

## KARL DAVID CASTILLO

## CURRICULUM VITAE

### PRESENT ADDRESS

University of North Carolina at Chapel Hill  
Department of Marine Sciences  
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### HOME ADDRESS

1700 Baity Hill Drive  
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### RESEARCH INTEREST

#### **Coral Ecophysiology**

My research interest falls between the boundaries of ecology and physiology. Therefore, as a coral physiological ecologist, I quantitatively link experiments conducted under controlled laboratory conditions to those conducted in the field to examine how corals interact with their physical environment and how they respond physiologically.

#### **Other Interests**

General Biology, Marine Biology, Conservation Biology, Global Change Biology, Marine Ecology, Coral Reef Ecology, Marine Physiological Ecology, Coral Reef Conservation

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### EDUCATION

#### **Postdoctoral Research Associate**

University of North Carolina at Chapel Hill, Marine Sciences Department (July 2008)  
Coral Ecophysiology and Conservation (Advisors: Dr. John Bruno and Dr. Justin Ries)

#### **Ph. D.** University of South Carolina, Marine Science Program (May 2008)

Dissertation: "Local Scale Coral Physiological Response: A Comparison between Inner Lagoon and Outer Barrier Reef Conspecifics" (Advisor: Dr. Brian Helmuth)

#### **M.S.** University of South Carolina, Marine Science Program (December, 2003)

Thesis: "Effects of Elevated Seawater Temperature on the Scleractinian Coral *Montastraea annularis* from the Inner and Outer Reefs of Southern Belize" (Advisor: Dr. Brian Helmuth)

#### **B.S.** Southeast Missouri State University, Department of Biology (May, 1998)

Majors: Biology and Unified Sciences Education Minor: Environmental Science  
(Advisor: Dr. Margaret Waterman)

#### **Trained Teacher's Diploma**

Belize Teachers' College, now University of Belize (UB), (October, 1994),  
Major: Education

#### **Associates Degree**

Dangriga Ecumenical College (May, 1989), Majors: Biology and Chemistry

### TEACHING EXPERIENCE

**GK-12 Teaching Fellow**, Center for Teaching Excellence, University of South Carolina, 2007 - 2008.

**Graduate Teaching Assistant**, Marine Science Program, University of South Carolina, 2002 – 2007. Includes teaching labs sections for several courses

**Lecturer**, Natural Resource Management Program, University of Belize, Toledo Campus 1998 – 2001. Includes planning and lecturing of several undergraduate and graduate level classes

**Teacher**, Roman Catholic Schools, 1989 – 1998. Includes teaching, supervision of environmental club activities, gathering of teaching resources, and preparation of teaching aids, and instruction and management of classes

## **COURSES TAUGHT**

**Coral Reefs and Climate Change (MASC 741) – Marine Sciences Department – University of North Carolina at Chapel Hill (Co-instructor with Dr. John Bruno and Dr. Justin Ries) –** A seminar style class addressing how global climate change, including acidification and ocean warming, are affecting tropical marine plants and animals with emphasis on reef-building corals (Fall 2009).

**Physical and Chemical Oceanography (MSCI 312L) – Marine Science Program – University of South Carolina** - An upper level undergraduate class emphasizing properties of seawater, mass balance, biogeochemical cycles, circulation, mixing, waves and tides, continental shelf processes, and estuarine dynamics. Includes three laboratory hours per week with one scheduled field trip (2004, 2005)

**Biology of Marine Organisms (MSCI 311L) – Marine Science Program – University of South Carolina** - An upper level undergraduate course emphasizing biological concepts and adaptations to the marine environments; Laboratory experiments emphasize principles and techniques of marine biological study. Three laboratory hours per week with a required one-day field trip (2004, 2005).

**Oceans and Man (MSCI 210L) – Marine Science Program – University of South Carolina**  
An introductory level marine science course designed to familiarize non-marine science majors with basic marine ecological concepts. This course focuses on the interactions of man with the oceans. Includes one laboratory hour per week with a scheduled weekend field trip (2006, 2007).

