

KRISTINA MARSTRAND CAMMEN

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marine mammal science	❖	ecological and evolutionary genomics	❖	ocean health
Duke University , Durham, NC Nicholas School of the Environment Ph.D., Ecology, 2014		University of Cambridge , United Kingdom M.Phil, Zoology, 2008		University of Maryland , College Park, MD B.S., Biology & Psychology, 2007

I. PROFESSIONAL APPOINTMENTS

Assistant Professor of Marine Mammal Science – 2017-present
School of Marine Sciences, University of Maine

NSF Postdoctoral Research Fellow – 2015-2017
School of Marine Sciences and School of Biology & Ecology, University of Maine

Postdoctoral Teaching and Research Associate – 2014-2015
School of Marine Sciences, University of Maine

II. RESEARCH EXPERIENCE

University of Maine, Orono, ME – Postdoctoral research associate, 2014-present
Ongoing research focused on evolutionary ecology and disease ecology of gray and harbor seals in the Northwest Atlantic. In collaboration with NOAA Northeast Fisheries Science Center, Canada Department of Fisheries and Oceans, and St. Mary's University.

Duke University Marine Lab, Beaufort, NC – PhD student, 2008-2014
Utilized both candidate gene and genome-wide approaches to study resistance to harmful algal blooms in populations of bottlenose dolphins in the Gulf of Mexico. In collaboration with the Sarasota Dolphin Research Program, Mote Marine Laboratory, and NOAA Southeast Fisheries Science Center.

Trained undergraduate and Masters students in molecular techniques, including microsatellite genotyping of ice seals and genetic sexing of seals and Antarctic humpback whales. Collaborated with researchers studying population genomics of blue crabs and ecotoxicogenomics of killifish. Research assistant for Marine Species Monitoring for the U.S. Navy's Atlantic Fleet Training and Testing.

University of Cambridge, Cambridge, United Kingdom – Masters student, 2007-2008
Studied the immunogenetics of grey seals and described variation at a major histocompatibility complex (MHC) gene. Used population genetic analyses to investigate differences in selective pressure among colonies that vary in habitat and number and diversity of pathogens present.

Harbor Branch Oceanographic Institution, Marine Mammal Program, Ft. Pierce, FL – Research intern, 2007

Conducted research on relationship between social affiliation patterns and transmission of an emerging disease in bottlenose dolphins. Acquired experience in marine mammal fieldwork and exposure to population-scale epidemiological study in a natural population.

National Aquarium, Marine Animal Rescue Program, Baltimore, MD – Intern & Volunteer, 2005-2007
Conducted research on causes of past marine mammal unusual mortality events. Analyzed geospatial stranding data in relation to environmental factors. Gained exposure to federal marine policy.

National Oceanic and Atmospheric Administration (NOAA), Office of Protected Resources, Marine Mammal Division, Silver Spring, MD – Research intern, 2002-2004

Conducted research on causes of past marine mammal unusual mortality events. Analyzed geospatial stranding data in relation to environmental factors. Gained exposure to federal marine policy.

III. TEACHING EXPERIENCE

University of Maine, Orono, ME

Ecology and Conservation of Marine Mammals, *Instructor*, Fall 2014 and 2015

Ocean Health Issues for Humans, Wildlife & Marine Ecosystems, *Co-Instructor*, Spring 2015

Duke University Marine Lab, Beaufort, NC

Marine Molecular Microbiology (Lecture & Lab), *Co-Instructor*, Fall 2012

Marine Ecology (Lecture & Lab), *Teaching Assistant & Guest Lecturer*, Fall 2011

Marine Mammals (Lecture & Lab), *Teaching Assistant & Guest Lecturer*, Summer 2009-2011, Fall 2010

Ichthyology (Lecture & Lab), *Teaching Assistant & Guest Lecturer*, Spring 2010

Marine Invertebrate Zoology (Lecture & Lab), *Teaching Assistant*, Spring 2011

Genetics and Cellular Biology, *Teaching Assistant*, Fall 2009

Workshop on Genomics, Cesky Krumlov, Czech Republic, *Teaching Assistant*, 2013

International workshop teaching experimental design and data analysis for genomic studies.

Research Supervision

University of Maine, Marine Sciences Capstone Undergraduate Students: Nicole Dubois, *Spatial and temporal trends of harbor seal pup abandonment in the Gulf of Maine*, 2015-2016; Andrea Garcia, *Spatial and temporal trends in gray seals in Maine compared to Canada and Massachusetts*, 2015-2016; Lindsay Fitzgerald, *Humpback whales in the Gulf of Maine: How they use sound and anthropogenic sound impacts*, 2015; Allison Culkin, *A literature review of the physical, psychological and social effects of captivity on killer whales*, 2014-2015; Morgan Smith, *The effects of the use of educational tools on the knowledge of whale watch passengers*, 2014-2015.

