

Dr. Shawn R. Noren
Associate Research Scientist
Physiological Ecologist of Marine Mammals

Institute of Marine Science
University of California, Santa Cruz
Center for Ocean Health
100 Shaffer Road
Santa Cruz, CA 95060
snoren@ucsc.edu
(408) 314-5377

Education

- 2002 Ph.D. Ecology and Evolutionary Biology (EEB), University of California, Santa Cruz (UCSC)
1997 M.S. Marine Science, University of California, Santa Cruz
1994 B.S. Biology, Marine Biology (Honors, Magna Cum Laude), University of Maryland, College Park

Research Positions

- 2012-present **Associate Research Scientist, Institute of Marine Science (IMS), UCSC**
Salaried position 100% reliant attaining extramural funding. Investigations have included a series of bioenergetics models for walruses and diving physiology and modeling of habitat use for beluga whales to determine possible population outcomes from the effects of global climate change and oil and gas exploration in Alaska. The research on walruses was directed to support the decision to list walruses under the Endangered Species Act.
- 2008-2012 **Project Scientist, EEB, UCSC, Advisor: Dr. Terrie M. Williams**
Duties included obtaining biological samples, mentoring undergraduate and graduate students, and writing permit applications, grants, and manuscripts. Research projects included effect of dive depth, swimming activity, and age on heart rate responses in marine mammals (using time depth recorders with heart rate monitors and accelerometers) to examine a possible link between decompression illness in marine mammals in relation to naval sonar testing.
- 2005-2012 **Research Associate, IMS, UCSC**
Position 100% reliant on my ability to attain extramural funding. Duties included collecting and analyzing data on heart rate, thermoregulation, blood and muscle biochemistry, and swimming kinematics of marine mammals. Included a field project in Antarctica on Weddell seals.
- 2003-2005 **National Research Council Resident Research Associate, Southwest Fisheries Science Center, NMFS, NOAA, La Jolla, CA, Advisor: Dr. Elizabeth F. Edwards**
Research included a review of the physiological and behavioral development of dolphin calves to identify periods of vulnerability to tuna purse-seine fishery impacts. Underwater video recordings were taken of dolphins to examine the influence of age and behavior on swimming kinematics and performance (using motion analysis software). This research was directed to support the strengthening and upholding of the Dolphin Safe Label for tuna.
- 2002-2003 **Smithsonian Institution Postdoctoral Fellow, Conservation and Research Center, National Zoological Park, Smithsonian Institution, Advisor: Dr. Daryl J. Boness**
Conducted research at a remote field site (Sable Island, Nova Scotia, Canada). Assessed the influence of body mass and body composition (determined by tritiated water method) on the duration of the post weaning fast in gray seal pups. Movement patterns were recorded (using radio telemeters) and oxygen stores (blood volume, hemoglobin, myoglobin) were quantified.
- 2000-2003 **Field Research Biologist, SRS Technologies, Supervisor: Dr. Phil Thorson**
Environmental Consulting: Conducted ship and land based monitoring to record marine mammal behavior in response to anthropomorphic noise from construction and military activity.
- 1995-2002 **Graduate Research, Ocean Sciences & EEB, UCSC, Advisor: Dr. Terrie M. Williams**

- Studies included the collection and analysis of data on the physiology that supports thermoregulation (morphology, blood flow, blubber) and diving (heart rate, blood biochemistry, and muscle biochemistry) in dolphins and the influence of ontogeny was explored.
- 1995-2001 **Research Assistant, EEB, UCSC, Advisor: Dr. Terrie M. Williams**
 Studies included investigating the thermal conductivity of mustelid pelts and blubber and examining the energetic costs (oxygen consumption) of exercise in dolphins and river otters.
- 1994-1995 **Research and Development Laboratory Technician, Quantum Group, San Diego, CA, Supervisor: Dr. Ping Lee**
 Prepared solutions, aided in production of experimental carbon dioxide alarm disks, conducted tests on experimental disks, collected and interpreted data.
- 1993-1994 **Undergraduate Research Assistant, University of Maryland, College Park, Advisor: Dr. Susan Carter-Porges**
 Conducted experiments to study the hormonal effects on sex behaviors and male parental care in Illinois prairie voles. Assisted with animal care and small animal surgeries.
- 1993 **Mammalogist Intern, National Aquarium in Baltimore, Supervisor: Nedra Hecker**
 Aided in animal care, medical procedures, and training exercises of dolphins and seals.
- 1993 **Aquarist Intern, National Aquarium in Baltimore, Supervisor: Lee Herman**
 Aided in animal care, medical procedures, and maintenance of exhibits, tanks, and filtration systems. Participated in collecting trips.