**The Ocean Environment (MSCI 101L) - Marine Science Program – University of South Carolina**  
An introductory level marine science course that emphasizes oceanic evolution and origin, specifically plate tectonics, ocean circulation, chemical composition, and primary production. Includes three laboratory hours per week and a scheduled field trip (2004, 2005).

**Primary Science Biological Concepts – Primary Education - University of Belize**  
An upper level undergraduate course designed specifically to introduce elementary school teachers to more detailed biological concepts, which in turn should allow them to feel more comfortable teaching science at the elementary level (1999, 2000).

**Field Ecology – Natural Resource Management Program - University of Belize**  
An upper level undergraduate class designed to expose students to ecological concepts such as population and population interactions, communities and ecosystems from a more field base perspective. Includes two lecture hours per week and one field based laboratory exercise per week (1999 – 2000).

**Introduction to Marine Ecology – Natural Resource Management Program – University of Belize** An introductory level marine science course designed to familiarize students with marine ecological concepts. This course focuses on the structure, dynamics, and interactions between populations and communities in marine systems. Three hours per week with a scheduled weekend field trip (1999 - 2000).

## **HONORS AND AWARDS**

**Guest Lecture, The Marine Environment (MASC 101/GEOL 103), UNC-Chapel Hill (2008-2009)**

**Guest Lecture, Marine Ecology (BIOL 462)**, UNC-Chapel Hill (2008)

**Invited Speaker, Conference for Conservation Science**, Earthwatch Institute (2008)

**Carolina Postdoctoral Fellowship for Faculty Diversity**, UNC-Chapel Hill 2008

**Preparing Future Faculty Credentials**, Center for Teaching Excellence, University of South Carolina, 2007-2008

**GK-12 Fellowship**, Center for Teaching Excellence, University of South Carolina, 2007-2008

**Guest Lecture, Marine Ecology (BIOL 575)**, USC Columbia 2006

**Best Poster Presentation**, Southeastern Ecology and Evolution Conference, University of Georgia, Athens GA, 2005

**Mellon Scholar**, University of Washington, Friday Harbor Laboratories Centennial Celebrations, 2004

**Dean's List**, College of Science and Technology, Southeast Missouri State University, 1997-1998

**Outstanding Contribution to Student Support Services**, for tutoring Trigonometry and Human Anatomy/Physiology, Southeast Missouri State University 1996-1997

**Fulbright Scholar**, Southeast Missouri State University, Central American Program for Undergraduate Scholars (CAMPUS) 1996-1998

**Belize Government Scholarship**, Belize Teachers' College, 1993-1995

### **SCHOLARLY PUBLICATIONS**

- 2009 **Castillo KD**, Ries JB, Weiss JW. Influence of thermal history on extension rates of *Siderastrea siderea* from the forereefs, backreefs, and inner reefs of southern Belize. *in prep. Coral Reefs*
- 2009 **Castillo KD**, Ries JB, Weiss JW. Declining skeletal extension rates in forereef and inner reef colonies of *Siderastrea siderea* on the Mesoamerican Barrier Reef, southern Belize. *in prep. PLoS ONE*
- 2009 **Castillo KD**, Influence of temperature on changes in dominant benthos cover in the inner lagoon and outer barrier reefs of southern Belize. *in prep. Bulletin of Marine Science*
- 2009 **Castillo KD**, Kemp D. A comparison of thermal history and maximum photochemical efficiency ( $F_v/F_m$ ) in inner lagoon and outer barrier reef *Montastraea faveolata*. *in prep. Marine Ecology Progress Series*
- 2009 **Castillo KD**, Lima FP. A comparison of sea surface temperature derived from MODIS Terra/Aqua and subtidal measurements from the inner lagoon and outer barrier reefs of southern Belize. *in review. Limnology and Oceanography: Methods*
- 2008 **Castillo KD** Local scale coral physiological response: A comparison between inner lagoon and outer barrier reefs conspecifics. Ph.D. Dissertation
- 2005 **Castillo KD**, Helmuth BS. Influence of thermal history on the response of the *Montastraea annularis* to short-term temperature exposure. *Marine Biology* 148:261-270
- 2004 **Castillo KD**, Effects of elevated seawater temperature on the scleractinian coral *Montastraea annularis* from the inner and outer reefs of southern Belize. M.S. Thesis

