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Education

- 2009 Ph.D. Ecology (minor in Physiology), Duke University
2005 B.S. Biological Sciences (*magna cum laude*), Vanderbilt University

Professional Experience

- 2018–Present Nina Bell Suggs Assistant Professor, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi
2016–2018 Assistant Professor, Division of Coastal Sciences, School of Ocean Science and Technology, The University of Southern Mississippi
2014–Present Adjunct Assistant Professor, Division of Marine Science and Conservation, Nicholas School of the Environment, Duke University
2013–2016 Assistant Professor, Department of Biological Sciences, Nicholls State University
2013–2016 University Affiliate Research Fellow, Marine Science Institute, The University of Texas at Austin
2013 Research Associate, Marine Science Institute, The University of Texas at Austin
2011–2013 Lecturer, Department of Marine Science, The University of Texas at Austin
2010–2013 Postdoctoral Fellow, Marine Science Institute, The University of Texas at Austin

Research Grants

- Darnell, M.Z.**, J.S. Levinton, W.P. Porter. An integrative field and biophysical model of thermal stress, physiological performance, and reproductive fitness. National Science Foundation. 8/15/2018–7/31/2022. Total collaborative budget: \$1,045,674. USM component: \$357,577.
Biber, P., **M.Z. Darnell**, K. Dillon, S. Altman. Evaluating success of beneficial use restoration on Deer Island. Mississippi-Alabama Sea Grant Consortium. 2/1/2018–1/31/2020, \$129,999.
Darnell, M.Z., K.M. Darnell. Acquisition of a small research vessel to support ecological and fisheries research at the Chandeleur Islands, Louisiana. Coypu Foundation. 10/1/2017–9/30/2018, \$77,500.

- Darnell, K.M., **M.Z. Darnell**, D.L. Smee, C.W. Martin, M.O. Hall. Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*). NOAA RESTORE Act Science Program. 6/1/2017–5/31/2020, \$992,136.
- Biber, P., **M.Z. Darnell**, M. Woodrey. Evaluating ecological success of beneficial use at Deer Island, MS. U.S. Army Corps of Engineers. 9/19/2016–9/18/2019, \$131,000.
- Darnell, M.Z.** Migratory movements and fishing mortality of the Louisiana blue crab spawning stock. Louisiana Sea Grant. 2/1/2016–10/31/2018, \$141,375.
- Darnell, M.Z.**, E.W. North. Large-scale movements, spawning locations, and structure of the Gulf of Mexico blue crab spawning stock. NOAA/NMFS. 9/1/2015–8/31/2018, \$230,237.
- Carruthers, T.J.B., K.M. Darnell, **M.Z. Darnell**. Linking blue crab abundance, growth, and mortality to marsh fragmentation and submerged aquatic vegetation cover. NOAA/NMFS. 9/1/2015–8/31/2018, \$283,578 (NSU/USM subaward: \$85,767).
- Darnell, M.Z.**, J. Carlson. Acquisition of a controlled environmental system to enhance biophysical ecology research and education at Nicholls State University. Louisiana Board of Regents. 7/1/2015–6/30/2016, \$58,697.
- Darnell, M.Z.**, D. Rittschof. Crane-crab conservation coupling: 2014. Disney Worldwide Conservation Fund. 11/1/2014–10/31/2015, \$25,000.
- Darnell, M.Z.** Development of a novel biotelemetry system for transformative studies of behavioral thermoregulation in free-ranging mobile intertidal animals. Nicholls State University Research Council. 7/1/2014–12/31/2015, \$5,885.
- Rittschof, D., **M.Z. Darnell**, J.L. Hench. Crane-crab conservation coupling: 2013. Disney Worldwide Conservation Fund. 11/1/2013–10/31/2015, \$25,000.
- Rittschof, D., **M.Z. Darnell**, J.L. Hench. Cranes and crabs: conservation coupling. Disney Worldwide Conservation Fund. 11/1/2012–10/31/2013, \$24,750.
- Rittschof, D., **M.Z. Darnell**, J.L. Hench. Whooping cranes and blue crabs: a marine conservation coupling. Oak Foundation. 8/1/2012–7/31/2013, \$89,083.
- Munguia, P., **M.Z. Darnell**, J.L. Hench, D. Rittschof, T. Schultz. Establishing a U.S.-Turkey collaboration on the introduction of blue crabs to the Mediterranean and their effects on the native ecosystems. National Science Foundation. 9/1/2011–8/31/2013, \$50,665.
- M.Z. Darnell**, Flow cues in a non-tidal estuary direct the female blue crab spawning migration. Joseph S. Ramus Endowment Fund, Duke University Marine Laboratory. 7/15/2008–10/31/2009, \$2,965.
- Rittschof, D., **M.Z. Darnell**. Distribution and movements of spawning blue crabs in non-tidal systems. North Carolina Sea Grant. 5/01/2007–4/31/2009, \$56,205.
- Rittschof, D., **M.Z. Darnell**. Effects of pot stress on mortality and viability of multiple clutches in the blue crab, *Callinectes sapidus*. North Carolina Sea Grant. 7/1/2007–12/31/2008, \$53,325.

