

Student Affairs Workshop

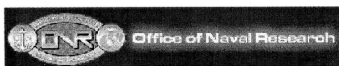
15th Biennial Conference on the Biology of Marine
Mammals

December 15, 2003

Organized by Carolyn Kurle

We gratefully acknowledge the following for their generous sponsorship
of this workshop:

The Office of Naval Research



The Society for Marine Mammalogy



Program

6:30 - 7:00: Check in and pizza dinner

7:00 - 7:05: Welcome from Carolyn Kurle, SMM Student
Member-at-Large, University of California Santa Cruz

7:05 - 7:35: **Jim Estes:** Conservation and Ecology in Marine
Mammal Science

7:35 - 8:05: **Alejandro Acevedo-Gutiérrez:** A Circuitous Path
to Academia

8:05 - 8:15: Break

8:15 - 9:30: Informal round table discussions with professionals
in marine mammal science

Host

Carolyn Kurlle

Doctoral Student, Ecology and Evolutionary Biology Department, University of California Santa Cruz; Student Member-at-Large, Society for Marine Mammalogy

Ms. Kurlle received her Master's degree in Wildlife and Fisheries Biology from Texas A&M University and then worked for several years as a Research Biologist for the National Marine Fisheries Service at the National Marine Mammal Laboratory in the Alaska Ecosystems Program in Seattle, Washington. There she primarily studied the foraging ecology of northern fur seals and Steller sea lions in Alaska using stable isotope and fatty acid signature techniques. Ms. Kurlle is currently working on her Doctorate at the University of California Santa Cruz and her present research focuses on the ecological effects of introduced mammalian predators on intertidal and terrestrial plant communities in the Aleutian Islands, Alaska.

Keynote Speakers

Alejandro Acevedo-Gutiérrez

Assistant Professor in Biology and Science Education, Western Washington University, Bellingham, Washington
<http://fire.biol.wvu.edu/acevedo/>

Dr. Acevedo is unique in that he has made it a priority to incorporate aspects other than strictly academic research into his career as a biologist. Specifically, Dr. Acevedo's academic position at Western Washington University (WWU) involves a unique combination of scientific educational outreach and marine vertebrate conservation research. The path by which Dr. Acevedo arrived at his professorship involved his participation in a variety of very different programs and activities including: serving as an advisor to ten conservation and scientific organizations in the United States and Costa Rica; writing and spearheading the initial draft of the regulations of marine mammals in Costa Rica; serving as a member of the National Board of Directors at the Museum of Science & Industry in Tampa, Florida; advising and acting as the scientist-on-camera in four educational films, including Telly Award and Silver CINDY Award winner *Marine Science: Exploring the Deep*, and Academy-Award nominee and Silver World Medal winner *Dolphins*; serving as a guest scientific expert on 26 media shows; giving interviews to 58 different media outlets, including TV, radio and print; teaching courses at the School for Field Studies at the Universidad Complutense in Spain; and broadening the participation of under-represented groups in science by giving over 160 lectures and presentations on marine biology as a career in English and Spanish to over 10,000 young students and the public at large. In addition, Dr. Acevedo was the Senior Aquatic Educator and Research Associate at the California Academy of Sciences where he developed scientific curriculum and taught outreach programs for students and he has authored or co-authored 19 peer reviewed publications. Finally, Dr. Acevedo's most recent awards include the Award for Excellence in Research, State of Baja California Sur, Mexico (2002), Award for Excellence in Research, City and Municipality of La Paz, Mexico (2002), Academic Excellence Award, Universidad Autónoma de Baja California Sur, Mexico (2002), and the Museum of Science and Industry's National Hispanic Scientist Award (2001).

Currently, Dr. Acevedo is heavily involved with science education through the Science, Mathematics, and Technology Program (SMATE) at WWU. This program works towards enrichment and education of kindergarten through 12th grade pre-service teachers. Currently, the SMATE faculty are collaborating with elementary, middle, and high school teachers and community college instructors to explore, create, and implement innovative course content to improve teaching and learning in both K-12 and higher education in 26 school districts throughout Washington state. SMATE faculty and collaborators also attempt to improve learning in middle school science students by partnering science graduate students and advanced undergraduates with middle school science teachers in four school districts in Northwest Washington.

Dr. Acevedo's biological research currently examines the roles of marine mammals and seabirds in their environment and those relationships to the management of protected areas. To this end, he and his students study how the distribution, abundance, and behavior of these marine predators respond to and interact with physical habitat characteristics, oceanographic processes, abundance, distribution and behavior of prey species, and abundance, distribution and behavior of potential predators or competitors. He studies these issues on large whales, pinnipeds,

and bottlenose and tucuxi dolphins in the Gulf of California, Mexico, the San Juan Islands, Washington, and Costa Rica, respectively.

Dr. Acevedo will be drawing on his extensive experience as a researcher, educational outreach specialist, and conservation scientist to talk about the many potential pathways a career in marine science can take.

