

EDUCATION

- Ph.D. Marine Biology, at Texas A&M University Galveston, Shark Biology and Fisheries Science Lab** Present
Advisor: Dr. R.J. David Wells
- M.S. Biology (emphasis in Marine Biology) at California State University Long Beach, Shark Lab** August 2019
GPA: 4.0
Degree Honors: Biological Sciences Department Honors
Advisor: Dr. Chris Lowe
Thesis: Diel, fine-scale spatial movements and activity patterns of California horn sharks (*Heterodontus francisci*)
- B.S. Marine Biology, California State University, Long Beach** December 2014
GPA: 3.638
Degree Honors: Cum Laude and Biological Sciences Department Honors
University Honors Program Thesis:
E.N. Meese, C.G. Lowe (May 2014). Spatial distribution, habitat selection, and effects of temperature on benthic elasmobranchs at Big Fisherman's Cove, Santa Catalina Island.

PUBLICATIONS

Peer-reviewed journal articles

E.N. Meese, C.G. Lowe. Finding a resting place: How environmental conditions influence the habitat selection of resting batoids. (*Accepted*, Southern California Academy of Sciences Bulletin).

T. Adam, C.A. Griffiths, V. Leos-Barajas, E.N. Meese, C.G. Lowe, R. Langrock, P. Blackwell, and D. Righton. Joint modeling of multi-scale animal movement data using hierarchical hidden Markov models. (*Accepted*, Methods in Ecology and Evolution).

Peer-reviewed conference articles

S. Karan, E.N. Meese, Y. Yang, H.G. Yeh, C.G. Lowe, W. Zhang. Classification of shark behaviors using K-nearest neighbors. (*In review*, 2019 IEEE Green Energy and Smart Systems Conference).

W. Zhang, A. Martinez, E.N. Meese, C.G. Lowe, Y. Yang, H.G. Yeh. Deep convolutional neural networks for shark behavior analysis. (*In review*, 2019 IEEE Green Energy and Smart Systems Conference).

RESEARCH EXPERIENCE

- Fine-Scale Movements and Behaviors of Horn Sharks** 2015 – 2019
Advisor: Dr. Chris Lowe
Thesis Committee: Dr. Yannis Papastamatiou (FIU), Dr. Bengt Allen (CSULB)
Description: Quantify fine-scale movements and behaviors using active acoustic telemetry and accelerometer data loggers. Designed custom tag packages, used Ethographer in IgorPro for acceleration analyses, and managed undergraduate volunteers for both field and lab assistance. Twenty active tracks completed, over 150 scientific dives completed.
- Movements and Habitat Use of Juvenile White Sharks** 2015 – 2019
Advisor: Dr. Chris Lowe
Description: Quantify juvenile white shark (*Carcharodon carcharias*) movements along the southern California coast using passive and active acoustic telemetry, remote underwater video systems (RUVs), and smart tags that include accelerometers, gyrometers, and videologgers. Manage a passive telemetry array of >100 VR2W receivers, tagging operations, data management and analysis.
- Research Tropical Marine Ecology Course, California State University, Long Beach** 2014
Advisors: Dr. Gwen Goodmanlowe & Dr. Chris Lowe
Description: Quantified feeding behaviors of *Chaetodon lunulatus* (oval butterflyfish) and *Chaetodon auriga* (threadfin butterflyfish) at Kaneohe Bay, Hawaii.
- Undergraduate Independent Research, California State University, Long Beach** 2013 – 2014
Advisor: Dr. Chris Lowe
Description: Quantified the spatial distribution of three benthic elasmobranchs, created benthic habitat maps of Big Fisherman's Cove, Catalina Island, and designed a temperature data logger array to quantify thermal preferences of elasmobranchs.
- Undergraduate Directed Research, California State University, Long Beach** 2012 – 2013
Advisor: Dr. Chris Lowe
Description: Determined the standard metabolic rate of California halibut (*Paralichthys californicus*) by using a Brett-type respirometer to measure oxygen consumption levels.

WORK EXPERIENCE

- State of California Beach Safety and Shark Research Program** 2017 – 2019
Supervisor: Dr. Chris Lowe

Description: Organize and maintain passive telemetry array of 100 VR2W receivers, manage education and outreach programs for lifeguards, fishers, and K-12 classrooms.

