by Sarah Everts. *Chemical and Engineering News*, December 2009

"Off-balance ocean," by Rachel Petkewich. *Chemical and Engineering News*, February 2009

"The many dangers of greenhouse gases," by Richard Kerr. *Science*, January 2009

"Marine calcifiers in a high-CO<sub>2</sub> ocean," by Victoria Fabry. *Science*, April 2008.

"Surprise! Corals switch their skeleton as seawater changes," by Lisa DeNike. *The Gazette*, July 2006

"Corals adapt to sea change," by Carolyn Gramling. *Geotimes*, September 2006.

"Corals undergo sea change," by Ken Ferguson. *Frontiers in Ecology and the Environment*, August 2006.

"Coral polyps can adjust skeletons to water chemistry," by Sara Goudarzi. *FOXNews.com*, July, 2006.

"Sea change: skeletons of ancient corals different from today's," by Lisa DeNike. *The Gazette*, November 2004.

"Sea change had major effect on coral reefs: Ocean chemistry led to death, rebound, JHU student finds," by Dennis O'Brien. *The Baltimore Sun*, November, 2004.

### **INVITED PRESENTATIONS**

Northeastern University Board of Trustees, Boston, MA, "Ocean sustainability", December 2017

MIT SeaGrant Principal Investigators' Workshop, Cambridge, MA, "Impact of ocean acidification on calcification dynamics of commercially important mollusks across critical life stages", November 2017.

Bertarelli Foundation, Geneva, Switzerland (presented at Northeastern), "Coral reefs and climate change", September 2017.

MIT SeaGrant Principal Investigators' Workshop, Cambridge, MA, "Impacts of ocean acidification on calcification rate, shell structure, and extrapallial fluid pH of commercially important mollusks across critical life stages", June 2017.

Joint Meeting of the Advisory Panel and Plan Development Team of the Scallop RSA Program, Boston, MA, "Effects of Ocean Acidification and Warming on Atlantic Sea Scallops", May 2017.

MIT SeaGrant Principal Investigators' Workshop, Cambridge, MA, "Impact of ocean acidification on calcification rate, shell properties, pallial fluid pH, and epigenetics of commercially important mollusks across critical life stages", November 2016.

Boston University, Boston, MA, Howard Hughes Seminar Series on Climate Change, "Coral calcification in a warmer, more acidic ocean", November 2016.

Hanse-Wissenschaftskolleg, Delmenhorst, Germany, "Impact of ocean acidification and warming on tropical and cold-water coral calcification", August 2016.

MIT SeaGrant Principal Investigators' Workshop, Cambridge, MA, "Molluscan vulnerability to ocean acidification across life stages", June 2016.

Zentrum für Marine Tropenökologie (ZMT), Bremen, Germany, "Exploring the cold-water vs. tropical coral response to ocean acidification", March 2016.

Royal Netherlands Institute for Sea Research (NIOZ), Texel, Netherlands, "Marine calcifiers' variable responses to ocean acidification", March 2016.

GEOMAR Helmholtz-Zentrum für Ozeanforschung, Kiel, Germany, "Impact of ocean acidification on marine calcification: past, present, and future", January 2016.

Alfred Wegener Institute for Polar and Marine Research (AWI), Bremerhaven, Germany, "Constraining the carbonate chemistry of coral calcifying fluid with combined microelectrode, fluorescent dye, and boron isotope measurements", January 2016.

Hanse-Wissenschaftskolleg, Delmenhorst, Germany, "A multidisciplinary approach to investigating the impacts of ocean acidification on marine bio-calcification", January 2016.

Zentrum für Marine Tropenökologie (ZMT), Bremen, Germany, "Carbonate biogeochemistry: response of marine organisms to climate change and ocean acidification", December 2015.

3rd US Ocean Acidification Program Principal Investigator's Meeting, Woods Hole, MA, "A multidisciplinary approach to investigating the scleractinian coral response to ocean acidification," June 2015.

City College of New York, New York, NY, "Marine calcification in a high-CO<sub>2</sub> world," May 2015.

Nahant Evening Lecture Series, Nahant, MA, "Impacts of ocean acidification on marine calcifiers," March 2015

MIT SeaGrant Ocean Acidification Workshop, Boston, MA, "Challenges and gaps in ocean acidification research," January 2015.

Ocean acidification and coastal New England conference, New Bedford, MA, "Impacts of ocean acidification on benthic marine calcifiers," October 2014.

Ocean acidification workshop (NSF): Integrating the effects of ocean acidification among functional scales on tropical coral reefs: cells to ecosystems, Catalina Is., California, "Impacts of ocean acidification on scleractinian corals," June 2014.

Harvard University (Boston, MA), "Calcareous biomineralization in a high-CO<sub>2</sub> world," November 2013.

College of the Holy Cross (Worcester, MA), "Marine calcification in a high-CO<sub>2</sub> world," November 2013.

University of Alabama at Birmingham (Birmingham, AL), "Marine calcification in an acidifying ocean," April 2013.

Cystic Fibrosis, Pulmonary Research & Treatment Center, University of North Carolina at Chapel Hill (Chapel Hill, NC), "pH regulation at the site of calcification shapes marine calcifiers' responses to CO<sub>2</sub>-induced ocean acidification," February 2013.