James Estes

Supervisory Zoologist, California Science Center, National Biological Service, Santa Cruz, California; Adjunct Professor in Biology, Marine Sciences, and Environmental Studies, University of California Santa Cruz
<http://brd1.ucsc.edu/>

Dr. Estes has worked as a marine community ecologist and conservation scientist for over 30 years and brings an incredible array of experiences to his role as a researcher and professor. He is an internationally recognized expert on sea otters and other marine mammals and a specialist in the critical role of apex predators in the marine environment. Dr. Estes' work on the role that sea otter predation on sea urchins plays in the kelp forest ecology of the Aleutian Archipelago provides one of the better known examples of how top-down trophic interactions influence ecosystem function. He has been a major contributor to the current ground-breaking theory that predation by killer whales is a significant cause of pinniped and sea otter declines over the past several decades in the northern North Pacific and southern Bering Sea. Dr. Estes and his students are focused on key marine conservation issues including attempting to understand and halt the current alarming decline of the threatened California sea otter and studying the spatial and foraging requirements of key predators in the Bering Sea ecosystem to determine the best design for a system of marine reserves. His work has been published in over 100 journal articles and book chapters, he has advised or co-advised over 24 graduate students, and been the focus of numerous media interviews. Finally, Dr. Estes has been the recipient of many honors and awards including the Ed Ricketts Marine Science Award from the Monterey Bay National Marine Sanctuary Research Activities Panel (2003), and a fellowship from the Pew Fellows Program in Marine Conservation (1999).

The broad research focus of Dr. Estes and his students includes population and community ecology, evolution, natural history, population dynamics, and experimental design. Specifically, he and his lab have many ongoing research programs. They examine sea otter/community interactions in the eastern Pacific Ocean and Bering Sea with research occurring in the Aleutians Islands, Prince William Sound, central California, the Channel Islands, and Mexico. They are looking primarily at sea otter-herbivore-kelp interactions, the ecology of nearshore fishes, and the disturbance effects of sea otters and other predators on the infauna of soft-sediment communities. In addition, they study plant-herbivore interactions in temperate marine communities and the evolution of plant defenses in the temperate northeast Pacific Ocean, Australia, and New Zealand. Finally, the Estes lab examines strategies for marine conservation including the effects of marine reserves on rockfish populations in central California and the scale and linkage of structuring processes in marine ecosystems. The central theme of all these studies is to identify the important high-trophic-level consumers and their influences on the organization of the communities within which they live. They are also interested in the behavioral ecology of marine vertebrates and the evolution of marine living in mammals.

Dr. Estes will speak to the importance of incorporating ecosystem concepts and applied conservation into the study of marine mammals.

Round Table Discussion Topics and Discussion Leaders

Acoustic Communication

Marc Lammers

Co-founder and current President of Oceanwide Science Institute (OSI); Research Program Director and Principal Investigator of the Nai'a Kuwili Project, OSI's long-term spinner dolphin research project. Post-Doctoral Fellow, NOAA Coral Reef Ecosystem Investigation Unit at the Hawaii Institute of Marine Biology, Honolulu, Hawaii
<http://www.oceanwidescience.org/docs/mlammers.html>

Dr. Lammers holds a B.A. and a Ph.D. in Zoology from the University of Hawaii where he studied under Dr. Whitlow Au. He is presently a Post-Doctoral Fellow with the NOAA Coral Reef Ecosystem Investigation (CREI) Unit at the Hawaii Institute of Marine Biology and president of Oceanwide Science Institute, a Honolulu,

Hawaii-based nonprofit organization specializing in issues related to marine research, conservation and education. His research interests are varied, but are primarily focused on marine bioacoustics. His work in this field has yielded numerous scientific publications, as well as a short television documentary. Dr. Lammers is an active collaborator with researchers in Hawaii, California, Florida and Denmark. His interests in marine science are broad and range in scope from research to education and conservation. He has worked on projects focused on a variety of topics and marine organisms including corals, fish, turtles, dolphins and whales.

Laela Sayigh

Associate Professor, Biological Sciences and Center for Marine Science, University of North Carolina at Wilmington
<http://www.uncw.edu/cmsr/bios/sayigh.htm>

Bottlenose dolphins (*Tursiops truncatus*) are a common species in southeastern coastal waters, yet surprisingly little is known about their ecology or behavior in many areas. Ongoing research in Dr. Sayigh's lab is focused on two major areas: 1) studies of population biology and social structure of dolphins in the waters near Wilmington, NC, and 2) studies of behavior and communication of dolphins in Wilmington, NC, and Sarasota, FL. Dr. Sayigh's lab utilizes photo-identification of dorsal fins to identify individual dolphins; this work suggests that stock structure of dolphins in coastal North Carolina is complex and includes many year-round residents with large home ranges. Dr. Sayigh's research on dolphin communication has focused on the individually distinctive signature whistles produced by bottlenose dolphins. The fact that dolphins learn these vocalizations sets them apart from most other non-human mammals. Current research in this area is focusing on functions of whistles in free-ranging dolphins, development and stability of signature whistles, and perception of whistle features by dolphins.