Teaching Positions

- 2002-present **Faculty, California State Summer School for Mathematics and Science (COSMOS), UCSC**
 COSMOS is a 4-week academic program emphasizing hands-on access to scientific research for talented and motivated underrepresented students in science and mathematics (grades 8-12).
Marine Mammal Biology
- 2009-2011 **Instructor, EEB, UCSC**
Biology 20B: Structure and Function of Plants and Animals
- 2007-2008 **Adjunct Faculty, West Valley College, Saratoga, CA**
Marine Biology Laboratory
- 2006, '08, '10 **Adjunct Faculty, Summer Session, UCSC**
Biology 20B: Structure and Function of Plants and Animals
Biology 139L: Biology and Ecology of Marine Mammals Laboratory
- 2006-2008 **Adjunct Faculty, Monterey Peninsula College, Monterey, CA**
Biology of Marine Mammals
- 1995-2000 **Teaching Assistant, Ocean Sciences & EEB, UCSC**
Ecology, Psychological Biology, Vertebrate Physiology, Introductory Biology: Structure and Function, Behavioral Ecology, Bioenergetics, Life in the Sea

Outreach Activities

- 1995-present Numerous invited public speaking and workshop engagements (See selected public speaking section)
- 2014-present Project Cornerstone Volunteer at Graystone Elementary School
- 2014 Marine Mammal Skull, Pelt, and Identification Lab for Graystone Elementary Kindergarten
- 2014 Antarctica Presentation for Graystone Elementary Kindergarten
- 2011, 2013 Marine Mammal Skull Lab for CDC Pre-school at Graystone Elementary
- 2008, '09, '10 Designed and implemented a workshop for high school teachers involved with COSMOS
- 2006 YES I CAN web-based education program for K-12th graders
- 2006 Invited speaker for 8th grade special education students at Monroe Middle School, San Jose (3/30/06)
- 2005 John's Hopkins Program Invited Scientist (10/8/05)
- 2005 Invited speaker for AP Biology Classes at Pacific Collegiate School, Santa Cruz
- 2005, '09 Judge for Science Fair at Pacific Collegiate School, Santa Cruz
- 2003 Zoo Days - Public Outreach and Educational Fair at the Smithsonian's National Zoo

Professional Activities

- 5/2015 Invited Advisor: Effects of Oil on Walrus, Effects of Oil on Wildlife Conference, Anchorage, AK
- 3/2015 Invited Advisor: Walrus Research in Aquaria, Walrus Conservation, Seward, AK
- 1/2015 Participant: Balancing Family and Career, Alaska Marine Science Symposium, Anchorage, AK
- 2014 Invited Presenter: Graduate Student Workshop "Non-traditional Career Paths for Comparative Physiologists", American Physiological Society Intersociety Meeting in Comparative Physiology, San Diego, CA
- 2014-present Advisory Panel: Sea World Blue World
- 2013-present Associate Editor: *Marine Mammal Science*
- 2013 Invited Participant: 51st Annual Meeting of the Marine Mammal Commission & 45th Meeting of its Committee of Scientific Advisors on Marine Mammals
- 2013-present Reviewer: North Pacific Research Board
- 2012 Invited Participant: International Seafood Sustainability Foundation "Tuna-Dolphin Workshop"
- 2012 Reviewer: National Resource Defense Council (NRDC) on the draft of an Environmental Impact Statement (EIS) on the Effects of Oil and Gas Activities in the Arctic Ocean
- 2008, 2014-present Panelist: American Association of University Women Educational Foundation Fellowship
- 2008 Participant: National Science Foundation ADVANCE Workshop, "Women Evolving Biological Sciences"
- 2008 Reviewer: Netherlands Organisation for Scientific Research (NOW, The Dutch Research Council)
- 2005 Invited Participant: COSMOS Statewide Board Meeting for Increasing Diversity
- 2005- present Reviewer: *Physiological and Biochemical Zoology*, *Journal of Comparative Physiology B*, *Marine Ecology Progress Series*, *Marine Mammal Science*, *Journal of Experimental Biology*, *Journal of Morphology*
- 2005- present Reviewer: Conference abstracts for the Society for Marine Mammalogy
- 2004- present Reviewer: National Science Foundation (*Arctic Program*, *Antarctic Program*)
- 2000 Invited Participant: Alliance of Marine Mammal Parks and Aquariums meeting
- 1995-2000 Marine Mammal Stranding Volunteer, UCSC Long's Marine Laboratory
- 1993-1994 Marine Animal Rescue Program Volunteer, National Aquarium in Baltimore

Professional Societies

- Society of Integrative and Comparative Biology
- American Physiological Society
- Society for Marine Mammalogy
- European Cetacean Society
- International Marine Animal Trainer's Association
- Association of Zoos and Aquariums
- American Association of University Women

Publication List

Noren SR, Udevitz MS, Piscotta N, Peterson K, Jay CV. *in preparation*. Ontogenetic Variation in Blubber Topography: Identifying a Reliable Blubber Measurement Site to Assess Body Condition of 0 - 2 Year-old Pacific Walrus Calves.

Noren SR. *in revision*. Rapid Hematological Development in Pacific Walruses (*Odobenus rosmarus divergens*).

Noren SR, Udevitz MS, Jay CV. 2016. Sex-specific energetics of Pacific Walruses (*Odobenus rosmarus divergens*) during the nursing interval. *Physiological and Biochemical Zoology* 89(2):93-109.

Noren SR, Jay CV, Burns JM. 2015. Muscle biochemistry of Pacific walruses (*Odobenus rosmarus divergens*): Modeling age-specific behavioral plasticity to alter foraging patterns in response to the changing Arctic ecosystem. *Journal of Experimental Biology* 218: 3319-3329.