Teaching Assistant, California State University Long Beach **2016 – 2018**

Supervisor: Dr. Brian Livingston

Description: Assist with course instruction, laboratories, and independent research projects. Designed lectures and instruct labs (both lab and field settings) for undergraduate students.

NSF Project Assistant: Multi Robot Systems for Tracking Shark Populations **2016 – 2017**

Supervisors: Dr. Chris Lowe (CSULB) and Dr. Chris Clark (Harvey Mudd College)

Description: Assist engineering and computer science students from Harvey Mudd College with in-field operations, learn use, care, and coding of underwater autonomous robots, data analyses of robotics and tracking technology testing.

Graduate Assistant, California State University Long Beach **2015 – 2016**

Supervisor: Yvette Ralph

Description: Aquarium husbandry skills, boat care and handling skills, specimen collecting for marine lab education and various research projects

Research Assistant, California State University Long Beach Shark Lab **2015**

Supervisor: Dr. Christopher Lowe

Description: Collaborate and finalize miscellaneous reports, download and initialize passive acoustic receivers, statistical analyses for various projects, create maps in ArcGIS for various projects

Administration & Demonstration Technician Assistant, Southern California Marine Institute (SCMI) **2015**

Supervisor: Adriana Bell

Description: Administration duties, otter trawl and boat safety demonstrations, assist with miscellaneous research projects

Communications and Biological Sciences Intern, NOAA Montrose Settlements and Restoration Program **2014**

Supervisor: Gabrielle Dorr

Description: Maintained fish webcam in wetland, various technical reports, social media posts and updates, logging projects into NOAA database, education and outreach responsibilities at elementary schools and miscellaneous events.

TEACHING AND MENTORING

Teaching:

Marine Ichthyology, California State University Long Beach, Teaching Assistant	2017
Aquatic Toxicology, California State University Long Beach, Teaching Assistant	2017
Introduction to Marine Biology Laboratory, California State University Long Beach	2015 – 2018

Mentoring:

CSU Catalina Semester Undergraduate Directed Research Projects, 16 students	2017
CSULB Undergraduate Students Lisa McWilliams, Bobby Hyla, Mariah Meyer, John Huang, Erin Pierce	2016 – 2018

HONORS AND AWARDS

Fellowships:

TAMUG 2-Year Competitive Graduate Student Fellowship	2019
USC Wrigley Graduate Fellowship	Summer 2016 & 2017
<u>Description:</u> Awarded fully paid housing to conduct research at the USC Wrigley Institute for Environmental Studies, Catalina Island, California. Participated in education and outreach events and presentations for the facility.	

Grants:

Donald R. Nelson Behavior Research Award	\$1,000	2017
Richard B. Loomis Graduate Research Grant	\$500	2017
Southern California Tuna Club Graduate Grant Recipient	\$1,500	2016
Southern California Academy of Sciences Research Grant Recipient	\$2,000	2016
Graduate Dr. Donald J Reish Grant Recipient	\$1,000	2016
Undergraduate Dr. Donald J Reish Grant Recipient	\$500	2013

Scholarships:

International Women's Fishing Association Scholarship	\$1,500	2018
Southern California Tuna Club Marine Biology Scholarship	\$1,500	2017
International Women's Fishing Association Scholarship	\$2,000	2017
International Women's Fishing Association Scholarship	\$2,000	2016
Project Hogar Graduate Student Recruitment Scholarship	\$5,000	2015
Southern California Tuna Club Marine Biology Scholarship	\$2,000	2013

LA Rod and Reel Scholarship	\$1,000	2013
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Awards and Recognition:

CSULB Biological Sciences Outstanding Graduate Researcher	\$100	2019
American Elasmobranch Society (AES) Travel Award	\$1,000	2018
CSU Coast Student Travel Award	\$500	2017
American Elasmobranch Society (AES) Travel Award	\$500	2017
Western Society of Naturalists (WSN) Travel Award	\$50	2017
Southern California Academy of Sciences (SCAS) Best Presentation	\$500	2017
Southern California Academy of Sciences Best Presentation Honorable Mention	\$250	2015
CSU COAST Student Travel Award	\$500	2014
Southern California Academy of Sciences Best Poster Honorable Mention	\$250	2014

PRESENTATIONS AND POSTERS

Scientific Presentations (speaker listed first):