Acoustics

Ann Bowles

Senior Research Biologist, Hubbs-SeaWorld Research Institute; Visiting Researcher, Scripps Institution of Oceanography; Adjunct Professor, Marine and Environmental Studies Program, University of San Diego; Adjunct Lecturer, San Diego State University
<http://www.hswri.org/bowles.htm>

Dr. Bowles came to the Hubbs-SeaWorld Research Institute in 1978 as a volunteer. She joined the scientific staff in 1979 and currently manages the Institute's Bioacoustics Laboratory. She received her B.A. in Linguistics from the University of California at San Diego and her Ph.D. in Marine Biology from the Scripps Institution of Oceanography for a study of vocal communication in the emperor penguin. Under contract to agencies such as the U.S. Air Force, National Park Service, and NASA, she has spent 20 years studying the effects of human-made noise and disturbance on a wide range of taxa, including pinnipeds, odontocete and mysticete cetaceans, domestic turkeys and chickens, farm-raised raptors, small mammals, terrestrial carnivores, birds, tortoises, and sea turtles. Her work has emphasized a comparative approach, searching for general models of noise effects. Recent research topics include: responses of marine mammals to gillnets and net 'alarms' (pingers); effects of simulated sonic booms on pinniped hearing and physiology; effects of helicopter overflights on passerines at Marine Corps Air Station Miramar and Camp Pendleton; responses of domesticated raptors to jet aircraft overflights; and responses of a California gray whale calf to playback of adult vocalizations. She maintains adjunct lecturer or visiting researcher positions at the Scripps Institution of Oceanography, San Diego State University, and the University of San Diego, advising interns and graduate students. She worked to bring the Acoustical Society of America's Animal Bioacoustics Technical Committee to full committee status (1990-1996) and is now the committee's representative to the ASA Committee on Standards.

Christopher Clark

I. P. Johnson Director of the Bioacoustics Research Program, Cornell Laboratory of Ornithology; Senior Scientist, Department of Neurobiology & Behavior, Cornell University, Ithaca, New York
<http://www.birds.cornell.edu/bvp/Staff.html>

Dr. Clark holds advanced degrees in electrical engineering (M.S.E.E., SUNY-Stony Brook, 1974) and biology (Ph.D., SUNY-Stony Brook, 1980). His doctoral research concentrated on acoustic communication in southern right whales. From 1980-1983, Dr. Clark was a NIH postdoctoral fellow with Dr. Peter Marler and in 1984 was appointed an assistant professor at The Rockefeller University where he conducted research on vocal learning in songbirds. He joined the Cornell Laboratory of Ornithology and the Department of Neurobiology & Behavior at Cornell University in 1987.

Dr. Clark's research concentrates on animal acoustic communication with a particular interest in the application of advanced acoustic methods for scientific conservation of endangered species. He leads the Bioacoustics Research Program in the design and development of computer-based systems for quantitative analysis of animal vocalizations, and acoustic techniques to monitor, locate, track and census birds, elephants and whales. Through ongoing collaborations with U.S. and international colleagues Dr. Clark conducts integrated research at a variety of spatial and temporal scales to investigate the influence of ecological, oceanographic and environmental factors on baleen whale social behavior. He continues to use passive acoustic technology developed for detecting submarines to census whales and study their acoustic behaviors. Results of this effort has also been directed at understanding and mitigating the potential impacts of human made underwater noises on the marine environment.

Anatomy and Physiology

Terrie Williams

Professor of Ecology and Evolutionary Biology, University of California Santa Cruz
<http://www.biology.ucsc.edu/faculty/williams.html>

Dr. Williams' research program investigates common morphological features and physiological limitations of marine and terrestrial animals. Primary areas of study include swimming and running energetics, thermoregulation during exercise, and the plasticity of mammalian skeletal muscle. By examining the functional relationships between animals and their environment, Dr. Williams believes that we can begin to understand the ecological significance of a species and the adaptive changes that may be necessary for its survival. This research approach provides a powerful tool that enables her group to predict the responses of animals to novel environmental perturbations and to speculate about the physiology and biomechanics of ancestral forms. For example, the thermal lability of marine mammals indicates the level of vulnerability of individual species to natural (El Niño) and anthropogenic (pollution, over-fishing) events. Current research projects in her laboratory that address this problem include metabolic regulation in swimming and diving dolphins, hunting behavior and physiology of Weddell seals in the Antarctic, and the effects of pregnancy on nutritional status of declining populations of Steller sea lions.

The regulation of oxygen uptake and utilization in the skeletal muscles of exercising mammals is another major research area in the Williams laboratory. In the diving or sprinting mammal, the contracting muscle must operate as a closed system. Research in this area allows her to examine the expression of molecular and cellular mechanisms that promote enhanced performance while preventing tissue damage during anoxia or hypoxia.

Graham Worthy

Provost's Distinguished Research Professor of Biology, Hubbs-Sea World Professor of Marine Mammalogy, and Director of the Physiological Ecology and Bioenergetics Lab, Department of Biology, University of Central Florida, Orlando, Florida
<http://www.cas.ucf.edu/biology/faculty/worthy.html>

Dr. Worthy's research interests relate to understanding the physiological ecology of marine mammals through the study of their energetics, growth, and nutrition. His research program integrates laboratory and field based investigations in an attempt to elucidate the capabilities of different species to withstand normal seasonal variation in their environment. Dr. Worthy is also interested in integrating lab and field information to more appropriately define suitable criteria for the husbandry of animals in captivity. His program includes ongoing investigations into the life history and physiological ecology of manatees, cetaceans, and pinnipeds at study sites around the world. The main thrust of his research program centers around determining the energy requirements of marine mammals and how the availability and quality of food impacts their survival and growth. Dr. Worthy's lab is currently involved in studies investigating the thermoregulatory capabilities, lactation energetics, water balance, feeding ecology, and free-ranging energetics of several species of marine mammals using techniques such as indirect calorimetry, proximate composition analysis of prey, doubly-labeled water energetics, carbon/nitrogen isotope

analysis, and fatty acid signature analysis.