Publications (* indicates undergraduate student co-author, # indicates graduate student co-author)

- 23) **Darnell, M.Z.**, C.C. Rittschof, J. Rittschof, C. Beach*, D. Rittschof. 2018. Autotomy of the major claw stimulates molting and suppresses feeding in fiddler crabs. *Journal of Experimental Marine Biology and Ecology* 509:66–70.
- 22) **Darnell, M.Z.**, A.A. Kemberling#. 2018. Large-scale movements of postcopulatory female blue crabs *Callinectes sapidus* in tidal and non-tidal estuaries of North Carolina. *Transactions of the American Fisheries Society* 147:716-728.
- 21) **Darnell, M.Z.**, K.M. Darnell. 2018. Geographic variation in thermal tolerance and morphology in a fiddler crab sister-species pair. *Marine Biology* 165:26.
- 20) Munguia, P., P.R.Y. Backwell, **M.Z. Darnell**. 2017. Thermal constraints on microhabitat selection and mating opportunities. *Animal Behaviour* 123:259–265.
- 19) Cunningham, S.R. *, **M.Z. Darnell**. 2015. Temperature-dependent growth and molting in early juvenile blue crabs, *Callinectes sapidus*. *Journal of Shellfish Research* 34:505–510.
- 18) **Darnell, M.Z.**, H.S. Nicholson*, P. Munguia. 2015. Thermal ecology of the fiddler crab *Uca panacea*: Thermal constraints and organismal responses. *Journal of Thermal Biology* 52:157–165.
- 17) **Darnell, M.Z.**, K.K. Fowler*, P. Munguia. 2013. Sex-specific thermal constraints on fiddler crab behavior. *Behavioral Ecology* 24:991–1003.
- 16) Kronstadt, S.M. *, **M.Z. Darnell**, P. Munguia. 2013. Background and temperature effects on *Uca panacea* color change. *Marine Biology* 160:1373–1381.
- 15) **Darnell, M.Z.** 2012. Ecological physiology of the circadian pigmentation rhythm in the fiddler crab *Uca panacea*. *Journal of Experimental Marine Biology and Ecology* 426–427:39–47.
- 14) **Darnell, M.Z.**, T.G. Wolcott, D. Rittschof. 2012. Environmental and endogenous control of selective tidal-stream transport behavior during blue crab *Callinectes sapidus* spawning migrations. *Marine Biology* 159:621–631.
- 13) **Darnell, M.Z.**, P. Munguia. 2011. Thermoregulation as an alternate function of the sexually dimorphic fiddler crab claw. *The American Naturalist* 178:419–428.
- 12) Hines, A.H., E.G. Johnson, **M.Z. Darnell**, D. Rittschof, T.J. Miller, L.J. Bauer, P. Rodgers, R. Aguilar. 2010. Predicting effects of climate change on blue crabs in Chesapeake Bay. In: Kruse, G.H., G.L. Eckert, R.J. Foy, R.N. Lipcius, B. Sainte-Marie, D.L. Stram, D. Woodby (eds) *Biology and Management of Exploited Crab Populations Under Climate Change*. Alaska Sea Grant College Program, University of Alaska Fairbanks, Fairbanks.
- 11) Rittschof, D., **M.Z. Darnell**, K.M. Darnell, M. Goldman, M.B. Ogburn, R.E. McDowell. 2010. Estimating relative abundance of the female blue crab spawning stock in North Carolina. In: Kruse, G.H., G.L. Eckert, R.J. Foy, R.N. Lipcius, B. Sainte-Marie, D.L. Stram, D. Woodby (eds) *Biology and Management of Exploited Crab Populations Under Climate Change*. Alaska Sea Grant College Program, University of Alaska Fairbanks, Fairbanks.

