Course Program

Hybrid SeaBASS 2022

June 12 - June 17, 2022

Organizers

Jennifer Miksis-Olds[1] & Susan Parks [2]

1- Center for Acoustics Research & Education, University of New Hampshire

2- Biology Department, Syracuse University

Financial Support

Funding to support the Bioacoustics Summer School was generously provided by the following sponsors.

Office of Naval Research

The Acoustical Society of America

National Oceanic and Atmospheric Administration

Office of the Chief of Naval Operations (*OPNAV*)

FORWARD

Welcome to the seventh biennial **B**io**A**coustics **S**ummer **S**chool program. SeaBASS was developed in response to the success of the long-standing Physical Acoustics Summer School (PASS), a biennial course that brings together educators and graduate students in the field of physical acoustics for a week-long retreat. With this seventh installment we feel that SeaBASS has matured and established its own place in the marine bioacoustics community, as a number of alumni have graduated and continue as professionals in the field.

The goal of the SeaBASS program is to provide the opportunity for graduate students interested in pursuing careers in marine bioacoustics to develop a strong foundation in marine animal biology and acoustics, foster technical communication across disciplines, and to develop professional relationships within the field. Experts within the field of marine animal bioacoustics will provide half day virtual seminars that describe fundamental aspects of underwater sound and marine animal behavior, summarize the present state of the field, identify current obstacles and challenges, and discuss important "hot topics" areas. Each seminar will include introductory lectures followed by group discussions or group projects to gain a more in-depth understanding of the issues.

We hope that SeaBASS will be more than a short course introducing students to the fundamental aspects of the field. We hope that the opportunity for close interaction over the week of the course will allow all of the participants, presenters and students alike, to develop lasting professional contacts that will help develop the next generation of marine bioacousticians.

Jennifer Miksis-Olds & Susan Parks

Table of Contents

***Supplemental materials for each lecturer will be provided in a GoogleDrive folder that will be emailed to all students in the course prior to SeaBass.

SCHEDULE

|	Sunday June 12	Monday June 13	Tuesday June 14	Wednesday June 15	Thursday June 16	Friday June 17
Session 1: 8:00 - 12:00 ET		*F. Jensen* *Introduction to Acoustics & Propagation*	*J. Warren* *Active Acoustics*	*P. Tyack* *Effects of Sound on Marine Mammals*	*D. Harris* *Acoustic Density Estimation*	*S. Parks* *Marine Mammal Acoustics & Behavior*
Session 2: 13:00 - 17:00 ET		*J. Miksis-Olds* *Soundscapes*	*H. Klinck & S. Madhusudhana* *Technology, Data Analysis & Automation*	*A. Rice* *Fish Acoustics & Behavior*	*J. Reidenberg* *Sound Production & Transmission Mechanisms in Cetaceans*	*P. Nachtigall* *Echolocation*
Evening Sessions 18:00- 20:00 ET	Optional Software Installation & Meeting	*Poster Session/Speed Talk Part 1*	*Poster Session/Speed Talk Part 2*	*Career Discussions*	*Evening Group Activity - TBD*	

LINK TO THE GOOGLE DRIVE FOLDERS FOR THE COURSE:
https://drive.google.com/drive/folders/1Losv-otyw_oemnt0v-ZEjFtLC4aHbBPA?usp=sharing

CAMPUS MAP

Housing and Dining will be in Ernie Davis Hall on Syracuse University Campus

All course activities will be in the Lundgren Room, Room 106, on the first floor of the Life Sciences Complex Building