- E.N. Meese**, C.G. Lowe. (Jul 2019). Movement strategies and fine-scale activity patterns of the California horn shark (*Heterodontus francisci*). Invited Symposium: Sensory Biology and Behavior of Elasmobranchs. Ann. Mtg. American Elasmobranch Society, Snowbird, UT.
- E.N. Meese**, C.G. Lowe. (Jun 2018). Diel movements and fine-scale activity patterns of California horn sharks (*Heterodontus francisci*) in response to environmental temperature. Sharks International Conference, João Pessoa, Brazil.
- C.G. Lowe, C.F. White, R.K. Logan, **E.N. Meese**, E.S. Burns, A. Clevenstine, C. Winkler, S. Jorgensen, J. O’Sullivan. (Jun 2018). Juvenile white shark nursery behavior and habitat use in southern California. Sharks International Conference, João Pessoa, Brazil.
- E.S. Burns, C.F. White, R.K. Logan, **E.N. Meese**, C.G. Lowe. (Jun 2018). An all inclusive Smart Tag combines active tracking, biologging, and animal motion sensors to observe the fine-scale, short-term behavior and habitat use of juvenile White sharks. Sharks International Conference, João Pessoa, Brazil.
- E.N. Meese**, C.G. Lowe. (Mar 2018). Investigating effects of temperature and depth on the fine-scale movement and activity of the horn shark, *Heterodontus francisci*. Biann. Mtg. North Eastern Pacific Shark Symposium, Seattle, WA.
- E.S. Burns, C.F. White, R.K. Logan, **E.N. Meese**, C.G. Lowe. (Mar 2018). Smart tags: combining active tracking and biologging to capture the fine-scale, short term behavior and habitat use of juvenile white sharks.
- E.N. Meese**, C.G. Lowe. (Nov 2017). Quantifying fine-scale movement and activity of the horn shark, *Heterodontus francisci*, to estimate minimum energetic costs. Ann. Mtg. Western Society of Naturalists, Pasadena, CA.
- E.N. Meese**, C.G. Lowe. (Jul 2017). Diel movements and fine-scale activity patterns across heterogeneous thermal environments of the CA horn shark, *Heterodontus francisci*. Ann. Mtg. Joint Meeting of Ichthyologists and Herpetologists, Austin, TX.
- C.G. Lowe, **E.N. Meese**, S. Luongo, D. Bernal. (Jul 2017). New advances in measuring and modeling metabolic costs of elasmobranchs to predict the future. Ann. Mtg. American Elasmobranch Society, Austin, TX.
- E.N. Meese**, C.G. Lowe. (Apr 2017). Diel movements and fine-scale activity patterns of the CA horn shark, *Heterodontus francisci*. Ann. Mtg. Southern California Academy of Sciences, Santa Monica, CA.
- E.N. Meese**, C.G. Lowe. (Mar 2016). Thermal energetics and activity rates of horn sharks, *Heterodontus francisci*. Biann. Mtg. North Eastern Pacific Shark Symposium, Catalina, CA.
- E.N. Meese**, C.G. Lowe. (Jul 2015). Finding a resting place: How environmental conditions affect the spatial distribution of benthic elasmobranchs at Big Fisherman’s Cove, Santa Catalina Island. Ann. Mtg. Joint Meeting of Ichthyologists and Herpetologists, Reno, NV.
- E.N. Meese**, C.G. Lowe. (May 2015). Spatial distribution, habitat selection, and effects of temperature on resting benthic elasmobranchs at Big Fisherman’s Cove, Santa Catalina Island. Ann. Mtg. Southern California Academy of Sciences, Los Angeles, CA.

Scientific Posters:

- E.N. Meese**, C.G. Lowe. (Nov 2016). Diel movements and fine-scale activity patterns of the CA horn shark, *Heterodontus francisci*. Ann. Mtg. Western Society of Naturalists, Monterey, CA.
- E.N. Meese**, C.G. Lowe. (Aug 2014). Spatial distribution, habitat selection, and effects of temperature on benthic elasmobranchs at Big Fisherman’s Cove, Santa Catalina Island. Ann. Mtg. Joint Meeting of Ichthyologists and Herpetologists, Chattanooga, TN.
- E.N. Meese**, C.G. Lowe. (May 2014). Spatial distribution, habitat selection, and effects of temperature on benthic elasmobranchs at Big Fisherman’s Cove, Santa Catalina Island. Ann. Mtg. Southern California Academy of Sciences, Oxnard, CA.