Noren SR, Udevitz MS, Triggs L, Paschke J, Oland L, Jay CV. 2015. Topographic variation in blubber in female Pacific walruses: relations to caloric intake, season, and condition. *Marine Mammal Science* 31(2):658-676.

Williams TM, Fuiman LA, Kendall T, Berry P, Richter B, **Noren SR**, Shattock, Farrell ER, Stamper AM, Davis RW. 2015. Deep-sea sprints triggers cardiac conflict in marine mammals. *Nature Communication* 6(6055):1-9.

Noren SR, Udevitz MS, Jay CV. 2014. Quantifying energy demands for maintenance growth, pregnancy, and lactation for female Pacific walruses (*Odobenus rosmarus divergens*). *Physiological and Biochemical Zoology* 87(6):837-854.

Noren SR, Noren DP, Gaydos JK. 2014. Life in the fast lane: Rapid development of the locomotor muscle of harbor porpoise (*Phocoena phocoena*). *Journal of Comparative Physiology B* 184(8):1065-1076.

Noren SR. 2013. Motherhood alters swimming gait and performance of dolphins: Implications for interactions with tuna purse-seine fisheries. *Marine Ecology Progress Series* 482:255-263.

Trumble SJ, Robinson E, **Noren SR**, Usenko S, Davis J, Kanatous SB. 2012. Assessment of legacy and emerging persistent organic pollutants in Weddell seals (*Leptonychotes weddellii*) near McMurdo Sound, Antarctica. *Science of the Total Environment* 439:275-283.

Noren SR, Williams TM, Kendall T, Cuccurullo V. 2012. The dive response redefined: underwater behavior influences cardiac variability in freely diving dolphins *Journal of Experimental Biology* 215:2735-2741.

Noren SR, Udevitz MS, Jay CV 2012. Bioenergetics model for estimating food requirements of female Pacific walruses (*Odobenus rosmarus divergens*). *Marine Ecology Progress Series* 460:261-275.

Noren SR, Williams TM, Ramirez K, Boehm J, Glenn M, Cornell L. 2012. Changes in partial pressures of respiratory gases during submerged voluntary breath-hold across Odontocetes: Is body mass important? *Journal of Comparative Physiology B* 182(2):299-309.

Noren SR, Redfern JV, Edwards EF. 2011. Pregnancy is a drag: hydrodynamics, kinematics, and performance in pre- and post-parturition bottlenose dolphins (*Tursiops truncatus*). *Journal of Experimental Biology* 214:4151-4159.

Williams TM, **Noren SR**, Glenn M. 2011. Extreme physiological adaptations as predictors of climate-change sensitivity in the narwhal, *Monodon monoceros*. *Marine Mammal Science*. 27(2):334-349.

Noren SR, Edwards EF. 2011. Infant position in mother-calf dolphin pairs: a social interaction with hydrodynamic benefits. *Marine Ecology Progress Series*. 424:229-236.

- Trumble SJ, **Noren SR**, Cornick LA, Hawke TJ, Kanatous SB. 2010. Age-related differences in skeletal muscle lipid profiles of Weddell seals: clues to developmental changes *Journal of Experimental Biology*. 213: 1676-1684.
- Noren SR**, Wells RS. 2009. Blubber deposition during ontogeny in free-ranging bottlenose dolphins (*Tursiops truncatus*): balancing disparate roles of insulation and locomotion. *Journal of Mammalogy* 90(3):629-637.
- Noren SR**, Pearson LE, Davis JW, Trumble SJ, Kanatous SB. 2008. Different thermoregulatory strategies in nearly weaned pup, yearling, and adult Weddell seals (*Leptonychotes weddelli*). *Physiological and Biochemical Zoology* 81(6):868-879.
- Noren SR**, Boness DJ, Iverson SJ, McMillan J, Bowen WD. 2008. The effect of body condition on the duration of the postweaning fast in gray seal pups (*Halichoerus grypus*): Should they fast or forage? *Physiological and Biochemical Zoology* 81(3):269-277.
- Noren SR**, Biedenbach G, Redfern JV, Edwards EF. 2008. Hitching a ride: The formation locomotion strategy of dolphin calves. *Functional Ecology* 22:278-283.
- Noren SR**. 2008. Infant carrying behaviour in dolphins? Costly parental care in an aquatic environment. *Functional Ecology* 22:284-288.
- Noren SR**, Edwards EF. 2007. Physiological and behavioral development in dolphin calves: Implications for calf separation and mortality due to tuna purse-seine sets. *Marine Mammal Science* 23(1):15-29.
- Noren SR**, Biedenbach G, Edwards EF. 2006. The ontogeny of swim performance and mechanics in bottlenose dolphins (*Tursiops truncatus*). *Journal of Experimental Biology* 209(23):4724-4731.
- Noren SR**, Iverson SJ, Boness DJ. 2005. Development of the blood and muscle oxygen stores in grey seals (*Halichoerus grypus*): implications for juvenile diving capacity and the necessity of a terrestrial postweaning fast. *Physiological and Biochemical Zoology* 78(4):482-490.
- Noren SR**. 2004. Muscle acid buffering capacities in cetaceans: Influences of diving performance, swimming performance, body size, and postpartum development. *Marine Mammal Science* 20(4):808-822.
- Noren SR**, Cuccurullo V, Williams TM. 2004. The development of diving bradycardia in bottlenose dolphins (*Tursiops truncatus*). *Journal of Comparative Physiology B* 174:139-147.
- Noren SR**. 2002. The ontogeny of diving in bottlenose dolphins (*Tursiops truncatus*). Doctoral Dissertation. UCSC.
- Noren SR**, Lacave G, Wells RS, Williams TM. 2002. The development of blood oxygen stores in bottlenose dolphins (*Tursiops truncatus*): implications for diving capacity. *Journal of Zoology, London* 258:105-113.
- Williams TM, Ben-David M, **Noren SR**, Rutishauser M, McDonald K. 2002. Running energetics of the North American river otter: do short legs necessarily reduce efficiency on land? *Comparative Biochemistry and Physiology A* 133:203-212.
- Noren SR**, Williams TM, Pabst DA, McLellan B, Dearolf J. 2001. The development of diving in marine endotherms: preparing the skeletal muscles of dolphins, penguins, and seals for activity during submergence. *Journal of Comparative Physiology B* 171:127-134.