Animal Training and Husbandry

Jen Gafney

Senior Trainer, Marine Mammal Performance and Physiology Project, Long Marine Laboratory, Santa Cruz, California

Ms. Gafney is in charge of providing care for and training the captive population of marine mammals used in the physiology research at the University of California Santa Cruz. She is responsible for 2 Atlantic bottlenose dolphins, 7 California sea lions, and 2 southern sea otters. Her job is to provide health care for the animals, and to train and condition them for voluntary medical procedures and to voluntarily participate in data collection regarding metabolism and bioenergetics.

Thad Lacinak

Vice President and Corporate Curator of Animal Training for Busch Entertainment Corporation, Orlando, Florida

Mr. Lacinak directs animal training and enrichment efforts at five Busch Entertainment Corporation (BEC) parks. He has been instrumental in the development of SeaWorld's industry-leading behavior modification techniques, husbandry procedures, and spectacular killer whale show behaviors. His efforts have been primarily dedicated to improving the care and display of zoo animals through positive reinforcement and behavioral enrichment, and to enhancing the animal training profession. He is frequently called upon by zoological facilities worldwide to consult on particularly challenging behavior questions.

With over 30 years of marine mammal training experience, Mr. Lacinak has trained more than 100 species of animals. In addition to his experience with marine mammals, he has conditioned terrestrial and avian species for husbandry, research, public display and education. He oversees and coordinates the efforts of over 350 animal trainers and keepers at BEC parks across the country. He is responsible for all operational aspects of SeaWorld's Animal Training Department, including animal husbandry and show quality. In recent years he has taken a progressively larger role in behavior modification and enrichment at the Busch Gardens parks. He has authored and presented numerous papers on the effective use of positive reinforcement, behavioral enrichment, preventing aggression, and husbandry training.

Mr. Lacinak recently coauthored the best seller, *Whale Done!* with Ken Blanchard and Chuck Tompkins. The book, written for a lay audience, demonstrates that the same principles of positive reinforcement utilized in controlled zoological settings can be applied in more familiar environments. The authors show that at home, school, or work, properly applied positive reinforcement leads to improved relationships with pets, coworkers, spouses, and children.

Mr. Lacinak is an active contributor to the American Zoological Association (AZA), the International Marine Animal Trainers Association (IMATA), the International Conference for Environmental Enrichment (ICEE), the Animal Behavior Management Association (ABMA) of which he is president elect for 2004, and the Association of Pet Dog Trainers (APDT). He also holds memberships in the International Association for Aquatic Animal Medicine (IAAAM), the Association for Behavior Analysis (ABA), and the Society for Marine Mammalogy.

Behavior

Stephen Insley

Assistant Researcher, Institute of Marine Science, University of California Santa Cruz

Dr. Insley studies the forces that shape animal behavior, particularly communication behavior, and combines the disciplines of behavioral ecology, acoustics, and conservation biology in his fieldwork on marine mammals and seabirds. His research has included studies of vocal recognition in northern fur seals, northern elephant seals and razorbills, behavioral responses to natural catastrophes in South American fur seals and underwater display behavior in harbor seals. He has also studied anthropogenic impacts, particularly noise, on several pinniped species. His research has been carried out on the Pribilof Islands in the Bering Sea, Sable Island and the Gannet Islands in the north Atlantic, and along the coastal desert of southern Peru.

Bernd Würsig

Professor of Marine Biology, Department of Marine Biology, Texas A&M University at Galveston
<http://www.marinebiology.edu/Wursig.htm>

Dr. Würsig enjoys teaching and studying the social and foraging strategies of whales and dolphins. His research interests include: long-term studies of the behavioral ecology of dolphins, porpoises and whales; elucidating differences of foraging techniques in different environments; and flexibilities of adaptation in social marine mammals and in social animals in general.

Biological Oceanography

Lisa Ballance

Leader, Ecology Program, Southwest Fisheries Science Center; Chief Scientist, *Stenella* Abundance Research Project, San Diego, California

The significance of species-habitat relationships has long been appreciated by biologists. The concepts of the ecological niche, competitive exclusion, and the causal relationship between community diversity and habitat diversity have all become central tenets of the science of ecology, and arose from research focusing on species-habitat relationships. The vast majority of this research has been conducted in terrestrial systems. In comparison, very little is known about species-habitat relationships in the marine environment, particularly in oceanic systems. But there is little doubt that the significance of these relationships is equally great for marine organisms. By combining oceanographic data with information on marine mammal distribution and abundance, we can address some of the more fundamental questions about basic ecology of marine mammals, then use this information for academic and applied goals. To this end, Dr. Ballance's current research interests include: the foraging ecology, energetic constraints, species diversity patterns, community structure, and general ecology of pelagic marine vertebrates, particularly seabirds and cetaceans. She is also interested in combining field-intensive studies on individual organisms from localized areas with at-sea surveys of multispecies communities covering large spatial and temporal scales.