Those needing parking can arrange for parking in advance or pay to park in the Comstock Ave Parking Garage
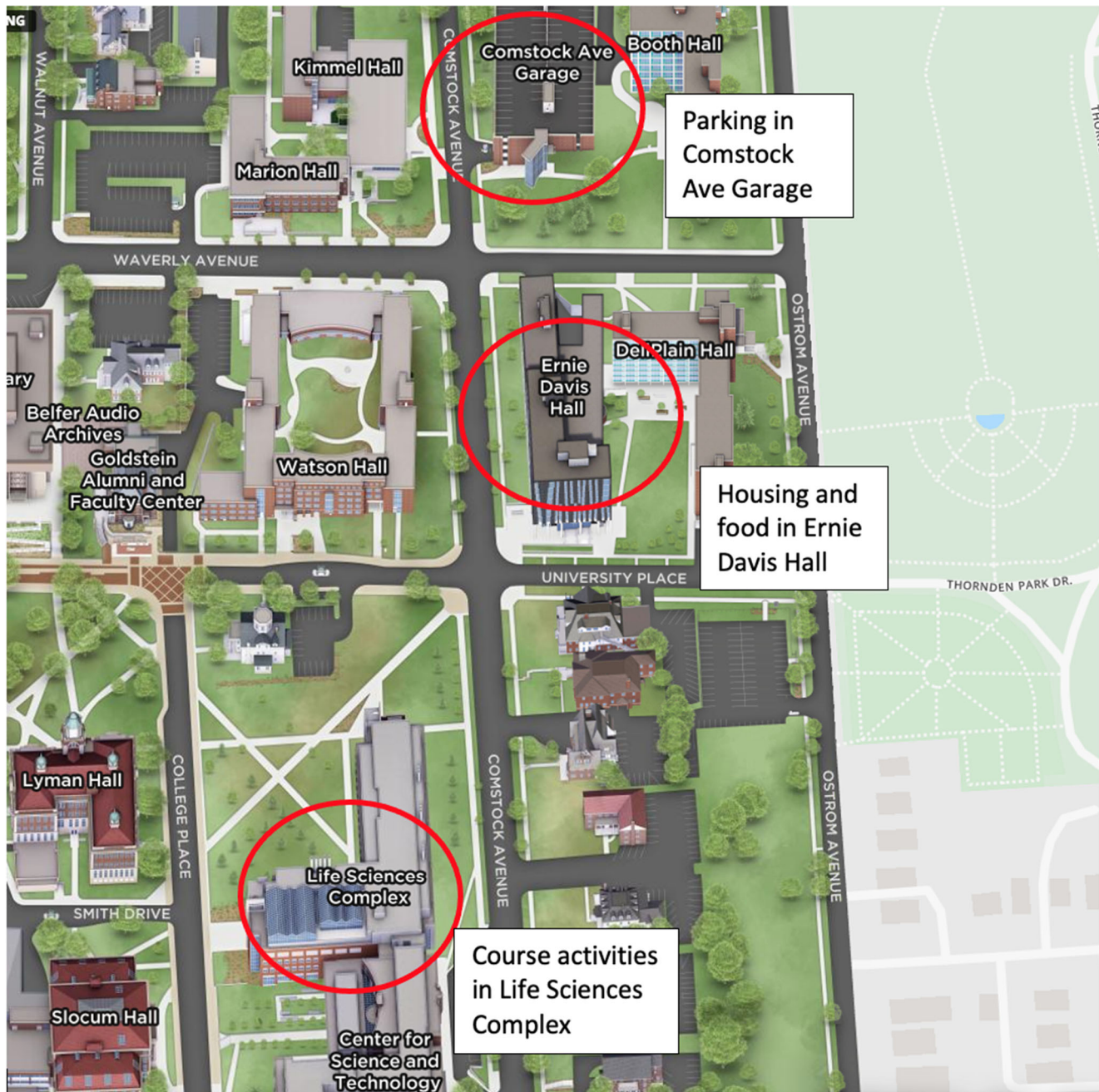
Topic: SeaBASS 2022
https://syracuseuniversity.zoom.us/j/96373028330?pwd=ZjR0U05MdTNKeGo0Y2lKUndXZ1h6dz09
Meeting ID: 963 7302 8330
Passcode: 052854
One tap mobile
+16468769923,,96373028330# US (New York)
TROUBLESHOOTING STEPS:
 Audio Echo In A Meeting: https://support.zoom.us/hc/en-us/articles/202050538-Audio-Echo-In-A-Meeting
Want to Join a Test Meeting?: https://zoom.us/test