Virginia Tech (Blacksburg, VA), "Impact of ocean acidification on marine calcifiers: patterns and processes," February 2013

American Geophysical Union, "Ocean pH on the eve of the Cambrian Radiation," December 2012



Chevron Corporation (San Mateo, CA), "Carbonates as monitors of global change: past, present, and future," April 2012

Northeastern University (Boston, MA), "Marine calcifiers in a high-CO<sub>2</sub> world," January 2012

Zentrum für Marine Tropenökologie (ZMT; Bremen, Germany), "Impact of ocean acidification on marine biological calcification: patterns and processes," November 2011

North Carolina State University, "Impacts of ocean acidification on marine calcification," October 2011

Franklin & Marshall College, "Acidifying the oceans: Impacts on the growth of skeletons by marine organisms and their potential ecological consequences," September 2011

UNC Humanities Program of the College of Arts and Sciences and the General Alumni Association (Blue gold: water resources in the world today), "Acidic oceans: The underwater CO<sub>2</sub> problem," September 2011

Duke University, "Impacts of ocean acidification on calcareous biomineralization: a geochemical perspective," September 2011

1st US Ocean Acidification Program Principal Investigator's Meeting, Woods Hole, MA, "Impact of ocean acidification on marine biological calcification," March 2011.

National Shellfisheries Association, "The varied responses of marine calcifiers to CO<sub>2</sub>-induced ocean acidification: how and why?" March 2011

Southern Methodist University, "Marine calcification in a high CO<sub>2</sub> world," November 2010.

University of North Carolina at Wilmington, "A physicochemical explanation for the mixed responses of marine calcifiers to CO<sub>2</sub>-induced ocean acidification," October 2010.

National Oceanographic and Atmospheric Administration, "Anthropogenic CO<sub>2</sub> and the fate of benthic marine calcifiers," October 2010.

Institute of Marine Sciences, University of North Carolina, "Marine calcifiers exhibit mixed responses to CO<sub>2</sub>-induced ocean acidification – how and why?" October 2010.

Eastern Carolina University, "The effects of CO<sub>2</sub>-induced ocean acidification on marine biocalcification," September 2010.

Paleo-Ocean Acidification Workshop (NSF), Catalina Is., California, "Impact of seawater Mg/Ca (calcite-aragonite seas) and CO<sub>2</sub>-induced ocean acidification on the mineralogy of marine calcifiers throughout Phanerozoic time," August 2010.

Calera Corporation, Los Gatos, California, "Utilizing continental flood basalts as a source of alkalinity and divalent cations in the Calera process: Characterization of Snake River flood basalts and plan for fluid-basalt reaction experiments," June 2010.

Calera Corporation, Los Gatos, California, "Mechanisms of formation, stabilization, and transformation of amorphous calcium carbonate and their relevance to carbon sequestration: Exploiting disorder," May 2010.

Marine Conservation Biology Institute: Puget Sound Ocean Acidification Workshop, "Impact of CO<sub>2</sub>-induced ocean acidification on the calcification and skeletal properties of benthic marine calcifiers," March 2010.

Calera Corporation, Los Gatos, California, "Brine utilization in CO<sub>2</sub> sequestration processes," January 2010.

University of North Carolina (Dept. of Geological Sciences), "Super-heavy pyrite ( $\delta_{34}\text{S}_{\text{pyr}} > \delta_{34}\text{S}_{\text{cas}}$ ) in the terminal Proterozoic Nama Group, Southern Namibia: A consequence of low seawater sulfate at the dawn of animal life," March 2009.

American Geophysical Union, "The mineralogical responses of marine calcifiers to CO<sub>2</sub>-induced ocean acidification," December 2008.

Yale University – Global Change Seminar Series, "Secular variation in seawater Mg/Ca: impacts on biotic and abiotic carbonates," November 2008

Duke University – 22<sup>nd</sup> Annual D/UNCOC Symposium, "Marine calcification in a high CO<sub>2</sub> world," November 2008

Appalachian State University, "Marine calcification under high-CO<sub>2</sub> atmospheres," September 2008.

Association of Monterey Bay Area Governments, "Sequestering fossil-fuel carbon through the production of green cement," August 2008.

Bodega Bay Marine Lab (University of California – Davis), "Marine calcifiers exhibit positive and negative responses to CO<sub>2</sub>-induced ocean acidification – how and why?" June 2008.

Calera Corporation, Los Gatos, California, "The calcification site proton pump – a biological model for calcification-based carbon sequestration," June 2008.

Ohio State University, "Benthic marine calcifiers exhibit mixed responses to CO<sub>2</sub>-induced ocean acidification," May 2008.

Woods Hole Oceanographic Institution, "Winners and losers of ocean acidification," May 2008.

Stanford University, "Effect of secular variation in oceanic Mg/Ca on calcareous biomineralization - experiments and observations," April 2008.

Massachusetts Institute of Technology, "Marine calcification under high-CO<sub>2</sub> atmospheres," November 2007.

American Society of Limnology and Oceanography, "Biocalcification – state of the knowledge," February 2007.