**PRESENTATIONS**

- 2009 Influence of thermal history on inner reef and outer barrier reef coral conspecifics – Marine Science Seminar- University of North Carolina at Chapel Hill – Oral Presentation - Chapel Hill, North Carolina, September 30
- 2009 Coral reefs under rapid climate change – Climate Leadership and Energy Awareness Program (Climate LEAP) – University of North Carolina at Chapel Hill – Oral Presentation – Chapel Hill North Carolina, June 17
- 2009 Spatial and temporal variability of pigmentation in *Montastraea faveolata* and *Porites asteroides* from the inner lagoon and outer barrier reefs of southern Belize – Symbiofest – Oral Presentation -Athens, Georgia, May 10
- 2008 A comparison of thermal history and  $F_v/F_m$  in inner lagoon and outer barrier reef *Montastraea faveolata* “International Coral Reef Symposium 2008 – Oral Presentation – Fort Lauderdale, Florida July 7-11
- 2008 A comparison of sea surface temperature derived from MODIS TERRA/AQUA and subtidal measurements from inner lagoon and outer barrier reefs of southern Belize,” 2008 Ocean Science Meeting – Oral Presentation – Orlando, Florida March 2-7
- 2005 A comparison of thermal histories for *Montastraea annularis* from the inner and outer reef of Southern Belize”, Symbiofest 2005 – Oral Presentation – Athens, Georgia April 29
- 2005 Managing for resistance – linking coral physiology to marine protected area design” Student Conference on Conservation Science, - Poster – Duke University, Durham NC, March 16-18,
- 2005 Influence of thermal history on the physiological response of the scleractinian coral *Montastraea annularis* to short-term temperature changes in the Gulf of Honduras.” Southeastern Ecology and Evolution Conference (SEEC), - Poster – Athens Georgia, March 11-13
- 2004 Influence of thermal history on the physiological response of the scleractinian coral *Montastraea annularis* to short-term temperature changes in the Gulf of Honduras.” Managing for Resilience: An Integrated Approach to Coastal Marine Science and Conservation, - Poster – University of Washington, Friday Harbor Labs, August 23-27
- 2004 Effects of elevated seawater temperature on the scleractinian coral *Montastraea annularis* from the inner and outer reefs of southern Belize,” Society for Integrative and Comparative Biology (SICB), - Oral Presentation - New Orleans, Louisiana January 5–9
- 2003 Resistance and resilience in coral communities along the Mesoamerican Barrier Reef Corridor - Connectivity and Resilience: Coordination between MAR, ERP, GCERA, and USC.” - Oral Presentation - Columbia SC September 7 – 12
- 1999 Update on the status of Conservation Agricultural Network in Belize” Annual Meeting Rainforest Alliance, - Oral Presentation -New York, New York March 25–31
- 1999 Current status of watersheds within the Maya Mountain Marine Area Transect (MMMAT)” Annual Freshwater Initiative Meeting, - Oral Presentation - FWI Peoria, Illinois April 7–14

**RESEARCH EXPERIENCE**

**Aquanaut, Aquarius Underwater Research Habitat,** Role of sponges in nitrogen cycling and total respiration, with Dr. Niels Lindquist and Dr. Chris Martens (September 2008)