Noren SR, Williams TM. 2000. Body size and skeletal muscle myoglobin of cetaceans: adaptations for maximizing dive duration. *Comparative Biochemistry and Physiology A* 126:181-191.

Noren SR. 1997. Oxygen stores and acid buffering capacity of cetacean skeletal muscle: A Hierarchy in adaptations for maximum dive durations. Master's thesis. UCSC.

Grants

IMS Associate Research Scientist & Associate Researcher

PENDING

2017-18 Archiving Historical Longitudinal Consumption and Body Condition Data of Male Pacific Walruses (*Odobenus rosmarus divergens*): Modeling Energy Demands and a Body Condition Index (North Pacific Research Board: \$299,926)

INVITED FOR FULL PROPOSAL, NOW PENDING FUNDING

2016-18 Development of an Index to Measure Body Condition of Free-ranging Cetaceans (Office of Naval Research: \$428,595)

FUNDED

2016 Postnatal Development of Muscle Biochemistry that Supports Swim Performance in Spinner Dolphins: Modeling Calf Vulnerability to Separation During Tuna Purse-seine Fishery Interactions (Dolphin Quest Research Grant: \$10,000)

2015 Metabolism of Reproductive Female Belugas and Their Calves: Modeling Caloric Requirements of Free-ranging Belugas (SeaWorld & Busch Gardens Conservation Fund: \$25,000)

2014-2016 Physiological Constraints to Diving In Beluga Whales: Predicting their Capacity to Alter Foraging Behaviors in Response to Habitat Degradation (North Pacific Research Board Project #1406: \$199,865)

2014 Linking Walrus Bioenergetics to Demographics (United States Geological Survey, Anchorage, AK *Contract Order #G14PX01061, Ref. No. 0040152675*: \$28,223)

2014 Spinner Dolphin Muscle Biochemistry Research (Dolphin Quest Research Grant: \$5,000)

2013 Spinner Dolphin Muscle Biochemistry Research (Dolphin Quest Research Grant: \$5,000)

2012-2014 Estimating Bioenergetic Parameters for Pacific Walrus Calves and Maternal Females (United States Geological Survey, Anchorage, AK *Contract Order #G13PX00035, Ref. No. 0040063988*: \$129,051)

2012-2014 Define Age-specific Hematology and Myoglobin Levels for Walruses (United States Geological Survey, Anchorage, AK *Contract Order # G12PX01531, Ref. No. 0040048425*: \$63,887)

2012 Walrus Bioenergetics Research (Pt. Defiance Zoo and Aquarium Conservation Committee Grant: \$4,680)

2011-2013 Increasing Sample Size for Modeling Seasonal Variations in Consumption and Energy Use and Storage in Pacific Walruses (United States Geological Survey, Anchorage, AK *Contract Order # G12PX01833, Ref. No. 0040023103*: \$23,000)

2011-2013 Modeling Seasonal Variations in Consumption and Energy Use and Storage in Pacific Walruses (United States Geological Survey, Anchorage, AK *Contract Order # G11PX01419, Ref. No. 0040012700*: \$149,271)

2011 Dolphin Swimming Performance Research (Dolphin Quest Research Grant: \$10,000)

2011 UCSC Non-Senate Faculty Professional Development Grant (\$1,910)

2010-2011 Bioenergetic Model (Pacific Walruses) (United States Geological Survey, Anchorage, AK *Contract Order # G10PX02537, Ref. No. 1090500155*: \$86,460)

2009-2010 Dolphin Swimming Performance Research (Resources Division-SWFSC-NMFS-NOAA *Contract Order # AB133F09SE3790, Ref. No. NFFR7000-9-18726*: \$30,000)

2007-2008 Antarctic Seal Thermoregulation Project (American Association of University Women American Fellowship: \$30,000)

2007 Harbor Porpoise Muscle Biochemistry Research (Conservation Biology Division-NWFSC-NMFS-NOAA *Contract Order# AB133F06SE4959, Ref. No. NFFP7100-6-00065*: \$1,990)