Woods Hole Oceanographic Institution, "The evolution of biocalcification in a chemically-dynamic ocean," February 2007.

American Geophysical Union, "Effect of secular variation in oceanic Mg/Ca on calcareous biomineralization," December 2006.

Center of Marine Biotechnology (University of Maryland), "Minerals, microbes, marine invertebrates, and magma: the effect of tectonically-forced variations in seawater Mg/Ca on calcareous biomineralization," May 2006.

University of North Carolina, Department of Marine Sciences, "Effect of secular variation in seawater chemistry (calcite/aragonite seas) on calcareous biomineralization: linking plate tectonics to paleobiology via marine geochemistry," April, 2006.

California Institute of Technology, Division of Geological and Planetary Sciences (Division Seminar), "The effect of secular variation in seawater Mg/Ca (calcite and aragonite seas) on calcareous biomineralization," September, 2005.

University of Maryland, Department of Geology (Geochemistry Seminar), "Secular variation in the Mg/Ca ratio of seawater (calcite/aragonite seas) and its effect on calcareous biomineralization," October, 2005.

## **WORKSHOPS CONVENED**

Data assimilation workshop: Impact of ocean acidification and warming on tropical and cold-water coral calcification (*20 participants*), Hanse Wissenschaftskolleg, Delmenhorst, Germany, August, 2016.

Mini-symposium: Exploring the cold-water vs. tropical coral response to ocean acidification (*60 participants*), Zentrum für Marine Tropenökologie, Bremen, Germany, March, 2016.

## **RESEARCH FUNDING**

### **External**

NOAA/MIT SEAGRANT	\$180,000	2018-2020
"Measuring acid/base chemistry in the extrapallial fluids of New England's commercially important mollusks to explore their differential responses to ocean acidification"	(\$270,000 incl. cost-sharing)	
(NA18OAR4170105; PI: J. Ries)		

NATIONAL SCIENCE FOUNDATION – Biological Oceanography “Collaborative Research: Does ocean acidification induce a methylation response that affects the fitness of the next generation in oysters?” (#1635423, PI: K. Lotterhos; co-PI: J. Ries)	\$1,103,702 \$714,861 (NU portion)	2017-2020
NOAA/MIT SEAGRANT “Investigation of the effects of ocean acidification and warming on the calcification rate and shell properties of commercially important early stage New England mollusks” (NA14OAR41705710004054; PI: J. Ries)	\$200,000 (\$300,069 incl. cost-sharing)	2016-2019
NATIONAL SCIENCE FOUNDATION – Marine Geology & Geophysics “Collaborative Research: RUI: Development of a coralline-algal-based $\delta^{11}\text{B}$ paleo-pH proxy and its application to investigating the impact of seawater pH on algal calcification” (#1459706, PI: J. Ries)	\$571,802 \$330,591 (NU portion)	2015-2019
NATIONAL SCIENCE FOUNDATION – Major Research Instrumentation “Acquisition of a laser ablation inductively coupled plasma mass spectrometer (LA-ICP-MS) for research in the marine, earth and environmental sciences” (#1429373, PI: J. Ries)	\$500,000 (\$714,286 incl. cost-sharing)	2014-2019
NATIONAL SCIENCE FOUNDATION – Biological Oceanography “Collaborative Research: A combined boron isotope, pH microelectrode and pH-sensitive dye approach to constraining acid/base chemistry in the calcifying fluids of corals and their responses to changing ocean chemistry” (#1437371; PI: J. Ries)	\$640,000 \$369,413 (NU portion)	2014-2019
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION “Investigating the effects of ocean acidification and warming on the shell properties and meat weights of NW Atlantic sea scallops via paired field surveys and laboratory experiments” (#NA14NMF4540072; PI: J. Ries; co-PI: J. Grabowski)	\$430,188	2014-2019
NATIONAL SCIENCE FOUNDATION – Biological Oceanography “Investigation of the effects of $\text{CaCO}_3$ saturation state & temperature on the calcification rate & skeletal properties of benthic marine calcifiers” (#1357665; PI: J. Ries)	\$374,630	2013-2015
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION “Impact of global warming on Caribbean coral calcification” (#NA13OAR4310186; PI: J. Ries)	\$104,575	2013-2015