SLACK CHANNEL INFORMATION
Follow this link to sign up for the slack channel:

https://join.slack.com/t/slack-8aa5818/shared_invite/zt-1aek15lat-LIpmc1qrz4~NGWlhxq1X0g

If you are not familiar with Slack, you can read more about it at this link:
https://slack.com/help/articles/360059928654-How-to-use-Slack--your-quick-start-guide.

INTERNET ACCESS

WiFi Network: **AirOrangeGuest**

Guest Account and Wi-Fi Instructions:

- ① Make sure your wireless adapter is set to dynamically obtain an IP address
- ② Connect to the wireless network: *AirOrangeGuest*
- ③ Enter credentials:
  - ○ – Username: **SUBiology**
  - ○ – Password: **biology22**
- ④ Account expires: Saturday, June 18, 2022 17:00

PARTICIPANT DIRECTORY

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Danielle Harris (dh17@st-andrews.ac.uk)

Dr. Danielle Harris is a post-doctoral research fellow at the Centre for Research into Ecological and Environmental Modelling (CREEM) at the University of St Andrews, with a multi-disciplinary background involving biological, statistical and acoustical analyses. Her BSc. was in Marine and Environmental Biology (2005, University of St Andrews) followed by a Masters in Environmental Biology (2007, Universities of St Andrews and Dundee). Her BSc and M.Res research projects provided an introduction to the fields of marine mammal acoustics and population monitoring methods, by studying bottlenose dolphin whistles during her BSc (supervised by Prof. Vincent Janik) and analysing visual survey data during her M.Res (supervised by Prof. Phil Hammond). Both topics were then combined during her PhD (2012, University of St Andrews), which focussed on cetacean density estimation using acoustic data (supervised by Dr. Len Thomas and Prof. John Harwood). Her thesis work comprised a variety of case studies, in collaboration with Scripps Institution of Oceanography (UC San Diego), the Cornell Lab of Ornithology (Cornell University) and the Instituto Dom Luiz (University of Lisbon). Subsequent post-doc projects have focussed on investigating cost-effective approaches to cetacean density estimation using acoustic data, by exploring existing opportunistic datasets and new technologies. Projects have included exploring cetacean density estimation using Ocean Bottom Seismometers (funded by the US Office of Naval Research); assessing the capability of a Waveglider for long term monitoring of both noise and marine mammals (funded by the UK Research Council & Department for Environment, Food and Rural Affairs); investigating large scale density estimation of blue and fin whales using non-standard density estimation methods (funded by ONR) and developing a framework for ocean glider-based acoustic density estimation (also funded by ONR).

Frants Jensen (fhjensen@syr.edu)

Dr. Frants Jensen is a Research Assistant Professor at Syracuse University. He received his PhD in bioacoustics from Aarhus University in 2011 under the mentoring of Prof. Peter Madsen, and has since held postdoctoral fellowships at Woods Hole Oceanographic Institution, Princeton University, and the Aarhus Institute of Advanced Studies as well as a short teaching position at the University of St. Andrews. Frants uses a variety of hydrophone arrays, sound and movement recording tags and acoustic modeling to understand how animals use sound to solve ecological

problems, and how human activities alter these processes. He has focused extensively on investigating the form, function and evolution of cetacean biosonar but also has broad interests in the function and evolution of animal communication. His current projects range from developing new tags for investigating fish and invertebrate communication, through investigating communication and collective action in hyena societies, to investigating and mitigating effects of offshore wind development on cetaceans.