Cynthia Tynan

Visiting Investigator, Physical Oceanography Department, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
http://www.whoi.edu/science/PO/dept/personnel/personnel_alpha_tynan.htm

Dr. Tynan's research interests include examining the influence of climate and ocean circulation on the distribution and ecology of top trophic level predators (i.e., mammals and seabirds). She is interested in developing predictive biophysical models of the occurrence patterns of mammals and seabirds in the California Current. She is also interested in performing research that will improve our understanding of the responses of top predators to climate-related variability in an upwelling boundary current system. Dr. Tynan has also performed research on the interaction between oceanography and marine mammal population structures in polar ecosystems.

Cognition and Psychophysics

Caroline DeLong

Visiting Assistant Professor of Cognitive Psychology, New College of Florida, Sarasota, Florida

Throughout her education, Dr. DeLong has specialized in human and animal cognition and her dissertation research at the University of Hawaii focused on object-centered representation in echolocating dolphins. Her current research interests include comparative cognition, bioacoustics, and sensory perception. She is focused on bottlenose dolphin cognition and acoustics (communication and echolocation signals) and Dr. DeLong's current research efforts are centered on understanding object perception by echolocating dolphins using acoustic analyses.

Colleen Reichmuth Kastak

Associate Researcher, Pinniped Cognition and Sensory Systems Laboratory, Long Marine Laboratory, Institute of Marine Sciences, University of California Santa Cruz
<http://pinnipedlab.ucsc.edu/staff.html>

Dr. Reichmuth Kastak earned her B.A. in Biology and her M.Sc. and Ph.D. in Ocean Sciences. She currently combines these disciplines with behavioral techniques to study cognition and perception in pinnipeds. Pinnipeds are particularly interesting subjects for these studies due to the adaptations they have developed in response to the challenges of their amphibious lifestyles. Dr. Reichmuth Kastak, working closely with Dr. Ronald Schusterman and his research team, has used psychophysical techniques to examine auditory and visual processing in three species of pinnipeds. Her own research efforts have emphasized problem solving and memory in California sea lions, including equivalence classification, learning by exclusion, and long-term conceptual memory. Dr. Reichmuth Kastak now serves as the manager of the Pinniped Cognition and Sensory Systems Laboratory at UCSC, where she conducts research, assists with program administration, and is responsible for the husbandry and training of the resident animals in the laboratory.

Community Ecology

James Estes

Supervisory Zoologist, California Science Center, National Biological Service, Santa Cruz, California; Adjunct Professor in Biology, Marine Sciences and Environmental Studies, University of California Santa Cruz
<http://brd1.ucsc.edu/>

Dr. Estes' group is interested in the ecology of coastal marine communities, particularly the influences of vertebrate consumers on benthic community structure. Most of their field research has focused on the sea otter in the northeastern Pacific Ocean. They have ongoing research projects in the Aleutian Islands, central California, the Channel Islands, and New Zealand. The central theme of all these studies is to identify the important high-trophic-level consumers and their influences on the organization of the communities within which they live. They are also interested in marine plant-herbivore interactions, the behavioral ecology of marine vertebrates, and the evolution of marine living in mammals.

Bruce Mate

Professor of Fisheries and Wildlife, Adjunct Professor of Oceanography, and Director, Endowed Marine Mammal Program, Oregon State University, Hatfield Marine Science Center, Newport, Oregon
<http://fw.oregonstate.edu/Personnel/Faculty/mateb.htm>
www.marinemammalprogram.org

Dr. Mate's general interests include: determination and characterization of seasonal critical habitats (areas of calving, mating, and feeding), as well as migration routes of large whales. Additional interests include diving physiology, navigation, behavior, energetics, and aspects of marine mammal competition with fisheries and aquaculture. In the past, Dr. Mate has also worked with pinnipeds, sea otters, and manatees. He has been working on soft money (grants and contracts) for 30 years and has raised \$6 million to endow the Oregon State University (OSU) program and make it stable.

Satellite-monitored radio tags developed at OSU have been used to monitor the movements of bowhead, gray, fin, sperm, blue, humpback, and right whales, as well as bottlenose dolphins and pilot whales. In addition to locations, some tags relay sensor data on dive duration, water temperature, dive depth, and time spent at the surface. These parameters help: establish sighting probabilities (to estimate population size from survey results), estimate energetics, understand diving physiology, and predict predator/prey relationships. Currently, Dr. Mate's research emphasizes oceanographic characterization of endangered whale habitats and determining if human activities impact the recovery of some populations. GIS and statistical skills are important aspects of the research. Students seeking a PhD, with skills and interests in these areas, are encouraged to apply for full-ride scholarships.