NATIONAL SCIENCE FOUNDATION – Major Research Instrumentation “Acquisition of a new thermal ionization mass spectrometer for high-precision isotope chronology and chemistry” (#1337554; PI: D. Coleman; Co-PIs: J. Ries, A. Glazner, D. Surge)	\$451,508 (\$645,011 incl. cost-sharing)	2013-2014
NATIONAL SCIENCE FOUNDATION – Major Research Instrumentation “Acquisition of a laser ablation inductively coupled plasma mass spectrometer (LA-ICP-MS) for earth and marine science research” (#1126669; PI: J. Ries; Co-PIs: B. McKee; A. Glazner; D. Coleman)	\$410,116 (\$585,880 incl. cost-sharing)	2011-2013
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION “Using multielement-isotope coral paleothermometry to reconstruct the thermal history of seawater across a Caribbean barrier reef system over the past century and evaluation of its impact on coral extension rates” (#NA11OAR4310161; PI: J. Ries; Co-PI: K. Castillo)	\$231,933	2011-2013
NATIONAL SCIENCE FOUNDATION – Biological Oceanography “Investigation of the effects of CaCO <sub>3</sub> saturation state & temperature on the calcification rate & skeletal properties of benthic calcifiers” (#1031995; PI: J. Ries)	\$655,688	2010-2013
AMERICAN CHEMICAL SOCIETY – New Investigator/Geochemistry “Geochemical and petrographic investigation of a novel calcite-aragonite sea transition in terminal Proterozoic time (549-548 Ma)” (#50214-DNI8; PI: J. Ries)	\$100,000	2010-2013
DEPARTMENT OF ENERGY/LAWRENCE BERKELEY NATIONAL LAB “Developing novel methods in synchrotron micro-X-ray diffraction for characterizing variations in the skeletal mineralogy of calcifying marine organisms resulting from CO <sub>2</sub> -induced ocean acidification” (ALS-03974: beamline 12.3.2/21 shifts; PI: J. Ries; *award amount estimated from LBNL-supplied rate of \$1,953 x 21 shifts )	\$40,099 (est.*)	2010
CALERA CORPORATION – Geochemistry “Utilization of natural brines and mafic-ultramafic rocks in CO <sub>2</sub> sequestration” (Gift; PI: J. Ries)	\$140,775	2009
NASA DELAWARE SPACE GRANT – Geosciences (PI: J. Ries)	\$15,000	1996-1998
<b>Internal</b> COST-SHARING FOR NOAA/MIT SEA GRANT “Measuring acid/base chemistry in the extrapallial fluids of New England’s commercially important mollusks to explore their differential responses to ocean acidification”	\$90,000	2018-2020

(PI: J. Ries)

COST-SHARING FOR NSF - MAJOR RESEARCH INSTRUMENTATION \$214,286 2014-2019  
"Acquisition of a laser ablation inductively coupled plasma mass spectrometer (LA-ICP-MS) for research in the marine, earth and environmental sciences"

(PI: J. Ries)

COST-SHARING FOR NOAA/MIT SEA GRANT \$100,000 2016-2019  
"Investigation of the effects of ocean acidification and warming on the calcification rate and shell properties of commercially important early stage New England mollusks"

(PI: J. Ries)

COST-SHARING FOR NSF - MAJOR RESEARCH INSTRUMENTATION \$175,764 2011-2012  
Acquisition of a laser ablation inductively coupled plasma mass spectrometer (LA-ICP-MS) for earth and marine science research

(PI: J. Ries; Co-PIs: B. McKee; A. Glazner; D. Coleman)

RJ REYNOLDS/UNC-CH JUNIOR FACULTY DEVELOPMENT AWARD \$7,500 2009-2010  
Development and application of new techniques for characterizing the mineralogy of calcifying marine organisms with high-power synchrotron radiation (PI: J. Ries)

W.H.O.I. TROPICAL RESEARCH INSTITUTE – Biogeochemistry \$57,000 2007-2008  
"An Experimental Investigation of the Impact of Ocean Acidification on Coral Calcification" (PI: A. Cohen; Co-PIs: D. McCorkle; N. Shimuzu; J. Ries; M. Holcomb)

W.H.O.I. OCEAN & CLIMATE CHANGE FELLOWSHIP – Biogeochemistry \$83,000 2007-2008  
"Experiments on the Effects of Ocean Acidification on Calcareous Biomineralization" (PI: J. Ries)

DAVID ELLIOT FUND FOR RESEARCH (J.H.U) – Geobiology \$10,000 2004-2005  
"Effect of Seawater Mg/Ca on Calcareous Biomineralization" (PI: J. Ries)

GLASSMANN GRANT FOR FIELD RESEARCH (J.H.U) – Geobiology \$12,000 2001-2004  
"Effect of Oceanic Mg/Ca on Paleozoic Reef-Building Organisms" (PI: J. Ries)

## TEACHING & ADVISING

### Courses taught

*Global Oceanic Change* (Spring 2015 = 26 students; Spring 2017 = 24 students; Spring 2018 = 31 students)

*Oceanography* (Fall 2014 = 29 students; Fall 2015 = 21 students; Fall 2016 = 23 students; Fall 2017 = 21 students)

*Oceanography Lab* (Fall 2014 = 29 students; Fall 2015 = 21 students; Fall 2016 = 23 students; Fall 2017 = 21 students)

*Directed Study in Ocean Acidification Research* (Spring 2018 = 1 student)

*Readings in Ocean Acidification Research* (Spring 2016 = 1 student)

*The Marine Environment* (Fall 2008 = 93 students; Fall 2009 = 104 students; Spring 2011 = 97 students; Spring 2012 = 57 students; Spring 2013 = 43 students)

*Marine Geology* (Spring 2009 = 8 student; Fall 2010 = 21 students, Fall 2011 = 11 students)

*Coral Reefs and Climate Change* (Co-taught with J. Bruno & K. Castillo; Fall 2009 = 11 students)

*Tropical Marine Ecology Field Course in Roátan, Honduras* (Winter term 2005 = 8 students; Winter term 2006 = 9 students)