- 10) **Darnell, M.Z.**, K.M. Darnell, R.E. McDowell, D. Rittschof. 2010. Postcapture survival and future reproductive potential of ovigerous blue crabs *Callinectes sapidus* caught in the central North Carolina pot fishery. *Transactions of the American Fisheries Society* 139:1677–1687.
- 9) **Darnell, M.Z.**, D. Rittschof, R.B. Forward Jr. 2010. Endogenous swimming rhythms underlying the spawning migration of the blue crab, *Callinectes sapidus*: ontogeny and variation with ambient tidal regime. *Marine Biology* 157:2415–2425.
- 8) **Darnell, M.Z.**, D. Rittschof. 2010. Role of larval release pheromones and peptide mimics in abdominal pumping and swimming behavior of ovigerous blue crabs, *Callinectes sapidus*. *Journal of Experimental Marine Biology and Ecology* 391:112–117.
- 7) **Darnell, M.Z.**, D. Rittschof, K.M. Darnell, R.E. McDowell. 2009. Lifetime reproductive potential of female blue crabs *Callinectes sapidus* in North Carolina, USA. *Marine Ecology Progress Series* 394:153–163.
- 6) Forward Jr., R.B., M.H. Bourla*, **M.Z. Darnell**, J.H. Cohen. 2009. Entrainment of the circadian rhythm of the supratidal amphipod *Talorchestia longicornis* by light and temperature: mechanisms of detection and hierarchical organization. *Marine and Freshwater Behaviour and Physiology* 42:233–247.
- 5) Ramach, S.M., **M.Z. Darnell**, N.G. Avissar, D. Rittschof. 2009. Habitat use and population dynamics of blue crabs, *Callinectes sapidus*, in a high-salinity embayment. *Journal of Shellfish Research* 28:635–640.
- 4) **Darnell, M.Z.**, M.B. Ogburn, H. Diaz. 2008. A novel running wheel apparatus to monitor locomotor rhythms in land crabs. *Marine and Freshwater Behaviour and Physiology* 41:205–210.
- 3) Welch, M.E., **M.Z. Darnell**, D.E. McCauley. 2006. Variable populations within variable populations: quantifying mitochondrial heteroplasmy in natural populations of the gynodioecious plant *Silene vulgaris*. *Genetics* 174:829–837. Featured as Editor's Choice in *Science* 314:1050.
- 2) Forward Jr., R.B., J.H. Cohen, **M.Z. Darnell**, A. Saal. 2005. The circatidal rhythm in vertical swimming of female blue crabs, *Callinectes sapidus*, during their spawning migration: A reconsideration. *Journal of Shellfish Research* 24:587–590.
- 1) McCauley, D.E., M.F. Bailey, N.A. Sherman, **M.Z. Darnell**. 2005. Evidence for paternal transmission and heteroplasmy in the mitochondrial genome of *Silene vulgaris*, a gynodioecious plant. *Heredity* 95:50–58.

Manuscripts in Review (* indicates undergraduate student co-author, # indicates graduate student co-author)

Kuhn[#], A.A., **M.Z. Darnell**. *In Review*. Elevated temperature decreases intermolt period and growth per molt in the lesser blue crab, *Callinectes similis*.

Teaching Experience

The University of Southern Mississippi: Global Change Biology (2018), Topics in Fisheries Ecology (2017), Marine Animal Behavior (2017).

Louisiana Universities Marine Consortium (LUMCON): Marine Invertebrate Ecology (2016), Marine Field Ecology (2014).

Nicholls State University: Invertebrate Zoology (2014–2016), Introduction to Marine Biology (2013–2015), Marine and Environmental Biology I (2014–2015).

The University of Texas at Austin: Marine Invertebrates (2013), Research Methods in Biological Oceanography (2013), Laboratory Studies in Marine Ecology (2011–2012), Marine Environmental Science (2011).

Graduate Students Advised

Christian Hayes, Ph.D. student (2017–): Variation in Turtlegrass (*Thalassia testudinum*) Habitat Complexity, Secondary Production, and Trophic Dynamics across the Northern Gulf of Mexico. Co-advised with Kelly M. Darnell.

Helen Olmi, Ph.D. student (2016–): Migratory movements, fishing mortality, and reproductive output of the Louisiana blue crab spawning stock.

Lennah Shakeri, M.S. student (2018): Linkages between marsh fragmentation, prey availability, and blue crab abundance and mortality.