2007 Dolphin Swimming Performance Research (Dolphin Quest Research Grant: \$9,000)

- 2006 Antarctic Seal Thermoregulation Project (Colorado State University-Antarctica Contract: \$9,750 + research expenses)
- 2005-2006 Dolphin Swimming Performance Research (Protected Resources Division-SWFSC-NMFS-NOAA Contract Order # AB133F05SE7013, Ref. No. NFFR7000-5-00362: \$66,000 + research expenses)

Postdoctoral

- 2004-2005 Dolphin Swimming Performance Project (National Research Council Resident Research Associateship: \$47,600 + research expenses)
- 2003-2005 Dolphin Swimming Performance Project (Dolphin Quest Research Grant: \$18,500)
- 2003-2004 Dolphin Swimming Performance Project (National Research Council Resident Research Associateship: \$46,100 + research expenses)
- 2002-2003 Gray Seal Diving and Fasting Physiology Project (Smithsonian Institute Postdoctoral Research Fellowship: \$30,000 + research expenses)

Graduate

- 2002 Marilyn C. Davis Memorial Scholarship
- 2001-2002 Alliance for Graduate Education and the Professorate Dissertation Year Fellowship
- 2001 Doctoral Student Sabbatical Fellowship
- 2000 Alan Baldrige Grant, American Cetacean Society, Monterey Bay Chapter (\$1,000)
- 2000 UCSC Biology Department Travel Grant
- 1999, 2001 Society for Marine Mammalogy Travel Award
- 1999 Dr. Earl H. Myers and Ethel M. Myers Oceanographic and Marine Biology Trust (\$1,000)
- 1999 American Women in Science Educational Foundation Predoctoral Award
- 1999 Kappa Alpha Theta Graduate Scholarship
- 1998-2001 UCSC Biology Department Summer Support Scholarship
- 1998, 2001 Lerner-Gray Fund for Marine Research, Museum of Natural History (\$4,000)
- 1998, 2001 Robert D. Bethel Award, American Cetacean Society, Monterey Bay Chapter (\$2,000)
- 1997-2001 UCSC Graduate Student Association Travel Grants
- 1997, '98, '00 Friend's of Long Marine Lab Grants (\$2,500)
- 1996-1997 UCSC Marine Science Travel Grants
- 1996 Dr. Scholl Foundation - John G. Shedd Aquarium Aquatic Sciences Partnership Program (\$3,000)
- 1995 University of California Regent's Grant

Undergraduate

- 1990-1994 University of Maryland Full Scholarship
- 1990-1994 Maryland Distinguished Scholar Scholarship

Honors

- 2015 *Journal of Experimental Biology* Holiday Card Photo
- 2014 *Physiological and Biochemical Zoology* Cover Photo
- 2012 1st authored paper (*J. Exp. Biol.* 215:2735-2741) featured in "Inside JEB".
- 2011 1st authored paper (*J. Exp. Biol.* 214:4151-4159) featured in "Inside JEB" and in the New York Times, Science, CNN World News, MSNBC, Smithsonian Magazine.org, YahooNews, Discovery Channel Canada, Canadian Broadcasting Corporation Quirks & Quarks Program, and numerous other websites and international broadcasts.
- 2010 1st authored paper (*J Comp Phys B* 174(2):139-147) was one of 10 most downloaded articles in 2010 for *Journal of Comparative Physiology B* (519 of 66,494 total article downloads).
- 2008 1st authored paper (*Phys Biochem Zool.* 81(6):868-879) highlighted in a "Featured Press Release" for *Physiological and Biochemical Zoology*
- 2008 Research Recognition Award, American Physiological Society Comparative & Evolutionary Section
- 2007 1st authored paper (*Func. Ecol.* 22:284-288) featured in *The Economist* (November 22, 2007) and on the Canadian Broadcasting Corporation Quirks & Quarks Program.

2000 1st Place Outstanding Research, 7th International American Cetacean Society Conference
 1996, '97 Honorable Mention Department of Defense Fellowship competition
 1992, '93, '94 Academic All-American Award
 1994 National Dean's List
 1994 University of Maryland Honor's Citation

Mentoring Activities

2014 Ashley Chrisman, high school research assistant
 2014 Denis Ivanov, high school research assistant
 2011-2013 Maia Goguen, undergraduate research assistant
 2010-2012 Nicole Thometz, graduate student
 2012 Erin Gudger, high school research assistant
 2012-2013 Katrine Heuer, undergraduate research assistant
 2009, 2011 Gregg Ringold, undergraduate research assistant
 2010 Chelsea Aydelott, undergraduate senior thesis student
 2010 Emma Ryan, post-graduate research assistant
 2004-2006 Emma Reimer, high school research assistant
 2005 UCSC Online Alumni Community Mentor
 2003 Participant in Job Shadow program for local high school students
 1999 Laura Yeates, undergraduate senior thesis student
 1999, 2001 Mentor for undergraduates at the Biennial Conference on the Biology of Marine Mammals