*Undergraduate Research in Marine Science* (Fall 2009 = 1 student; Spring 2010 = 5 students  
Fall 2010 = 4 students; Spring 2011 = 4 students; Fall 2011 = 6 students; Spring 2012 = 5 students;  
Spring 2013 = 3 students)

*Seminar in Oceanography* (Fall 2010 = 3 students)

*Master's Research in Marine Science* (Fall 2009 = 1 student; Spring 2010 = 1 student; Fall 2011 = 2 students;  
Spring 2012 = 2 students; Spring 2013 = 1 student)

*Doctoral Research in Marine Sciences* (Fall 2009 = 1 student; Spring 2010 = 1 student; Fall 2010 = 1 student;  
Spring 2011 = 1 student; Fall 2011 = 3 students; Spring 2012 = 1 student; Fall 2012 = 1 student;  
Spring 2013 = 1 student)

#### TRACE evaluations

Course #	Title	Term	Year	Role	# students	TRACE
5516	Oceanography	Fall	2014	3 Seas core	29	4.2
5516	Oceanography	Fall	2015	3 Seas core	21	4.6
5516	Oceanography	Fall	2016	3 Seas core	23	4.8
5516	Oceanography	Fall	2017	3 Seas core	21	4.3
5517	Oceanography Lab	Fall	2014	3 Seas core	29	4.4
5517	Oceanography Lab	Fall	2015	3 Seas core	21	4.6
5517	Oceanography Lab	Fall	2016	3 Seas core	23	4.7
5517	Oceanography Lab	Fall	2017	3 Seas core	21	4.2
3125	Global Oceanic Chng	Spring	2015	Major	26	4.5
3125	Global Oceanic Chng	Spring	2017	Major	24	4.6
3125	Global Oceanic Chng	Spring	2018	Major	31	4.7
8982	Readings in OA Res	Spring	2016	EEMB elective	1	n/a

#### Postdoctoral researchers supervised

Dr. Isaac Westfield: Impact of ocean acidification and warming on calcification rates and skeletal properties of crustose coralline algae (2016 – present).

Dr. John Gunnell: Development of a multi-elemental paleothermometer for the scleractinian reef-building coral *Siderastrea siderea* and its application to reconstructing post-Industrial Revolution warming and acidification of the Western Caribbean Sea (2016 – present).

Dr. Eleni Anagnostou: Development of a boron-isotope pH proxy for the crustose coralline algae *Clathromorphum compactum* and its application to reconstructing pH and temperature change in high latitude oceans over the past 1600 years (2016 – 2017). *Presently employed as scientist at GEOMAR Center for Ocean Research (Kiel, Germany).*

Dr. Sarah Davies: Exploring the genetic underpinnings of corals' response to ocean warming and acidification (2014 – 2015). *Presently employed as Assistant Professor at Boston University.*

Dr. Karl Castillo: Reconstructing 100-year changes in seawater temperature, sedimentation and pollution across the Mesoamerican Barrier Reef System (southern Belize), and their effects on calcification rates within the major reef-building coral *Siderastrea siderea* (2008 – 2012). *Presently employed as Assistant Professor at University of North Carolina - Chapel Hill (note: notification of tenure received 6 April 2018).*

#### Graduate students supervised

Jessica Gould (Ph.D.): “Development of multi-elemental paleothermometers for coralline and other long-lived biocalcifying archives of oceanic change” (2018 – present)

Elise Begin (Ph.D.): “Impact of ocean acidification on the oyster-sponge-crab system” (2017 – present)

Louise Cameron (Ph.D.): “Impact of ocean acidification on the calcification, shell properties, and tissue quality of the Atlantic Sea Scallop” (2015 – present)

Isaac Westfield (Ph.D.): “Mineralization of anthropogenic CO<sub>2</sub> via water-gas-rock reaction” (2009 – 2013)

Kimmaree Horvath (Master's): “Synergistic impacts of ocean acidification and warming on calcification rate and septal morphology of the Caribbean reef-building coral *Siderastrea siderea*” (2011 – 2014)

Brian Connolly (Masters): “Dissolution kinetics of biogenic carbonates” (2011 – 2012)

#### Thesis committees served

Jessica Gould (Ph.D., EEMB, NU, 2018 – present; Major advisor: Justin Ries)

Elise Begin (Ph.D., EEMB, NU, 2017 – present; Major advisor: Justin Ries)

Alan Downey (Ph.D., EEMB, NU, 2016 – present; Major advisor: Katie Lotterhos)

Tomasz Borszcz (Ph.D., Inst. of Ocean., Polish Inst. of Sci., 2016 – present; Major advisor: Piotr Kuklinski)

Louise Cameron (Ph.D., EEMB, NU, 2015 – present; Major advisor: Justin Ries)

Colleen Bove (Ph.D., Marine Sciences, UNC-CH, 2014 – present; Major advisor: Karl Castillo)

Amanda Dwyer (Ph.D., EEMB, NU, 2014 – present; Major advisor: Mark Patterson)

Justin Baumann (Ph.D., Marine Sciences, UNC-CH, 2013 – present; Major advisor: Karl Castillo)