Holger Klinck (Holger.Klinck@cornell.edu)

Dr. Holger Klinck is the John W. Fitzpatrick director of the K. Lisa Yang Center for Conservation Bioacoustics (CCB) at the Cornell Lab of Ornithology. He is also a Faculty Fellow with the Atkinson Center for a Sustainable Future, Cornell University. In addition, Holger holds a Courtesy Professor position at Oregon State University (OSU). Before moving to the U.S. in early 2008 for a postdoctoral position at OSU, he was a Ph.D. student at the Alfred Wegener Institute for Polar and Marine Research in Germany. Holger's graduate work focused on developing the Perennial Acoustic Observatory in the Antarctic Ocean and the study of the leopard seal vocal behavior. His current research focuses on developing and applying hard- and software tools for passive-acoustic monitoring of terrestrial and marine ecosystems and biodiversity. One of his goals is to enable researchers around the globe to acoustically monitor wildlife and habitats at ecologically relevant scales. Holger is also studying the impacts of anthropogenic noise on the vocal and locomotive behavior of animals.
Holger is a full member of the Acoustical Society of America (ASA) and the moderator of the popular Bioacoustics-L mailing list hosted by CCB. In addition, he advises several undergraduate, graduate students, and postdocs at Cornell and OSU and regularly teaches national and international classes on bioacoustics. Holger is an avid college and professional sports fan. His hobbies include running, sailing, and tinkering with gadgets. He and his wife Karolin live in Lansing, NY, and enjoy hiking with their two Australian shepherd dogs Lilly and Sammy, and their miniature dachshund Marvin.

Shyam Madhusudhana (shyamm@cornell.edu)

Dr. Shyam Madhusudhana is a postdoctoral researcher at the K. Lisa Yang Center for Conservation Bioacoustics (CCB) within the Cornell Lab of Ornithology. His research interests are largely multidisciplinary as is his academic background – Bachelors in Engineering, Masters in Computer Science, and PhD in Applied Physics. He has also worked as a speech scientist for a leading Automatic Speech Recognition solutions provider. Prior to joining CCB, he has been a research associate at the Centre for Marine Science and Technology in Australia, a research associate at the

National Institute of Oceanography, Goa, India and a postdoctoral research fellow at the Indian Institute of Science Education and Research in Tirupati, India. His current research involves developing deep-learning techniques for realizing effective and efficient machine-listening in the big-data realm, with applications in the monitoring of both marine and terrestrial fauna.

He is a Senior Member of IEEE, and currently serves as an Administrative Committee member in IEEE's Oceanic Engineering Society (OES). He is also the Coordinator of Technology Committees in OES and a co-Chair of the Student Poster Competitions at the biannual OCEANS conference. He referees manuscripts for journals focused on animal bioacoustics, pattern recognition and machine learning.

Jennifer L. Miksis-Olds (J.MiksisOlds@unh.edu)

Dr. Jennifer L. Miksis-Olds is the Director of the Center for Acoustics Research and Education, Research Professor in the School of Marine Science & Ocean Engineering at the University of New Hampshire (UNH), also holding a research position in the UNH Center for Coastal and Ocean Mapping. Dr. Miksis-Olds is the university Member Representative and on the Board of Trustees of the Consortium for Ocean Leadership. She is a member of the Scientific Committee of the International Quiet Ocean Experiment Program and serves as a Scientific Advisor to the Sound and Marine Life Joint Industry Programme (International Oil & Gas Producers). Most recently, she is the lead PI of a National Oceanographic Partnership Program project partnering with BOEM, ONR, and NOAA focused on the development of the Atlantic Deepwater Ecosystem Observatory Network (ADEON). Dr. Miksis-Olds was the recipient of an Office of Naval Research Young Investigator Program award in 2011 and the Presidential Early Career Award in Science and Engineering in 2013. Dr. Miksis-Olds received her A.B. cum laude in Biology from Harvard University, her M.S. in Biology from the University of Massachusetts Dartmouth; she was a guest student at Woods Hole Oceanographic Institution, and then received her Ph.D. from the University of Rhode Island. Her primary research interests are patterns and trends in ocean soundscapes, animal behavior and communication, and the environmental effects of anthropogenic activities.