Selected Public Speaking

2016 **Invited Speaker** Moss Landing Marine Laboratories, California "Physiology & Performance of the Weakest Links: Predicting Demographic Consequences of Perturbation for Marine Mammals"
 2016 **Invited Speaker** University of South Carolina, Columbia "Physiology & Performance of the Weakest Links: Predicting Demographic Consequences of Perturbation for Marine Mammals"
 2016 Job Candidate at University of Rhode Island: "Physiology & Performance of the Weakest Links: Predicting Demographic Consequences of Perturbation for Marine Mammals"
 2015 21st Biennial Conference on the Biology of Marine Mammals: "Rapid muscle biochemistry maturation: a prerequisite for growing up in a polar environment with ephemeral breathing holes"
 2015 **Invited Speaker:** Effects of Oil on Wildlife Conference, Anchorage, AK: "Physiological Effects of Oil on Walruses"
 2015 **Invited Speaker:** Walrus Conservation Workshop, Seward, AK: "Research on Walruses in Human Care"
 2015 European Cetacean Society 18th Annual Conference "Energy Demands of Juvenile Pacific Walruses (*Odobenus rosmarus divergens*) During the Nursing Interval: Modeling the Costs of Lactation To Assess Possible Demographic Effects in a Changing Arctic Ecosystem"
 2015 **Invited Speaker:** Mountain View High School Environmental Club: "Physiological Research Aids in Conservation and Management of Marine Mammals"
 2015 Alaska Marine Science Symposium "Pre-weaning growth and blubber deposition in Pacific walruses"
 2014 **Invited Speaker** NMML-NMFS-NOAA, Seattle, WA: "Modeling the Vulnerability of Marine Mammals to the Changing Arctic Ecosystem"
 2014 **Invited Speaker** American Physiological Society Intersociety Meeting: "The Soft Money Position: How Does It Work?"
 2014 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: "Modeling the Vulnerability of Marine Mammals to the Changing Arctic Ecosystem"
 2014 Invited Speaker UCSC COSMOS Discovery Lecture: "Physiology: A tool to predict vulnerability of marine mammals to environmental degradation"
 2014 **Invited Speaker** Temple Emanu - El: "Physiological Research Aids in Conservation and Management of Marine Mammals"

- 2014 **Invited Speaker** Sea World, San Antonio: "Research on Walruses in Human Care Aids with Conservation and Management of Free-ranging Walruses"
- 2014 **Invited Speaker** University of California, Santa Cruz EEB: "Food Consumption, Body Condition, and Limits to Foraging Behaviors of Pacific Walruses: Assessing Survivability in a Changing Arctic Ecosystem"
- 2014 **Invited Speaker** Alaska Science Center, USGS-Anchorage, AK: "Food Consumption, Body Condition, and Limits to Foraging Behaviors of Pacific Walruses: Assessing Survivability in a Changing Arctic Ecosystem"
- 2014 **Invited Speaker** School of Aquatic and Fishery Sciences, University of Washington: " Food Consumption, Body Condition, and Limits to Foraging Behaviors of Pacific Walruses: Assessing Survivability in a Changing Arctic Ecosystem"
- 2013 20th Biennial Conference on the Biology of Marine Mammals: "Blood Oxygen Stores of Pacific Walruses (*Odobenus rosmarus divergens*): Modeling Limits to Breath-hold For Foraging in a Changing Arctic Ecosystem"
- 2013 **Invited Speaker** Indianapolis Zoo: "Research on Walruses in Human Care Aids Conservation and Management of Wild Cousins"
- 2013 Annual International Marine Animal Trainer's Association: "Research on Marine Mammals in Aquaria Aids Conservation and Management of Wild Cousins: Two Case Studies (Dolphins & Walruses)"
- 2013 **Invited Speaker** New York Aquarium: "Walruses in human care: Models to estimate food requirements and a body condition index for wild animals"
- 2013 **Invited Speaker** UCSC COSMOS Discovery Lecture: "Physiology: A tool to predict vulnerability of marine mammals to environmental degradation"
- 2013 **Invited Speaker** 51st Annual Meeting of the Marine Mammal Commission & 45th Meeting of its Committee of Scientific Advisors on Marine Mammals: "Swim Performance of Mother-calf Pairs: Implications for Dolphin Interactions with Tuna Purse-seine Fisheries in the ETP"
- 2013 **Invited Speaker** Alaska Science Center, USGS-Anchorage, AK: "Body Condition and Caloric Demand of Female Pacific Walruses"
- 2013 Society of Integrative and Comparative Biology Annual Meeting: "Body Condition and Caloric Demand of Female Pacific Walruses"
- 2012 **Invited Speaker** NMML-NMFS-NOAA, Seattle, WA: "Using Bioenergetics and Captive Animals for Models to Predict Vulnerability of Pacific Walruses to Global Climate Change"
- 2012 **Invited Speaker** "Tuna-Dolphin Workshop" International Seafood Sustainability Foundation: "Effects of Motherhood on Dolphin Swimming: Implications for Interactions with Tuna Purse-seine Fisheries in the ETP"
- 2012 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: "Effects of Motherhood on Dolphin Swimming: Implications for Interactions with Tuna Purse-seine Fisheries in the ETP"
- 2012 **Invited Speaker** Indianapolis Zoo: "Walruses in human care: Models to estimate food requirements, body condition, and fasting abilities of wild animals"
- 2012 **Invited Speaker** UCSC COSMOS Discovery Lecture: "Physiology: A tool to predict vulnerability of marine mammals to environmental degradation"
- 2012 **Invited Speaker** Point Defiance Zoo and Aquarium: "Walruses in human care: Models to estimate food requirements, body condition, and fasting abilities of wild animals"
- 2012 **Invited Speaker** Six Flags Discovery Kingdom: "Walruses in human care: Models to estimate food requirements, body condition, and fasting abilities of wild animals"
- 2012 **Invited Speaker** Dolphin Quest Hawaii: "Swimming Kinematics of Dolphins: effects of age, position, and pregnancy."
- 2012 Society of Integrative and Comparative Biology Annual Meeting: "Heart rate during quiescent submergence in dolphins: Influences of dive duration and ontogeny."
- 2011 19th Biennial Conference on the Biology of Marine Mammals: "Bradycardia Redefined: Cardiac activity varies with swim speed in freely diving dolphins"
- 2011 **Invited Speaker** Alaska Science Center, USGS-Anchorage, AK: "Bioenergetics model for estimating food requirements of female Pacific walruses"