Duke University, Masters of Environmental Management Student: Brianne Soulen, *Genetic analysis of stranded ice seals in the Northwest Atlantic*, 2010-2011

Duke University, Independent Study Undergraduate Students: Alison Hall (Carleton College), *Genetic sexing of Antarctic minke whales*, Fall 2013; Logan Pallin, *Genetic sexing of Antarctic humpback whales*, Summer 2013; Elizabeth Campbell (Universidad de Valle de Guatemala), *Genetic sexing of harp seals*, Spring 2011; Meredith Chase, *Genetic sexing of humpback whales*, Spring 2011; Tammy Chin, *Variation in the MHC gene among dolphin populations*, Fall 2009

IV. RECENT GRANTS AND FELLOWSHIPS

NSF Postdoctoral Fellowship in Biology, 2015 – Evolutionary ecology of population decline and rebound in sympatric pinniped species in the northwest Atlantic (\$138,000)

PADI Foundation, 2015 – Conservation genomics of protected species recovery: A case study of gray seal population growth in the Northwest Atlantic (\$5,000)

American Genetic Association, 2013 – Special Event Award to host workshop entitled, Marine mammal genomics: Applications to ecology, evolution, and conservation (\$11,000)

Funding for PhD research: Bottlenose dolphin susceptibility to HABs in the Gulf of Mexico

American Fisheries Society, Steven Berkeley Conservation Fellowship, 2010 (\$10,000)

PADI Foundation, 2010 (\$8,600)

Duke University Marine Lab Kaupe Research Grant, 2009 (\$2,900)

Duke University Katherine Goodman Stern Fellowship, 2013

Duke University Scholars Program Fellowship, 2008

James B. Duke Fellowship, 2008-2012

V. PEER-REVIEWED PUBLICATIONS

Cammen KM, Andrews KR, Carroll EL, Foote AD, Humble E, Khudyakov JI, Louis M, McGowen MR, Olsen MT, Van Cise AM (2016) Genomic methods take the plunge: recent advances in high-throughput sequencing of marine mammals. *Journal of Heredity*. **107**:481-495.

- Greenberg R, **Cammen KM**, Wilson AG, Olsen BJ, Ballentine B, Rotzel N, Fleischer R (2016) Geographic population structure and subspecific boundaries in a tidal marsh sparrow. *Conservation Genetics* **7**: 603-613
- Cammen KM**, Schultz TS, Rosel PE, Wells RS, Read AJ (2015) Genome-wide investigation of adaptation to harmful algal blooms in bottlenose dolphins. *Molecular Ecology* **24**: 4697-4710.
- Cammen KM**, Wilcox LA, Rosel PE, Wells RS, Read AJ (2015) From genome-wide to candidate gene: An investigation of variation at the major histocompatibility complex in bottlenose dolphins exposed to red tides. *Immunogenetics* **67**:125-133.
- Cammen KM**, Rosel PE, Wells RS, Read AJ (2014) Lack of variation in voltage-gated sodium channels of common bottlenose dolphins exposed to neurotoxic algal blooms. *Aquatic Toxicology* **157**:150-158.
- Soulen BK*, **Cammen KM***, Schultz TF, Johnston DW (2013) Factors affecting harp seal (*Pagophilus groenlandicus*) strandings in the Northwest Atlantic. *PLoS ONE* **8**:e68779.
*authors contributed equally to this manuscript
- Cammen KM**, Hoffman JI, Knapp LA, Harwood J, Amos W (2011) Geographic variation of the major histocompatibility complex in Eastern Atlantic grey seals. *Molecular Ecology* **20**:740-752.
- Bossart G, Peden-Adams M, Romano T, Rice C, Fair P, Goldstein J, **Cammen K**, Reif J (2008) Hematological, biochemical and immunological findings in Atlantic bottlenose dolphins (*Tursiops truncatus*) with orogenital papillomas. *Aquatic Mammals* **34**:166-177.

In Preparation

- Cammen KM**, Steneck R (In revision) Looking back to see forward: expanding perspectives on cross-species pinniped recovery. *Conservation Biology*
- Jayasundara N, Fernando PW, Osterberg JS, **Cammen KM**, Schultz TF, Di Giulio RT (In review) Cost of tolerance: fitness consequences of contemporary evolution to an anthropogenic stressor in teleost fish. *Environmental Science & Technology*.
- Cammen KM**, Vincze S, Hellar S, McLeod B, Kinnison M, Frasier T (In prep) Genetic diversity from bottleneck to recovery in two sympatric pinniped species in the Northwest Atlantic. *Cons Genetics*.
- Osterberg J, Schultz T, **Cammen KM**, Clark B, Di Giulio R (In prep) RADseq of adapted Atlantic killifish, *Fundulus heteroclitus*, subpopulations from the Elizabeth River, VA. *Molecular Ecology*.