Adam Kemberling, M.S. (2018): Regional variation in migratory behavior and reproductive output of the Gulf of Mexico blue crab spawning stock.

Abby Kuhn, M.S. (2017): Effects of temperature on growth and molting in blue crabs *Callinectes sapidus* and lesser blue crabs *Callinectes similis*.

Samantha Humphrey, M.S. (2016): Proximate cues underlying maternal care behaviors in blue crabs.

Graduate Committees

Branden Kohler, M.S. student (2017–): Thesis title TBD.

April Panyi, M.S. student (2016–): Interrelationships among Monorchiid trematodes with special emphasis on some Northwestern Atlantic genera.

Andrew Claxton, Ph.D. student (2016–): Dissertation title TBD.

Jeremy Johnson, M.S. student (2016–): Analysis of the effects of atorvastatin on *Xenopus tropicalis*.

Juan M. Carillo, Ph.D. student (2013–): Effects of White Spot Syndrome Virus and the parasitic dinoflagellate *Hematodinium perezii* on catch per unit effort of the blue crab (*Callinectes sapidus*) from the Mississippi Sound.

Frank Yrle, M.S. (2017): Spatio-temporal characterization of barrier island vegetation using a small unmanned aircraft system.

Thomas J. Fayton, Ph.D. (2017): Taxonomy and systematics of the freshwater Plagioporines (Trematoda) with descriptions of 10 new species of *Plagioporus* from freshwater fishes of the Nearctic.

Ashley Booth, M.S. (2016): Impact of molt-inhibiting PBDEs on epidermal ecdysteroid signaling in *Callinectes sapidus*: an initial mechanistic look into disruption of crustacean molting.

Stacy Calhoun, M.S. (2015): Analysis of exoskeletal content and epidermal enzymatic activity during the molting cycle of the blue crab, *Callinectes sapidus*.

Invited Presentations

The blue crab spawning migration in a changing Gulf of Mexico. Institute for Marine and Environmental Technology, University System of Maryland. 9/27/2017.

Fiddler crabs of the Gulf of Mexico. Grand Bay National Estuarine Research Reserve. 9/20/2017.

Thermal constraints on reproduction in marine and intertidal crabs. Loyola University New Orleans. 9/19/2017.

Linking movement ecology to fisheries management: Decision rules and behavioral plasticity underlying blue crab migrations. USGS Wetland and Aquatic Research Center. 10/20/2015.

Large-scale movements of the blue crab spawning stock in the Gulf of Mexico: a Gulf-wide mark-recapture effort. Blue Crab Subcommittee, Gulf States Marine Fisheries Commission. 10/13/2014.

Sexually dimorphic thermal constraints on fiddler crab behavior and morphology. LSU Museum of Natural Science. 2/7/2014.

Blue crab recruitment monitoring in the Mission-Aransas National Estuarine Research Reserve. Texas Commission on Environmental Quality Surface Water Quality Monitoring Workshop. 12/6/2012.

Blue crab biology in Texas estuaries. Mission-Aransas NERR Blue Crabs and Texas Coastal Ecosystems Workshop. 1/26/2011.

Blue crab life history, ecology, and potential responses to altered salinity and freshwater inflow. Guadalupe-San Antonio Basin and Bay Expert Science Team Blue Crab Workshop. 11/19/2010.

Spawning biology and lifetime reproductive potential of female blue crabs. Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi. 4/23/2010.

Contributed Presentations at Conferences (last 5 years)

Darnell, M.Z., A.A. Kemberling, H. Olmi. 2018. Large-scale movements of spawning female blue crabs in the Gulf of Mexico: A Gulf-wide mark-recapture study. Benthic Ecology Meeting, Corpus Christi, TX.