- 2011 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Physiology: A tool to predict marine mammal vulnerability to global climate change”
- 2011 **Invited Speaker** USGS-Anchorage, AK: “Physiology: A tool to predict animal vulnerability to environmental perturbations”
- 2010 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Effects of Pregnancy and Infant position swimming on the hydrodynamics and kinematics of dolphins”
- 2010 **Invited Speaker** University of California, Santa Cruz EEB: “Physiology & Kinematics: Tools to Elucidate A Potential Fishery Impact on Dolphin Populations”
- 2010 **Invited Speaker** Santa Clara University: “Effects of Body Size & Development on Performance in Marine Mammals”
- 2010 Society of Integrative and Comparative Biology Annual Meeting: “Bradycardia Redefined: A Variable cardiovascular dive response in dolphins”
- 2010 **Invited Speaker** NMML-NMFS-NOAA, Seattle, WA: “Physiology: A tool to predict animal vulnerability to environmental perturbations”
- 2009 **Invited Speaker** San Jose State University: “Physiology: A tool to predict animal vulnerability to environmental perturbations”
- 2009 26th Annual Physiological Ecology Bishop Meeting: “Physiological Limits of Narwhals (*Monodon monoceros*): Predictors of Vulnerability to Changing Arctic Sea Ice Conditions”
- 2009 **Invited Speaker** FASEB Experimental Biology Annual Meeting: “Blubber deposition during ontogeny in free-ranging bottlenose dolphins (*Tursiops truncatus*): balancing disparate roles of insulation and locomotion”
- 2008 **Invited Speaker** San Jose Branch of American Association of University Women: “Thermoregulation in Weddell Seals (*Leptonychotes weddelli*)”
- 2008 **Invited Speaker** FASEB Experimental Biology Annual Meeting: “Development of Muscle Diving Physiology in Marine Mammals”
- 2008 **Invited Speaker** Monterey Bay Aquarium, Monterey, CA: “Effects of Body Size and Development on Performance of Marine Mammals”
- 2007 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Performance Limitations in Marine Mammals”
- 2007 **Invited Speaker** NWFSC-NMFS-NOAA Monster Jam Lecture Series: “Ontogeny of Swimming in Dolphins: Implications for Interactions with the ETP Tuna Purse-Seine Fishery”
- 2007 Job Candidate at California Polytechnic State University, San Luis Obispo: “Effects of Body Size and Development on Performance of Marine Mammals”
- 2006 **Invited Speaker** McMurdo, Antarctica Sunday Science Lecture Series: “Ontogeny of Thermoregulation in Weddell Seals”
- 2006 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Ontogeny of Swim Performance in Dolphin Calves 0-2 Years Postpartum”
- 2005 16th Biennial Conference on the Biology of Marine Mammals: “The swimming kinematics of mother-calf dolphin pairs: Echelon position reduces the locomotor effort of calves”
- 2005 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Swimming Kinematics of Mother-calf Dolphin Pairs”
- 2004 Dr. Ken Norris Memorial Symposium, Long Marine Laboratory, UCSC: “The Swimming Capabilities of Mom-calf Dolphin Pairs”
- 2004 **Invited Speaker** Dolphin Quest Hawaii: “Does ‘Free-riding Behavior Enhance Swimming Efficiency and Reduce Locomotor Costs of Dolphin Calves? Implications for Depleted Dolphin Stocks in the Eastern Tropical Pacific”
- 2004 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Does ‘Free-riding Behavior Enhance Swimming Efficiency and Reduce Locomotor Costs of Dolphin Calves? Implications for Depleted Dolphin Stocks in the Eastern Tropical Pacific”
- 2004 European Cetacean Society 18th Annual Conference: “Does ‘Free-riding Behavior Enhance Swimming Efficiency and Reduce Locomotor Costs of Dolphin Calves? Implications for Depleted Dolphin Stocks in the Eastern Tropical Pacific”