Paul E. Nachtigall (nachtiga@hawaii.edu)

Dr. Paul E. Nachtigall is the former editor (1991-2000) and current editorial board member of the
journal Aquatic Mammals for the European Association for Aquatic Mammals, past president of the over 2000 member international Society for Marine Mammalogy, Fellow in the Acoustical

Society of America and Honorary member of the European Association for Aquatic Mammals. His research interests primarily focus on the hearing and echolocation of marine mammals. Former head of the Research Division of the, now closed, Naval Ocean Systems Center's Hawaii Laboratory, Dr. Nachtigall is the founding director of the marine mammal research program of the University of Hawaii at Manoa's Hawaii Institute of Marine Biology where he is also an emeritus Research Professor and a member of the graduate faculty in Zoology, Psychology and Marine Biology. He has published six edited books (including two on whale echolocation) and over one hundred and fifty peer-reviewed journal articles and chapters in reviewed books. His recent efforts include the measurement of the hearing of odontocetes while they echolocate and determining that dolphins, whales and porpoises learn to adjust their hearing sensation levels when warned that a loud sound is about to arrive.

Susan E. Parks (sparks@syr.edu**)**   **@ParksLabSU (Twitter)**
Dr. Susan E. Parks is a Professor in Biology at [Syracuse University](). Her primary research interests are focused on the behavioral function and evolution of sound production in animals, their perceptual abilities, and the impact of noise on their ability to communicate. She has been involved in animal bioacoustics studies since 1995, first as an undergraduate working on whale acoustic census data and studying male frog calling behavior, then as a graduate student focusing on acoustic communication of the North Atlantic right whale. She earned her B.A. in Biology (Neurobiology and Behavior) from Cornell University and her Ph.D. in Biological Oceanography in the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography. She has received numerous awards in her career including the Office of Naval Research Young Investigator Award and a Presidential Early Career Award for Scientists and Engineers from the White House. She has served as PI and Co-PI on several federally funded research projects through the National Oceanic and Atmospheric Administration (NOAA), Office of Naval Research (ONR), and the National Science Foundation (NSF) studying acoustic behavior, hearing, soundscapes and noise impacts on a variety of marine and terrestrial species. She is currently a member of the Committee on Offshore Science and Assessment for Ocean Energy Management for the U.S. National Academies of Sciences and an Associate Editor for the journal Behavioral Ecology and Sociobiology.

Joy S. Reidenberg (joy.reidenberg@mssm.edu)

Joy S. Reidenberg, Ph.D. is a Professor at the Icahn School of Medicine at Mount Sinai in New

York City, a Fellow of the American Association of Anatomists, and an Inaugural Fellow of the Society for Marine Mammalogy. She received a B.A. in 1983 from Cornell University's College of Arts and Sciences. She earned her M.Phil. in 1985 and her Ph.D. in 1988 in Anatomy from Mount Sinai's Graduate Program in Biomedical Sciences in New York. Dr. Reidenberg has also held appointments as a Guest Investigator at the Woods Hole Oceanographic Institution, and as an Associate Scientist at the National Museum of Natural History of the Smithsonian Institution. Dr. Reidenberg is a biomedical research scientist who studies comparative anatomy. She has examined a large variety of animals ranging from insects to humans, but her particular fascination is with aquatic animals. Much of Dr. Reidenberg's recent work is focused on how animals adapt to environmental extremes. Current research is focused on the anatomy of whales, dolphins and porpoises, especially in understanding how they produce sounds and withstand the pressures of diving. Her anatomical research focuses on these animals as "natural experiments" from which we can learn about basic biomechanical relationships that affect all animals, including humans. Dr. Reidenberg is interested in how these animals have evolved adaptations to solve problems we consider a survival challenge in humans. She hopes to learn from nature and develop protective/preventive technologies or new medical treatments for injuries and diseases based upon mimicking these adaptations. Dr. Reidenberg work has been federally funded by: Office of Naval Research, Department of Defense, National Oceanic Partnership Program, and National Oceanic and Atmospheric Administration. She is also a well known popular television figure, having been the comparative anatomist for several television documentary series including: *Inside Nature's Giants, Sex in the Wild, Born in the Wild, Whale Detective, Humpnback Whales: A Detective Story, Big Blue Live, Wild Alaska Live, Mythical Beasts, Jimmy and the Whale Whisperer, Brave New World with Stephen Hawking, Decoding Humpbacks, Science of Whales, Cracking the Humpback Code, Whale Communication.*