- Darnell, M.Z., L.M. Shakeri, K.M. Darnell, T.J.B. Carruthers. 2017. Effects of marsh fragmentation of juvenile and adult blue crab abundance. Coastal & Estuarine Research Federation Biennial Meeting, Providence, RI.
- Munguia, P., P.R.Y. Backwell, M.Z. Darnell. 2017. Thermal constraints on microhabitat selection and mating opportunities in fiddler crabs. Society for Integrative and Comparative Biology Annual Meeting, New Orleans, LA.
- Darnell, M.Z., K.M. Darnell. 2016. Latitudinal gradients in thermal tolerance and morphology in a fiddler crab species pair. Benthic Ecology Meeting, Portland, ME.
- Darnell, M.Z. 2015. Temperature, growth, and size at maturity: Global patterns and implications for crab fisheries under climate change. American Fisheries Society Annual Meeting, Portland, OR.
- Rittschof, C.C., J. Rittschof, D. Rittschof, C. Beach, M.Z. Darnell. 2015. Costs of autotomy: Major claw autotomy causes cessation of feeding in male fiddler crabs. Benthic Ecology Meeting, Quebec City, Canada.
- Darnell, M.Z. 2014. Evidence for an offshore blue crab spawning stock in the Gulf of Mexico and implications for fisheries management. Gulf Estuarine Research Society, Port Aransas, TX.
- Darnell, M.Z. 2014. Temperature-dependent growth and size-at-maturity in the blue crab *Callinectes sapidus*. Louisiana Chapter of the American Fisheries Society, Thibodaux, LA.
- Darnell, M.Z. 2014. Temperature-dependent growth and size-at-maturity in the blue crab *Callinectes sapidus*. Texas Bays and Estuaries Meeting, Port Aransas, TX.
- Darnell, M.Z. 2014. Size-at-age vs. size-at-stage: Environmental control of blue crab growth rates. Benthic Ecology Meeting, Jacksonville, FL.
- Darnell, M.Z. 2014. Size-at-age vs. size-at-stage: Environmental control of blue crab growth rates. Society for Integrative and Comparative Biology Annual Meeting, Austin, TX.
- Darnell, M.Z. 2013. Spatial dynamics of blue crab spawning in Texas bays, estuaries, and offshore waters. Texas Bays and Estuaries Meeting, Port Aransas, TX.

Honors and Awards

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| 2018 | Nina Bell Suggs Endowed Professorship, The University of Southern Mississippi |
| 2016 | Top 10 Grantsmanship Award, Nicholls State University (for 2 nd highest annual grant funding university-wide) |
| 2015–2017 | Early-Career Research Fellowship, Gulf Research Program, National Academies of Sciences, Engineering, and Medicine (\$76,000) |
| 2015 | Travel Grant for Emerging Faculty, Louisiana Board of Regents |
| 2008–2009 | Preparing Future Faculty Fellowship, AACU/CGS |

- 2008–2009 Robert W. Safrit Jr. Fellowship, Duke University
- 2006 Best Poster, Gulf of Mexico Graduate Student Symposium
- 2005–2006 Graduate Fellowship, Duke University Marine Laboratory

Professional and University Activities

Editorial responsibilities: *Associate Editor*, Gulf and Caribbean Research (2015–present); Assistant Editor, Deep-Sea Research II special issue: The Northern Chukchi Sea Benthic Ecosystem: Characterization, Biogeochemistry, and Trophic Linkages (2014).

Review responsibilities: *Review panelist* for Georgia Sea Grant, National Science Foundation; *Proposal reviewer* for Georgia Sea Grant, Maryland Sea Grant, North Carolina Sea Grant, South Carolina Sea Grant, Illinois Water Resources Center; *Manuscript reviewer* for Aquaculture Research, Aquatic Biology, Biology Letters, Diseases of Aquatic Organisms, Ecosphere, Estuaries and Coasts, Evolutionary Ecology, Global Ecology and Biogeography, Hydrobiologia, Invertebrate Reproduction and Development, Journal of Animal Ecology, Journal of Crustacean Biology, Journal of Experimental Marine Biology and Ecology, Marine and Freshwater Behaviour and Physiology, Marine Ecology Progress Series, Oecologia, Revista de Biología Tropical, Transactions of the American Fisheries Society, Turkish Journal of Fisheries and Aquatic Sciences.

Service positions held: Secretary-Treasurer, Gulf Estuarine Research Society (2015–present); Program Director, ASPIRE (Awards for Students and Postdocs for Innovation and Research Excellence), University of Texas Marine Science Institute (2012–2013); Ph.D. Student Representative, Duke University Marine Laboratory (2007–2008).

Professional memberships: American Fisheries Society, American Society of Naturalists, Animal Behavior Society, Gulf Estuarine Research Society, National Shellfisheries Association, Society for Integrative and Comparative Biology, The Crustacean Society, Sigma Xi.

Conference service: Symposium organizer, *Challenges, Opportunities, and Innovation in Crustacean Fisheries*, 2015 and 2018 Annual Meetings of the American Fisheries Society; Session co-organizer, *Relationships Between Commercially Fished Invertebrates and their Habitats*, 2017 Biennial Meeting of the Coastal and Estuarine Research Federation.