- 2004 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “The Development of Dive Capacity in Gray Seal Pups: Should They Fast or Forage?”
- 2003 15th Biennial Conference on the Biology of Marine Mammals: “The Development of Oxygen Stores from Birth through the Postweaning Fast: Should Gray Seal Pups Fast or Forage?”
- 2003 **Invited Speaker** Dolphin Quest Hawaii: “Swimming Kinematics of Mom-calf Dolphin Pairs: Implications for Depleted Dolphin Stocks in the Eastern Tropical Pacific”
- 2003 **Invited Speaker** Smithsonian National Zoological Park: “The Effects of Body Size and Development on Diving and Thermoregulation in Marine Mammals”
- 2003 Job Candidate at California State University San Marcos: “The Effects of Body Size and Development on Diving and Thermoregulation in Marine Mammals”
- 2002 **Invited Speaker** SWFSC-NMFS-NOAA, La Jolla, CA: “Surviving in the ocean: Challenges Faced by Small, Immature Dolphins.”
- 2002 Doctoral Dissertation Defense: “The Ontogeny of Diving in Bottlenose Dolphins.”
- 2002 Job Candidate at Salisbury University, Maryland: “The Effects of Body Size and Development on Diving Capacity in Marine Mammals.”
- 2001 14th Biennial Conference on the Biology of Marine Mammals: “The Development of Diving in Bottlenose Dolphins (*Tursiops truncatus*): Implications for Foraging Behaviors of Lactating Females and Newly Weaned Juveniles.”
- 2001 Dr. Ken Norris Memorial Symposium, Long Marine Laboratory, UCSC: “The Development of Diving in Bottlenose Dolphins (*Tursiops truncatus*): Implications for Foraging Behaviors of Lactating Females and Newly Weaned Juveniles.”
- 2001 **Invited Speaker** The Dolphin Experience, Freeport Bahamas: “Development of Diving Physiology in Bottlenose Dolphin Calves (*Tursiops truncatus*)”
- 2000 **Invited Speaker** American Cetacean Society, Monterey Bay, CA Chapter: “The Development of Diving Abilities in Bottlenose Dolphins (*Tursiops truncatus*)”
- 2000 **Invited Speaker** SPAWAR, La Jolla, CA: “Development of Diving Physiology in Bottlenose Dolphin Calves (*Tursiops truncatus*)”
- 1999 13th Biennial Conference on the Biology of Marine Mammals: “The Effect of Body Size on Odontocete Breath-hold Capacity: Pacific white-sided dolphins to Killer whales.”
- 1999 Dr. Ken Norris Memorial Symposium, Long Marine Laboratory, UCSC: “The Effect of Body Size on Odontocete Breath-hold Capacity: Pacific white-sided dolphins to Killer whales.”
- 1999 Doctoral Dissertation Proposal Defense: “Development of Diving and Thermoregulation in Bottlenose Dolphins (*Tursiops truncatus*)”
- 1997 **Invited Speaker** John G. Shedd Aquarium, Chicago, IL: “Breath-hold Capacity of Pacific white sided dolphins”
- 1997 Master’s Thesis Defense: “Cetacean Skeletal Muscle Adaptations: A Hierarchy for Diving Capacity”

Poster Presentations

- 2016 Alaska Marine Science Symposium: "Physiological constraints to diving: Defining the capacity of belugas to alter foraging behaviors in response to habitat degradation"
- 2015 Alaska Marine Science Symposium: "Physiological constraints to diving: Defining the capacity of belugas to alter foraging behaviors in response to habitat degradation"
- 2014 American Physiological Society Intersociety Meeting: "Linking Caloric Intake to Growth and Blubber Deposition in Walrus Calves"
- 2014 Alaska Science Symposium: "Topographic Variation of Blubber in Female Pacific Walruses: Relations to Caloric Intake, Season, and Condition"
- 2013 Alaska Marine Science Symposium: "Body Condition and Caloric Demand of Female Pacific Walruses"
- 2012 Alaska Marine Science Symposium: "Bioenergetics model for estimating food requirements of female Pacific walruses (*Odobenus rosmarus divergens*)"
- 2009 Office of Naval Research Marine Mammal Program Review: “Bradycardia Redefined: A Variable cardiovascular dive response in dolphins.”

- 2009 FASEB Experimental Biology Annual Meeting: “Blubber deposition during ontogeny in free-ranging bottlenose dolphins (*Tursiops truncatus*): balancing disparate roles of insulation and locomotion”
- 2008 FASEB Experimental Biology Annual Meeting. “Development of Muscle Diving Physiology in Marine Mammals”
- 2008 National Science Foundation ADVANCE Workshop, Women Evolving Biological Sciences. “Effect of Ontogeny on Performance in Extreme Environments”
- 2007 FASEB Experimental Biology Annual Meeting. “Developmental Thermoregulation of a Polar Mammal”
- 2002 APS Intersociety Meeting, The Power of Comparative Physiology: Evolution, Integration, and Application. “Ontogeny of Diving Bradycardia in Bottlenose Dolphins (*Tursiops truncatus*).”
- 2001 Annual Meeting for the Society of Integrative and Comparative Biology. “Development of Blood Oxygen Stores in Bottlenose Dolphins (*Tursiops truncatus*).”
- 2000 The American Cetacean Society’s 7th International Conference. “Postpartum Development of Blood Oxygen Stores in Bottlenose Dolphins (*Tursiops truncatus*): Effects on Calculated Aerobic Dive Limits.”
- 1996 APS Intersociety Meeting, The Integrative Biology of Exercise. “The Relationship Between Muscle Oxygen Stores and Aerobic Dive Limits in Small Odontocetes.”