Peter L. Tyack (ptyack@whoi.edu)

Dr. Peter Tyack is a Professor of Marine Mammal Biology at the University of St Andrews. His research focuses on behavioral ecology, especially acoustic communication and social behavior in marine mammals. He has studied the role of vocal learning in reproductive advertisement in baleen whales and individually distinctive contact calls in toothed whales, and echolocation in deep diving toothed whales. He has developed new methods to sample behavior continuously from marine mammals, including the development of sound-and-orientation recording tags, and has used these to study communication and echolocation. During his field work recording sounds of whales, he noticed that anthropogenic sound is ubiquitous in the ocean, and he developed concern that anthropogenic sounds could disturb marine mammals. He has developed a series of

studies on responses to anthropogenic sounds, including effects of oil exploration on baleen and sperm whales, and the effects of naval sonar on toothed whales. Tyack graduated *summa cum laude* in Biology from Harvard College and his PhD is in Animal Behavior from Rockefeller University. His PhD advisor was Donald Griffin, an early pioneer of studying animal sonar and animal awareness. He is an author of more than 100 peer reviewed scientific publications, served on 3 National Research Council Committees on the effects of sound on marine mammals, and is an author of 3 reports published by the National Academy Press and an editor of 2 books on animal behavior. He chaired a committee of the US National Academy of Sciences Ocean Studies Board which wrote a 2017 report on "Approaches to Understanding the Cumulative Effects of Stressors on Marine Mammals." He has served on the US Federal Advisory Committee on Acoustic Impacts on Marine Mammals, and testified to Congress and advised many non-governmental groups and government agencies on this topic.

Joseph D. Warren (joe.warren@stonybrook.edu)   **@warren_lab (Twitter)**
I'm an Associate Professor in the School of Marine and Atmospheric Sciences at Stony Brook University. I was an undergraduate engineering major and discovered underwater acoustics as a summer student at WHOI working on acoustic measurements of sediment transport. I quickly realized that animals are more interesting than sand grains and started working with Tim Stanton (a physicist) and Peter Wiebe (a biologist) on using active acoustics to measure zooplankton populations in the Gulf of Maine. The majority of my field work involves acoustic surveys of zooplankton and nekton populations and my research interests include: improving our ability to get "biologically-meaningful" information from acoustic echosounders, development of acoustic scattering models for different types of scattering processes, and examining predator-prey relationships between zooplankton and their charismatic megafauna (including seabirds) consumers. "Studying whale food" has become a larger part of my lab's activities in the past few years and I've done a bit of work looking at small zooplankton in freshwater lakes which has allowed me to make the [completely unverified] claim that I've used an underwater echosounder at a higher elevation (7000 ft above sea level) than anybody else in the world. I've also dabbled in the world of passive acoustics using them to examine dolphin-human interactions at artificial reefs in New York, fish behavior in local estuarine habitats, and even some terrestrial acoustics.

Student Directory

Student names, contact information and description of research.