VI. PRESENTATIONS (*Invited)

- *Cammen, K. (2016). Insights from genome-enabled marine mammal science. Dalhousie University, Biology Seminar Series, Halifax, Nova Scotia, Canada.
- *Cammen, K. (2016). From genome-wide to candidate gene: investigating marine mammal adaptation to coastal ocean stressors. University of New England, Marine Science Seminar Series, Biddeford, ME.
- *Cammen, K. (2016). Molecular perspectives on marine mammal health: understanding evolutionary adaptation to coastal ocean stressors. University of Maine, School of Marine Sciences Seminar Series, Orono, ME.
- Cammen, K. (2015). From genome-wide to candidate gene: Investigating adaptation in bottlenose dolphins. Workshop on Marine Mammal Genomics II. 21st Biennial Conference on the Biology of Marine Mammals. San Francisco, CA.
- *Cammen, K. (2015). From genome-wide to candidate gene: evolutionary adaptation in marine mammals. Bates College Department of Biology, Lewiston, ME.
- *Cammen, K. (2015). Dolphins (and seals), DNA, and disease. Coastal Studies for Girls, Freeport, ME.
- *Cammen, K. (2014). Genome-wide investigation of adaptation to harmful algal blooms in bottlenose dolphins. University of Maine, School of Marine Sciences Seminar Series, Orono, ME.
- Cammen, K. (2014). Genome-wide investigation of adaptation to harmful algal blooms in bottlenose dolphins. Duke University Marine Lab Seminar Series, thesis presentation, Beaufort, NC.

- Cammen, K., Rosel, P., Schultz, T., Wells, R., Read, A. (2013). Genome-wide investigation of adaptation to harmful algal blooms in bottlenose dolphins. 20th Biennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand.
- *Cammen, K. (2013). DNA, dolphins, and disease. Duke University Alumni Association, Beaufort, NC.
- *Cammen, K. (2011). Evolution of solutions to natural problems facing marine mammals. Elizabeth City State University, Environmental Studies Guest Lecture, Elizabeth City, NC.
- *Cammen, K. (2011). Evolution of solutions to natural problems facing marine mammals. Hampton University, Marine Biology Guest Lecture, Hampton, VA.
- *Cammen, K. (2011). Threats to Marine Mammals: A case study of red tides & dolphins. Meredith College, Environmental Studies Guest Lecture, Raleigh, NC.
- Cammen, K., Rosel, P., Wells, R., Read, A. (2011). The influence of variation in voltage-gated sodium channel genes on susceptibility of bottlenose dolphins to harmful algal blooms. 19th Biennial Conference on the Biology of Marine Mammals, Tampa, FL.
- Cammen, K. (2009). Genetic variation at the MHC in grey seals. 18th Biennial Conference on the Biology of Marine Mammals, Quebec City, Canada
- Cammen, K. (2009). Genetic variation at the MHC in grey seals. Southeast and Mid-Atlantic Marine Mammal Symposium, Wilmington, NC.

Poster Presentations

- Cammen, K., Rosel, P., Schultz, T., Wells, R., Read, A. (2014). An investigation of adaptation in bottlenose dolphins exposed to harmful algal blooms using complementary genome-wide and candidate gene approaches. American Genetic Association Symposium, Seattle, WA.
- Cammen, K., Rosel, P., Schultz, T., Wells, R., Read, A. (2013). Genome-wide investigation of adaptation to harmful algal blooms in bottlenose dolphins. Gordon Research Conference on Ecological and Evolutionary Genomics. Biddeford, ME.
- Cammen, K., Rosel, P., Wells, R., Read, A. (2012). Genetic variation in detoxification enzymes of Florida bottlenose dolphins exposed to harmful algal blooms. Florida Marine Mammal Health Conference IV. Sarasota, FL.
- Cammen, K., Rosel, P., Wells, R., Read, A. (2011). A candidate gene approach to investigating resistance to harmful algal blooms in bottlenose dolphins. 6th Symposium on Harmful Algae in the United States, Austin, TX. (**awarded best student poster**, US National HAB Committee)

VII. SERVICE TO ACADEMIC, RESEARCH, AND PUBLIC COMMUNITIES

- Board member of Marine Mammals of Maine stranding network (2014-present).
- Member of the North Atlantic Seal Research Consortium on pinniped health (2015-present)
- Co-organizer of workshops entitled, “Marine Mammal Genomics: Applications to ecology, evolution, and conservation” and “Marine Mammal Genomics II” held at the 20th and 21st Biennial Conferences on the Biology of Marine Mammals (2013, 2015).
- Participant in Researcher Education Exchange Forum hosted by the Center for Ocean Sciences Education Excellence Southeast (2012); formed partnerships with local schoolteachers and informal educators to develop marine science teaching materials.
- Organizer and lecturer for the Duke Marine Science & Conservation Lectureship Series (2011-2012) that brings young marine scientists to present their research and offer professional mentorship at historically minority-serving institutions.
- Graduate student representative for the Duke University Marine Lab (2011-2012); represented the graduate student community at faculty meetings and coordinated diverse aspects of graduate student life, including development of graduate student teaching opportunities.
- Co-coordinator of the Duke Marine Lab seminar series (2009-2010).
- Contributions to marine science outreach publications: Invited guest blogger for Smithsonian’s Ocean Portal, “Ice-Loving Seals and the Loss of Sea Ice” (2013); Regular contributor to Sarasota Dolphin Research Program annual newsletter, *Nicks N Notches* (2009-2014).