**Ph. D. Research**, Coral Physiology, Gulf of Honduras, Belize (2004-2008)

**Research Monitoring Team Leader**, Atlantic and Gulf Rapid Reef Assessment (AGRRA), (2006)

**Conservation Research Field Director**, Earthwatch Institute's Belize Conservation Research Initiative (2005-2006)

**Research Assistant, Aquarius Underwater Research Habitat**, Decoupling the effects of mass transfer, water motion and temperature on reef health, to Dr. Brian Helmuth, USC-LUMCON Mission, Key Largo Florida (October 2002)

**M.S. Research**, Coral Physiology, Gulf of Honduras, Belize (2002-2003)

**Research Team Leader**, Green Reef/TNC, Grouper monitoring, Sapodilla Caye Marine Reserve Site

**Scientific Research Coordinator**, Toledo Institute for Development and Environment (TIDE)

### **FUNDED GRANTS AND FELLOWSHIPS**

**Carolina Postdoctoral Fellowship for Faculty Diversity**, US\$ 87,000.00 – Postdoc Research

**Center for Teaching Excellence**, US\$ 40,500.00 - GK-12 Fellowship

**World Wildlife Fund**, US\$13,000.00 - AGRRA Monitoring Southern Belize

**Green Reef/TNC**, US\$ 3,000.00 - Annual Nassau Grouper Monitoring, Sapodilla Cayes Marine Reserve

**Freshwater Initiative Program (TNC)**, ~US\$4,000.00 - Hydrolab Minisonde Mini-Grant

**Fulbright Scholarship**, ~ US\$70,000.00 - Central American Program for Undergraduate Scholars

**Belize Government Scholarship**, ~US\$22,000.00 - Belize Teachers' College

### **PROFESSIONAL AND COMMUNITYSERVICE**

**Reviewer for:** *Marine Ecology Progress Series, Limnology and Oceanography, Invertebrate Biology*

#### **Graduate Students Mentored**

Andrea Anton – University of North Carolina – presently Ph.D. student at UNC-Chapel Hill

Ann Mooney – University of North Carolina – presently Ph.D. students at UNC-Chapel Hill

#### **Undergraduate Students Mentored**

Andrae Genus – Tuskegee University - presently M.S. student at Tuskegee University

Isani Chan – University of Belize – presently employed with Belize Fisheries Department

Fern Gutierrez – University of Belize – presently student at University of Belize

#### **Others Service**

Treasurer - USC Marine Science Graduate Society (MSGS), South Carolina

Volunteer - South Carolina Department of Natural Resources (assist regional conservation plan)

Timekeeper, Question Writer, Science Judge - National Ocean Science Bowl (NOSB), SC

Marine Science Club Volunteer, Spring Valley High School, South Carolina

Board Member - Toledo Community College, Belize

Development Committee Member – University of Belize, Belize

Science Fair Judge – Satchel Ford Elementary, South Carolina

## **PROFESSIONAL ASSOCIATIONS**

SCMEA – South Carolina Marine Educators Association  
ASLO – American Society of Limnology and Oceanography  
DAN – Divers Alert Network  
IANTD - International Association of Nitrox and Technical Divers  
AAUS – American Academy of Underwater Scientist

## **REFERENCES**

**John Bruno**, Associate Professor, Department of Marine Sciences, University of North Carolina at Chapel Hill, (919) 962-0263, [jbruno@unc.edu](mailto:jbruno@unc.edu)

**Justin Ries**, Assistant Professor, Department of Marine Sciences, University of North Carolina at Chapel Hill, (919) 962-0269, [jries@unc.edu](mailto:jries@unc.edu)

**Brian Helmuth**, Associate Professor, Biological Sciences Department and Marine Science Program, University of South Carolina, (803) 777-2100, [helmuth@biol.sc.edu](mailto:helmuth@biol.sc.edu)

**Jed Lyons**, Professor, Department of Mechanical Engineering and Faculty Director, Center for Teaching Excellence, University of South Carolina, (803) 777-9552, [lyons@enr.sc.edu](mailto:lyons@enr.sc.edu)