Student Name	Research Description
Abigail Kreuser	I am currently working on building an individual movement model for North Atlantic right whales to help identify patterns in behavior or environmental variables that indicate their presence in a changing climate. This summer our lab will begin analyzing PAM data from buoys along the Southeast coast listening for fin, humpback, sei, and right whales with future goals to investigate temporal changes in migration behavior of right whales.
Amadi Afua Sefah-Twerefour	My research will focus on analyzing North Atlantic right whale / human interactions in the southeast USA, including a comparison of entanglement and vessel strike rates in the region relative to other areas (northeast USA and Canada) throughout the right whale habitat range. In the course of this research, I will also use passive acoustic monitoring from an Autonomous Underwater Vehicle (AUV) to detect right whale vocalizations off the coast of South Carolina during their migration and breeding season. These detections will be communicated in real-time to nearby vessel operators via the WhaleAlert app, especially targeting vessels near the Charleston, SC and Savannah, GA ports to encourage compliance with vessel speed limits.
Andrea Bonilla	My current work focuses on assessing marine mammals' occurrence in Antarctica and how the soundscape in the Southern Ocean has

Student Name	Research Description
	changed over time.
Angela Amlin	My project is titled "Studying Seals with Static Sensors: Using Remote Technologies to Inform Conservation Management," and includes characterizing the underwater vocal repertoire of Mediterranean monk seals, analyzing the impact of disturbance on Mediterranean monk seal haul-out patterns utilizing camera monitoring and PAM, and examining spatiotemporal patterns of harbor seal underwater vocal behavior and quantifying the effects of anthropogenic noise on this behavior using PAM.
Ayshah Kassamali-Fox	My proposed graduate work aims to improve our understanding of the acoustic behavior of manatees by applying new acoustic techniques to explore important questions regarding the functional use of vocalizations and the evolution of this behavior across sirenians. This research will employ a large database of manatee vocalizations of all manatee species (African manatee, Florida manatee, Antillean manatee, Amazonian manatee) acquired through long-term deployments with passive acoustic recorders and recordings of captive animals, and new recordings gathered in the field at at the Sian Ka'an Biosphere Reserve, Mexico, St. George's Caye, Corozal Bay, and Turneffe Atoll in Belize. These studies will help address fundamental questions in the use of sound by manatees and will facilitate the use of bioacoustic monitoring for long-term monitoring and management of manatee populations globally.
Dana Adcock	I hope to examine humpback whale communication ontogeny and the

Student Name	Research Description
	impact of noise on their communication.
Delaney Costante	I am interested in using passive acoustics to monitor oyster reef restoration on Long Island, NY.
Emily Pepple	I am currently working on stable isotope analysis and photo-ID of bottlenose dolphins in Perdido Bay located on the Alabama-Florida border. A combination of the two techniques can provide a better picture of their habitat use such as movements, diet, and population connectivity.
Giulia Bellon	To navigate, communicate and predate orcas rely on the production of acoustic signals which, if detected, can be proof of their presence in waters where they are rarely observed. Acoustic recordings collected between February and August 2020 and 2021 in East Iceland are being analysed to identify and categorise pulsed calls produced by orcas (Orcinus orca). A comprehensive comparison with published catalogues will follow to identify call repertoires.
Hannah Sawyer	Our research is investigating the biophysical drivers of bowhead whales during a period of rapid environmental change, using both short- and long-term acoustic moorings based in the Beaufort Sea to detect bowhead abundance and migration patterns. We are investigating linkages between hydrography, prey abundance, atmospheric forcing, sea ice patterns and bowhead abundance.