Kate McClure (Ph.D., EEMB, NU, 2013 – 2017; Major advisor: Geoff Trussell)

Isaac Westfield (Ph.D., Marine Sciences, UNC-CH, 2009 – 2014; Major advisor: Justin Ries)

Kimmaree Horvath (Masters, Marine Sciences, UNC-CH, 2011 – 2014; Major advisor: Justin Ries)

Brian Connolly (Master's, Marine Sciences, UNC-CH, 2011 – 2012; Major advisor: Justin Ries)

Sara Coleman (Master's, Marine Sciences, UNC-CH, 2011 – 2015; Major advisor: Joel Fodrie)

Luke Dodd (Masters, Marine Sciences, UNC-CH, 2011 – 2015; Major advisor: Mike Piehler)

Ting Wang (Ph.D., Geological Sciences, UNC-CH, 2009 – 2014; Major advisor: Donna Surge)

Julie Schram (Ph.D., Biology, U. Alabama at Birmingham, 2010 – 2015; Major advisor: James McClintock)

Ian Winkelstern (Master's, Geological Sciences, UNC-CH, 2010 – 2012; Major advisor: Donna Surge)

Robin Mattheus (Ph.D., Marine Sciences, UNC-CH, 2008 – 2009; Major advisor: Tony Rodriguez)

#### Undergraduate students supervised



Katie Lee (Wellesley College, Summer 2018)  
 Brian Hoang (NU, Summer 2018)  
 Isabel Gutowski (NU, Spring 2017, Summer 2017, Fall 2017, Spring 2018)  
 Jaxine Wolfe (NU, Spring 2017, Fall 2017)  
 Jaxon Derow (NU, Spring 2017)  
 Andrew Madanjian (NU, Spring 2017, Fall 2017)  
 James Ash (NU, Spring 2017)  
 Rosalie Moleti (NU, Spring 2017)  
 Eliza Lehner (NU, Fall 2015, Spring 2016)  
 Matthew Tyler (NU, Fall 2015, Spring 2016)  
 Fiona Mueller-Lundin (St. Andrews University, Spring 2016)  
 Jake Campolo (NU, Spring 2015)  
 Maya Gilchrist (NU, Spring 2015)  
 Maggie Poyant (NU, Fall 2014)  
 Pualani Armstrong (UNC-CH, Spring 2013)  
 Aaron Gross (UNC-CH, Spring 2013)  
 Hayley Vatcher (UNC-CH, Spring 2013)  
 Raven Wright (UNC-CH, Summer 2012)  
 Maite Ghazaleh (UNC-CH, Spring 2012, Spring 2013, Fall 2013, Spring 2014)  
 Deepti Schroff (UNC-CH, Fall 2011, Spring 2012)  
 Kruti Patel (UNC-CH, Spring 2011, Fall 2011, Spring 2012, Spring 2013)  
 Elaine Chow (UNC-CH, Fall 2011, Spring 2012)  
 Blake Elder (UNC-CH, Spring 2011, Fall 2011, Spring 2012)  
 Travis Courtney (UNC-CH, Spring 2010, Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014) – awarded first place for undergraduate research at the 2013 Anadarko Research Symposium  
 Richard Yost II (UNC-CH, Fall 2011)  
 Andrea Brandt (UNC-CH, Spring 2011)  
 Veronica Butler (UNC-CH, Spring 2011, Fall 2011)  
 Samuel Spalding (UNC-CH, Spring 2011)  
 Bradley Fleck (UNC-CH, Fall 2010)  
 Bradley Pence (UNC-CH, Spring 2010, Fall 2010)  
 Christopher Presnell (UNC-CH, Spring 2010, Fall 2010)  
 Areeg Rehman (UNC-CH, Spring 2010)  
 Brittany Worthington (UNC-CH, Spring 2010)  
 Laura Brown (UNC-CH, Fall 2008, Spring 2009)  
 Jane Lee (UNC-CH, Fall 2009) – received Sigma Xi award for her research in my laboratory

## **SERVICE & PROFESSIONAL DEVELOPMENT**

### **Service to the Institution**

#### **Department Service:**

2018 Co-authored the Northeastern Carbon Initiative Game Changer White Paper  
 2018 – present Workload Distribution Committee, Chair  
 2017 – present Geoscience Curriculum Committee  
 2014 – present Undergraduate Curriculum Committee