Conservation Biology

Jason Baker

Leader, Hawaiian Monk Seal Population Assessment Program, National Marine Fisheries Service, Honolulu, Hawaii

Jason Baker has been conducting research on pinnipeds for the U.S. National Marine Fisheries Service for 20 years. He worked for many years for the Alaska Ecosystem Program at the National Marine Mammal Laboratory in Seattle researching northern fur seal populations in Alaska. For the past five years, he has led the Hawaiian Monk Seal Population Assessment Program at the NMFS Pacific Islands Fisheries Science Center. His research on demography and ecology of monk seals is directed toward recovery of this endangered species.

Conservation Genetics

Howard Rosenbaum

Conservation Associate, American Museum of Natural History; Adjunct Faculty, New York University and Columbia University, New York, New York
<http://wcs.org/home/science/SRC/srcpersonnel/24232823/>

Broadly speaking, Dr. Rosenbaum's research interests involve the application of current techniques in molecular biology to the conservation of wildlife. His conservation genetics research is focused at different hierarchical levels ranging from evolutionary relationships between taxa to determination of relatedness among individuals within populations. The results of these detailed theoretical and empirical studies are subsequently applied to guide conservation decision-making and priority setting.

Dr. Rosenbaum's main areas of research focus on population genetics, systematics, biogeography, and conservation of the large baleen whales. One aspect of his research program involves the examination of population structure, migration links, and social organization of humpback whales (*Megaptera novaeangliae*) throughout the Indian and South Atlantic Oceans, and more comprehensively throughout the entire Southern Hemisphere. These studies integrate genetic analyses (high-throughput sequencing and multi-locus genotyping), with extensive field surveys and life history data collected from natural populations of whales off the coasts of Madagascar, Gabon, and elsewhere in these oceans.

The effects of overexploitation (whaling) on genetic variation among endangered whale populations are still largely unknown. His work on right whales and closely related species has focused on comparing samples from historical and extant populations in order to assess the impacts of whaling and climate change on levels of genetic diversity for several species over time. In order to interpret observed patterns of genetic diversity in extant populations of whales, Dr. Rosenbaum and his team developed an effective and reliable technique to isolate DNA from historical whaling and archaeological specimens ranging in age from 100-10,000 years before present. These data allow them to evaluate the extent to which changes in genetic diversity may be associated with current factors effecting extant populations. The analysis of historical specimens has also enabled them to investigate genetic structure and relationships within and among populations where no such information previously existed.

Evolutionary Biology

Annalisa Berta

Professor and Associate Chair, Department of Biology, Evolutionary Biology Program Area, San Diego State University
<http://www.bio.sdsu.edu/faculty/berta.html>

Research in Dr. Berta's lab focuses on the evolution, systematics, functional morphology, and biogeography of marine mammals especially pinnipeds, odontocetes and mysticetes. Projects currently being pursued include the molecular phylogeny and biogeography of monk seals, morphological and molecular phylogeny of mysticetes, evolution of the forelimb of mysticetes, evolution and comparative morphology of filter feeding in mysticetes, phylogeny and biogeography of phocoenids, and comparative morphology of the melon in odontocetes.

Daryl Domning

Professor, Department of Anatomy, College of Medicine, Howard University, Washington, D.C.

<http://www.med.howard.edu/anatomy/>

Dr. Domning's research interests include the biology, paleontology, systematics, paleoecology, and evolution of fossil and living marine mammals, particularly of the orders Sirenia and Desmostylia. Investigations completed to date include: myology and functional anatomy of dugongs and manatees; interspecific and intraspecific morphological variation in manatees; evolutionary history of sirenians and desmostylians in the northern and eastern Pacific Ocean; Pliocene sirenians of Libya and France; Miocene sirenians of Austria; Eocene-Miocene sirenians of the southeastern U.S.A.; and functional anatomy of Odobenocetops, a walrus-like fossil cetacean from Peru. Recent paleontological field projects have been located in France, Austria, Venezuela, and Jamaica. Ongoing work in the Eocene of Jamaica has revealed the most primitive sirenian known from postcranial remains, the quadrupedal seacow *Pezosiren portelli*. Work in progress includes: systematics, ecomorphology, and evolution of fossil sirenians of the West Atlantic and Caribbean; cladistic analysis of the Sirenia; and bibliography of the Sirenia and Desmostylia.

Foraging Ecology

Leslie Cornick

Visiting Assistant Professor of Biology, Connecticut College, New London, Connecticut
http://www.conncoll.edu/academics/web_profiles/cornick.html

Dr. Cornick's research has focused largely on interdisciplinary approaches to examining the physiological constraints on foraging in marine predators, and the plasticity of foraging strategies in response to natural and anthropogenic changes in the environment. She is particularly interested in the effects of repeated exposure to high hydrostatic pressure and periodic anoxia on foraging efficiency and strategy.

She has worked with both captive and free-ranging dolphins, seals, and sea lions, in California, Alaska, Belize, and the Antarctic. Dr. Cornick is also interested in environmental impact assessment, examining impacts of human activity on marine sanctuaries and marine mammal populations, and conservation of the marine environment in general. Some of her most recent work has been examining the effects of pressure on marine mammal blood and tissues, and examining the role of the post-dive surface recovery period in oxygen balance and foraging behavior.