Student Name	Research Description
Karianne Kapfer	My graduate work has mainly consisted of creating a baleen whale data set through the use of traditional and frequency contour annotations that will be used to create new deep learning algorithms. For my master's thesis I am investigating if there is a correlation between biological masking (black drum chorusing) and whale migration, though the bulk of my Ph.D. will be spent studying the effects of offshore wind construction on fish and marine mammals.
Kirstianna Morin	Characterization of sperm whale acoustic behavior in the Irish Atlantic Margin and impact assessment of anthropogenic noise acoustic behavior.
Krista Greeley	Skeletal growth ring microanalysis and growth rates in sea pens from the Laurentian Channel, MPA, Newfoundland". I determined the physical basis of growth rings in deep-water sea pens via their elemental composition and structure to better understand their growth and longevity as a vulnerable species in a marine protected area. Accurate age-dating methods for deep-sea corals can be generated from this research and will aid in the resolution of their recovery rates and thus their vulnerability to anthropogenic disturbances.
Maia Austin	I am interested in utilizing acoustic analysis and machine learning tools to develop our understanding of the evolution of dolphins' acoustic repertoires. In particular, I'm looking at how inter-specific associations, social networks, and genetic relationships affect acoustic repertoire use.
Marisol Patricia Valverde Montellano	I am interested in using soundscapes to investigate community structure and dynamics of freshwater systems, with a particular focus

Student Name	Research Description
	on fish. For my PhD, I've been studying sound production in different species of fish from New York and soundscape patterns across lakes that exhibit a diversity gradient. This summer, I will be traveling to the Colombian Amazon to explore acoustic niche partitioning in tropical fish communities, as well as the potential impacts of boat noise on migratory fish species.
Marissa Garcia	Even though central Oregon waters are well-defined oceanographically, few long-term and comprehensive studies on cetaceans exist regionally, though short-term and opportunistic survey efforts have suggested that the region fosters high cetacean biodiversity. Through the HALO project (Holistic Assessment of Living marine resources off Oregon), I am contributing to the year-round collection of long-term acoustic and visual datasets documenting cetacean presence; I seek to understand how changes in oceanographic conditions driven by global climate change influence the spatiotemporal distribution of cetaceans in central Oregon waters.
Melanie Smith	My proposed graduate work will be exploring changes in humpback whale calling behavior in Southeast Alaska before, during, and after vessel traffic reductions from COVID-19.
Miranda Mayhall	I am focusing on the current spatiotemporal distribution of fin whales in the NE Pacific as they relate to environmental characteristics via the analyses of passive acoustic monitoring and observational transect surveys.
Ondrej Belfin	I primarily work on bird bioacoustics topics - how many calls one

Student Name	Research Description
	species has to use to communicate. In addition to birds, I would like to start investigating the pond acoustics regarding the habitat quality and species biodiversity.
Philip Souza, Jr.	Using passive acoustic techniques to monitor oyster reef community response to natural disturbance and human modification efforts. Additionally, using passive acoustics to monitor the habitat use and spawning activity of sciaenid fishes in the Mission-Aransas Estuary, TX.
Tiffany Zorotrian	My research project is a comparative analysis of delphinid postmortem vitreous humor chemistry values with antemortem blood chemistry to explore the forensic utility of vitreous humor analysis in delphinids. In the process, I am also running a validation study for a small, inexpensive, benchtop chemistry analyzer on delphinid vitreous humor, developing a sample collection and processing protocol, and performing a stability study on chemistry analytes of delphinid vitreous humor at room temperature. My goals with the project are to determine what data can be collected from the vitreous humor of stranded delphinid carcasses and offer an inexpensive and accessible option for stranding response organizations to analyze samples.
Toniann Keiling	The research I'm working on includes the use of active acoustics to quantify distributions of zooplankton, squid, and fish biomass in the New York Bight. This project is part of long-term data monitoring to establish baseline data and monitor for patterns in biomass
Virginia Tortolini	Acoustic Ecology of Southern Right Whale (SRW - *Eubalaena*

Student Name	Research Description
	australis) in Península Valdés wintering ground, Patagonia Argentina: an assessment of the nature and rate of vocalizations for passive acoustic monitoring purposes