- 2016 – 2017 Strategic Planning Committee
- 2016 – 2017 Graduate Curriculum Committee
- 2014 – 2017 3 Seas Transition Committee
- 2014 – present Developed and manage an independent cost-center for major instrumentation at the MSC that affords access to both internal and external users at competitive rates
- 2013 – present Provided teaching evaluations for various junior faculty
- 2014 – 2016 Department By-Laws Committee
- 2016 Participated in MSC Outreach workshop organized by Carole McCauley.
- 2016 Served as a co-PI on and made substantive contributions to the \$5.92M internal proposal for the Northeastern Institute for Coastal Sustainability Science and Engineering (ICCSE)
- 2014 – 2015 Evolutionary and Ecological Genomics Faculty Search Committee (Lotterhos hire)
- 2014 – 2015 Environmental Science Faculty Search Committee (Bowen hire)
- 2014 – 2015 Researched, purchased, installed and established cost-centers for 5 pieces of major instrumentation at the Marine Science Center: (1) TESCAN Scanning Electron Microscope; (2) Rigaku X-ray diffractometer; (3) Oxford energy dispersive spectrometer; (4) Oxford electron backscatter diffractometer; and (5) Nikon AZ100 microscope with fluorescence.
- 2014 Presented ocean acidification research to Doherty Foundation Board of Trustees as part of their consideration for an endowed chair, which they ultimately funded
- 2014 Covered the Department's share of the mandatory cost-sharing for my NSF MRI award with funds from the start-up account (\$75,000)
- 2013 Member of ad hoc hiring committee for engineering hire
- 2013 – 2014 Designed and oversaw construction of 4 new laboratories at Northeastern's Marine Science Center: (1) geochemistry lab; (2) mass spectrometry lab; (3) sample preparation lab; (4) aquarium culturing facility
- 2010 Organized and ran UNC-CH Department of Marine Science external speaker seminar series
- 2010 Member of the faculty search committee – Biological Oceanographer, UNC-CH

#### **College Service:**

- 2016 Participated in the 'What's in a major' event at Northeastern University – a cross-college event in which faculty from various COS departments meet with groups of undergraduate students interested in majoring in a COS degree program
- 2014 Participated in STRIDE training workshop for equal opportunity hiring at NU
- 2013 – 2015 Ries Lab participation in Northeastern University Research Exposition ('EXPO Manhattan, Boston, and Hong Kong)

#### **University Service:**

- 2017 Presented research on global oceanic change to Northeastern Senior Leadership and Board of Trustees at Northeastern's annual Board of Trustees' Meeting
- 2017-2018 Participated in Northeastern ReDI Leadership Program
- 2017 Presented coral research to Bertarelli Foundation, Dean of College of Science, University Provost
- 2016 Served on ad hoc inter-college advisory committees (including Chip Storey, Bouve College Office of Research, and Art Kramer, Senior Vice Provost for Research) to assist two NU

- faculty prepare their 2017 MRI proposals: Asst. Prof. Danielle Levac (Physical Therapy) and Assoc. Prof. Steve Lustig (Chemical Engineering)
- 2014 Coordinated a cross-college (Colleges of Engineering, Science, and Health Sciences) proposal to acquire a laser ablation inductively coupled plasma mass spectrometer that was successfully funded by the NSF MRI program
- 2012 – 2013 Mentored underrepresented minority students through the UNC Increasing Diversity & Enhancing Academia (IDEA) program (Institute for the Environment)
- 2011 – 2013 Served as chair of the laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) facility management panel
- 2010 – 2012 Mentored underrepresented minority postdoctoral fellow through the UNC Seeding Postdoctoral Innovators in Research and Education (SPIRE) program
- 2011 – 2013 Conceived of, obtained funding for, and oversaw installation of the high-resolution laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) system in the UNC Mass Spectrometry Facility (operational in fall 2012)
- 2011 Featured speaker for the College of Arts and Sciences' and the General Alumni Association's UNC Humanities Program (*Blue gold: water resources in the world today*)
- 2010 Conceived of, designed, obtained funding for, and oversaw the construction of the Aquarium Research Center in the new Venable Hall, UNC-CH (became operational in fall 2010)
- 2008 – 2010 Mentored underrepresented minority postdoctoral fellow through the Carolina Postdoctoral Program for Faculty Diversity

### **Service to the Discipline/Profession**

#### **Journal editorship:**

2011 – present Associate Editor, *Global Biogeochemical Cycles*

#### **Peer review:**

*Manuscripts:* *Science*; *Geology*; *Nature Geosciences*; *Nature Climate Change*; *Geochimica et Cosmochimica Acta*; *Geological Society of America Bulletin*; *Journal of Geophysical Research*; *Proceedings of the Royal Society B*; *Geophysical Research Letters*; *Biogeosciences*; *Journal of Sedimentary Research*; *Coral Reefs*; *Journal of the Geological Society of London*; *Proceedings of the International Coral Reef Symposium*; *Biogeosciences*; *FEMS Microbiology*; *Marine Ecology Progress Series*, *Earth and Planetary Sciences Letters*; *Journal of Experimental Marine Biology and Ecology*; *PLoS ONE*; *Diversity*; *Aquatic Biology*; *Global Biogeochemical Cycles*; *Limnology and Oceanography*

*Grant proposals:* National Science Foundation; National Oceanic and Atmospheric Administration; US Department of Energy; US Department of Agriculture; United States Geological Survey; American Chemical Society/Petroleum Research Fund; MIT Sea Grant; Washington State Sea Grant; Estonia National Science Foundation; Czech National Science Foundation; Qatar National Research Foundation; Polish National Science Foundation

*Grant panels:* NOAA/NURC Ocean Acidification (2008); NSF Ocean Acidification (2013); NOAA Ocean Acidification (2015, 2018)