Sara Iverson

Associate Professor, Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada
<http://is.dal.ca/~biology2/index.html>

Dr. Iverson studies the physiological and biochemical mechanisms that constrain or provide opportunities for the evolution of reproductive strategies in mammals, particularly marine mammals. Her lab also focuses on fatty acid metabolism and foraging ecology by applying fatty acid signatures analysis to the determination of prey type and diet in marine animals.

Policy and Management

Shane Capron

Steller Sea Lion Recovery Coordinator, National Oceanic and Atmospheric Administration

Dr. Capron's work focuses on Steller sea lion recovery efforts, especially in Alaska. This involves working under the Endangered Species Act as well as with the Marine Mammal Protection Act. His office's efforts have resulted in increased protection areas around key sea lion rookeries and haul-outs and the allocation of millions of dollars towards researching both the biological needs of Steller sea lions and the causes of their decline.

Population Dynamics and Assessment

Jay Barlow

Leader, Coastal Marine Mammal Program, Southwest Fisheries Science Center; Adjunct Professor of Biological Oceanography, Scripps Institution of Oceanography, San Diego, California
<http://swfsc.nmfs.noaa.gov/prd/cmmpl/>

Population dynamics is the quantitative analysis of population growth rates and the factors that effect those rates. Population assessment is the quantitative determination of the status of a population relative to human management goals. The common theme in both is the application of quantitative tools to applied problems in marine mammal conservation. Therefore, Dr. Barlow's research interests include: marine mammal population dynamics, marine mammal survey methods, conservation biology, acoustic and visual survey methods, bycatch reduction with pingers, abundance estimation, population dynamics, and effects of anthropogenic sound.

Paul Wade

Research Biologist and Leader of the Cetacean Assessment and Ecology Program, National Marine Mammal Laboratory, Alaska Fisheries Science Center, NOAA Fisheries, Seattle, Washington; Affiliate Assistant Professor, School of Aquatic and Fisheries Science, University of Washington, Seattle

Dr. Wade's research interests focus on the population dynamics and ecology of marine mammals, the conservation biology of marine vertebrates, and the use of modeling and quantitative methods, particularly Bayesian statistics, in conservation and management. He received his degree from Scripps Institution of Oceanography in 1994, researching the abundance, population dynamics, and conservation status of spotted and spinner dolphins in the eastern tropical Pacific. He has worked on the population dynamics of gray, bowhead, and right whales, as well as research on establishing sustainable levels of marine mammal bycatch in fisheries. He has extensive experience designing and conducting line-transect cetacean surveys from small boats, large ships, and airplanes, but has also increasingly been involved in mark-recapture studies of various cetaceans to estimate survival and abundance. More recently, much of his research has been on killer whales, including ship-based surveys in western Alaska. He is a member of the U.S. delegation to the Scientific Committee of the International Whaling Commission, the Cetacean Specialist Group of the IUCN Species Survival Commission, and has participated in several ESA recovery and review teams.

Technological Applications and use of Telemetry Equipment

Sascha Hooker

Royal Society Dorothy Hodgkin Research Fellow, Sea Mammal Research Unit, University of St. Andrews, St. Andrews, Fife, United Kingdom
<http://www.smr.u-st-and.ac.uk/skh/>

Dr. Hooker's research interests primarily focus on the interaction between marine mammal behaviour, ecology and the surrounding environment. She has recently been involved in collaborative work between the British Antarctic Survey and the Sea Mammal Research Unit, developing methods to incorporate environmental and oceanographic data into studies of marine mammal foraging. Dr. Hooker's group has been developing new oceanographic sensors for incorporation into time-depth recording tags (TDRs) and using digital video linked to TDRs to investigate the fine-scale behavior of these marine predators in relation to prey density and distribution. Most recently, they have been using both oceanographic sensors, video and hydrophone-recording tags to look at aspects of diving physiology of fur seals. Her previous research has involved studying the foraging ecology of northern bottlenose whales in the Gully, eastern Canada, and work on the diving behaviour of cetaceans in Hawaii.

Yann Tremblay

Postdoctoral Research Assistant, Long Marine Laboratory, University of California Santa Cruz
http://www.cebc.cnrs.fr/Uk_taat/equip_YT.html

Dr. Tremblay researches the behavioral ecology of marine top predators with a special interest in seabirds (penguins, murres, albatross) and pinnipeds. In particular, he works on foraging ecology in relation to the marine environment, plasticity in diving behavior, and habitat characteristics and selection.

During Dr. Tremblay's doctoral research, he studied the foraging strategies of the Rockhopper Penguin on

Amsterdam Island, and the Kerguelen and Crozet Archipelagoes. In order to study the behavior of marine animals at sea, it is necessary to acquire data through telemetry. In this way, the use of transmitting or acquiring autonomous electronic instruments is helpful, but constraints still remain. For instance, no simple solution exists to record the whole behavior at sea for medium sized flying and diving birds. The use of standard diving recorders in a non-conventional way (belly fastening on birds) allowed Dr. Tremblay and his collaborators to acquire this information. This technique allowed the study of time budgets and diving behaviors of Cormorants in Kerguelen and Crozet and of Troil Guillemots in Hornøya (Norway). Dr. Tremblay is also interested in trying to understand the oceanographic ecology of the marine animal's environment as viewed from the animal's perspective. At present, his work focuses on this question and he is working to acquire oceanographic data using marine mammal borne instruments.