### **Service to the Community/Public**

- 2017 Presented to the Joint Meeting of the Advisory Panel and Plan Development Team of the Scallop RSA Program, Boston, MA, open to public and attended by scientists, legislators, govt. officials, educators, fishermen
- 2017 Delivered keynote presentation at the 2017 MIT Sea Grant ocean acidification workshop, open to public and attended by scientists, legislators, govt. officials, educators, fishermen
- 2013 – present Ries Lab participation in Marine Science Center Open House
- 2016 Delivered keynote presentation at the 2016 MIT Sea Grant ocean acidification workshop, open to public and attended by scientists, legislators, govt. officials, educators, fishermen
- 2015 Delivered keynote presentation at the 2015 MIT Sea Grant ocean acidification workshop, open to public and attended by scientists, legislators, govt. officials, educators, fishermen
- 2015 Presented ocean acidification research as part of the Nahant Evening Lecture Series
- 2014 Delivered keynote presentation at the New Bedford Ocean Acidification Conference, open to public and attended by scientists, legislators, govt. officials, educators, and fishermen.
- 2014 Delivered keynote presentation at the 2014 MIT Sea Grant ocean acidification workshop, open to public and attended by scientists, legislators, govt. officials, educators, fishermen
- 2008 – 2013 Ries Lab members regularly make presentations at educational institutions such as the North Carolina Natural History Museum, the North Carolina Aquarium at Pine Knoll Shores, the Museum of Life and Sciences (Durham, NC), and local schools
- 2010 Presented the results of ocean acidification research conducted in the Ries Lab to the National Oceanographic and Atmospheric Administration (Beaufort, NC)
- 2010 Provided a formal written response to the presentation and review of my 2009 Geology article on ocean acidification by the US Senate Commerce, Science, and Transportation Subcommittee (SR-253) hearing on The Environmental and Economic Impacts of Ocean Acidification (<http://tinyurl.com/2bmoad>; 72:30; 75:30; 100:00; 102:30, April 22<sup>nd</sup>, 2010)
- 2009 Contributor to the 2009 UNC Climate Change Committee Report submitted to the North Carolina General Assembly

## **Professional Development**

### **Workshops convened**

- 2016 Data assimilation workshop: Impact of ocean acidification and warming on tropical and cold-water coral calcification (20 participants), Hanse Wissenschaftskolleg, Delmenhorst, Germany
- 2016 Symposium: Exploring the cold-water vs. tropical coral response to ocean acidification (60 participants), Zentrum für Marine Tropenökologie, Bremen, Germany
- 2016 Symposium: The role of calcifying fluid chemistry in determining marine calcifiers' resilience/vulnerability to ocean acidification (25 participants), Alfred Wegener Institute for Polar and Marine Research (AWI), Bremerhaven, Germany

### **Participation in professional workshops:**

- 2017 Invited participant in the Winter 2017 MIT SeaGrant Principal Investigators' Workshop, Boston, MA
- 2017 Invited participant in the Summer 2017 MIT SeaGrant Principal Investigators' Workshop, Boston, MA

- 2016 Invited participant in the 2016 Data assimilation workshop: Impact of ocean acidification and warming on tropical and cold-water coral calcification, Hanse Wissenschaftskolleg, Delmenhorst, Germany
- 2016 Invited participant in the 2016 Symposium: Exploring the cold-water vs. tropical coral response to ocean acidification, Zentrum für Marine Tropenökologie, Bremen, Germany
- 2016 Invited participant in the 2016 Symposium: The role of calcifying fluid chemistry in determining marine calcifiers' resilience/vulnerability to ocean acidification, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany
- 2016 Invited participant in the Winter 2016 MIT SeaGrant Principal Investigators' Workshop, Boston, MA
- 2016 Invited participant in the Summer 2016 MIT SeaGrant Principal Investigators' Workshop, Boston, MA
- 2015 Invited participant in the 3rd US Ocean Acidification Program Principal Investigator's Meeting, Woods Hole, MA
- 2015 Invited participant in the 2015 MIT SeaGrant Ocean Acidification Workshop: Challenges and gaps in ocean acidification research, Boston, MA
- 2014 Invited participant in the 2014 Ocean acidification and coastal New England Workshop, New Bedford, MA
- 2014 Invited participant in the 2014 NSF-sponsored Ocean acidification workshop: Integrating the effects of ocean acidification among functional scales on tropical coral reefs: cells to ecosystems, Catalina Is., CA
- 2011 Invited participant in the 1st US Ocean Acidification Program Principal Investigator's Meeting, Woods Hole, MA
- 2010 Invited participant in the 2010 NSF-sponsored Paleo-Ocean Acidification Workshop on Catalina Island, California
- 2010 Invited participant in the 2010 NOAA Ocean Acidification Instrumentation and Research Needs Workshop in St. Petersburg, FL
- 2010 Invited speaker in the Marine Conservation Biology Institute/Puget Sound Ocean Acidification Workshop in Seattle, WA
- 2009 Invited participant in the 2009 NSF-funded Early Career Geoscience Faculty Workshop: On the Cutting Edge, College of William and Mary (competitive application)

**Session chair at international conferences:**

- 2009 Session chair for the 2009 Association for the Society of Limnology and Oceanography (ASLO) Meeting – “Coral reefs and coral communities in a changing environment”