Theoretical Ecology

Ian Boyd

Professor and Chair, School of Biology and Gatty Marine Laboratory, University of St Andrews; Director, Sea Mammal Research Unit, St. Andrews, Fife, United Kingdom; Editor, Journal of Zoology; Member of the Editorial Board, Antarctic Science
<http://smub.st-and.ac.uk/ILB/ilb.htm>

Major Research Interests:

Behavioural dynamics of marine predators

Dr. Boyd has many research interests including behavioral dynamics of marine predators. He uses the application of scale-based theoretical and statistical models to examine single- and multi-dimensional behavioral vectors of marine predators, particularly in relation to the distribution of food patches. The objective of this research is to: develop and test dynamic models of the way in which predator fitness varies in relation to the distribution and abundance of food and of how this ultimately influences the evolution of life-histories and the viability of predators in different environments; characterize the functional relationship (in terms of fitness) of animals to environmental variability and thereby to develop a predictive framework for population trajectories under different environmental conditions; and examine the impact of marine predators on their food supply.

This research has involved extensive studies of bioenergetics and behaviour including the use of remote recording technology. The results from these studies are providing the foundation for the development of algorithms to calculate the direction and dynamics of energy flux through predators populations.

Dr. Boyd is also interested in the management of marine ecosystems and is working towards development of ecosystem-based management procedures for the sustainable exploitation of marine resources. This interest lies at the interface between ecology, systems modelling and economics. The goal is to: use predators at the top of marine food chains as models of sustainable exploitation in marine ecosystems; examine the underlying natural levels of variability from large-scale physical forcing of the ecosystem and to develop an appreciation of their role in marine resource management through the use of signals from top food chain predators; and to develop the conceptual and strategic models underlying ecosystem-based management.

Finally, Dr. Boyd and his lab study ecological economics which aims to bridge to gap between economics and ecology. Traditionally, ecological economics has stressed the importance of natural resources for commerce and conservation. It covers the whole range of subjects from bioenergetics through to resource exploitation by commercial interests. The objectives of this research are to: apply theory developed within economics to understanding the criteria used by animals when making investment decisions and also the evolutionary implications of those decisions. This will provide a better understanding of how we should place a value on natural resources (such as unexploited wildlife populations) which have no marketable value.

Toxicology and Pathology

Kimberlee Beckmen

Wildlife Veterinarian, Alaska Department of Fish and Game, Division of Wildlife Conservation, Fairbanks, Alaska

Dr. Beckman's major research interests are the adverse effects of environmental contaminants on health in free-ranging pinnipeds, with an emphasis on immune function in particular. Her current work entails a much broader scope of wildlife disease but she has advanced training in veterinary medicine, pathology, and toxicology.

Veterinary Medicine

Pam Tuomi

Senior Veterinarian, Alaska SeaLife Center, Seward, Alaska

Dr. Tuomi is responsible for the health and well being of all of the animals housed at the Alaska SeaLife Center (ASLC). In addition to routine medical monitoring of collection and research animals, she treats injured or ill animals, and assists the Husbandry Director, Curators, Science Director, and Research and Rehabilitation Managers in husbandry programs and design and implementation of research protocols consistent with Institutional Animal Care and Use Policies and the USDA Animal Welfare Act. Dr. Tuomi has practiced clinical veterinary medicine in Alaska since 1970 with a special interest in birds and marine wildlife. She has worked as a field veterinarian for the Exxon Valdez Oil Spill Sea Otter Rehabilitation Program and for projects with birds and marine mammals for US Fish and Wildlife Service, US National Biological Service, Alaska Department of Fish and Game, and the Canadian Wildlife Service. As Alaska Coordinator for International Wildlife Research, Dr. Tuomi continues to be active in program design and training for oil spill wildlife response. She received her degree as a Doctor of Veterinary Medicine from Washington State University and has served on the Alaska Board of Veterinary Examiners and as President of the Alaska State Veterinary Medical Association. She has published articles and reports on marine mammal medicine and oil spill rehabilitation and was awarded the American Animal Hospital Association Northwest Region Practitioner of the Year Award in 1989.

Diedrich (Deke) Beusse

Professor and Director, Marine Mammal Medicine, Department of Small Animal Clinical Sciences, College of Veterinary Medicine, University of Florida, Gainesville
<http://www.vetmed.ufl.edu/MarineMammal/>

Dr. Beusse has been a veterinarian for SeaWorld of Florida, Animal Actors at Universal Studios in Florida, and Discovery Island at Walt Disney World in Florida, among other organizations. Dr. Beusse received his degree as a Doctor of Veterinary Medicine from the University of Georgia and his research interests have included manatee care, immunological investigations of dolphins, and medical findings in stranded pilot whales. Dr. Beusse's current areas of expertise are small animal medicine and surgery, exotic animal medicine, avian medicine, and marine animal medicine. He currently directs the Marine Mammal Medicine Program at the University of Florida whose mission is to provide training in marine mammal science and to promote the health and understanding of marine mammals in Florida.