Outreach Presentations:

- Ocean Institute Girls in Ocean Science Day, Dana Pt, CA. (Mar 2019). So you want to study shark behavior?
- Pt. Fermin Elementary School Ocean Day, San Pedro, CA. (Apr 2018). Juvenile white sharks in southern California.
- Vista Magnet Middle School, Oceanside, CA. (Mar 2018). What we use to track sharks (and other fish).

Belmont Shore Garden Club, Long Beach, CA. (Feb 2018). Beach babies: White shark nurseries of the Northeast Pacific.

Wrigley Marine Science Center's Saturday at the Lab, Catalina Island, CA. (Aug 2017). Movements and behaviors of an important kelp forest predator, the California horn shark.

Vista Magnet Middle School, Oceanside, CA. (Mar 2017). Developing technology to study shark behavior: using robots and drones to track sharks.

Aquarium of the Pacific's Teachers Retreat, Wrigley Marine Science Center, Catalina Island, CA. (Jul 2016). Determining the importance of horn sharks at Catalina Island.

Wrigley Marine Science Center's Saturday at the Lab, Catalina Island, CA. (Jun 2016). Thermal energetics and activity rates of horn shark.

Aquarium of the Pacific's Night Dive, Long Beach, CA. (Feb 2015). Taking a bite out of shark myths and the El Niño .

EDUCATION AND OUTREACH

CSULB Shark Lab White Shark Education and Outreach program **2017 – 2019**
Supervisor: Dr. Chris Lowe
Duties: Manage and design off-campus education and outreach program for juvenile white shark research to be used for lifeguard agencies, commercial and recreational fishermen, K-12 classrooms, and the general public. Implement Shark Lab tour curriculum for students and coordinate Shark Lab tours (approx. 1,000 visitors annually).

M.V. Horizon Isla Guadalupe White Shark Education program **2018**
Supervisors: Dr. Chris Lowe (CSULB) and Spencer Salmon (Horizon)
Duties: Collaborate and advise computer scientist on creation of custom shark recognition software program, *Shark Sonar*, for the M.V. Horizon. Provide educational content for software. Manage On-Board Shark Biologist program; create presentation and provide scientific content for biologists to educate tourists. Participated as the on-board Shark Biologist educating tourists about shark biology and research at Isla Guadalupe, Mexico.

Understanding White Sharks 8th Grade NGSS Learning Sequence **2017**
Supervisors: Dr. Chris Lowe (CSULB) and Jill Grace (K-12 Alliance at WestEd)
Duties: Contributed to 8th grade science curriculum for new NGSS standards. Curriculum includes physics and biology lessons from juvenile white shark work using acoustic and satellite telemetry. Instructed teachers how to use curriculum in classrooms.

VOLUNTEER EXPERIENCE

Dive Volunteer, Aquarium of the Pacific, Long Beach, CA **2011 – 2016**
 Feed animals and clean exhibits, full-face mask certified, presented on kelp forest ecology and tropical reef ecology to aquarium visitors, over 700 dives completed.

CSULB Shark Lab Volunteer **2012 – 2015**
 Assisted graduate students in active and passive acoustic tracking, scientific dives, animal collections, and stingray sperm collecting surgeries.

RELEVANT SKILLS

Lab Techniques:

Operating Brett-type flume respirometer
 Water chemical analysis
 Marine animal husbandry

Field Methods:

Active acoustic telemetry tracking
 Passive acoustic telemetry: designing and managing acoustic arrays, telemetry data, VEMCO VRAP system, etc.
 Tag package development for various dorsal fins
 Boat maintenance: outboard engines, general maintenance
 Animal capture techniques: Beach seines, gill nets, hook and line
 Animal handling techniques
 Specimen collecting and quarantine

Computing:

Arc-GIS Programming
 R studio
 IgorPro and Ethographer
 VUE
 Geospatial Modeling Environment Program
 PRIMER

CERTIFICATIONS

AAUS Scientific Diver (100 ft depth rating, > 300 scientific dives), Motorboat Operator Training Certification (MOTC), CSULB Public Media Training Certification, First Aid/CPR, O2 Administration, AED Administration, NAUI Training Assistant, PADI Master Diver, PADI Rescue Diver, US Coast Guard Boating Safety Certification, State of CA Defensive Driving Certification

BOATING EXPERIENCE

Certifications:

Motorboat Operator Training Course (MOTC) Certification	2017
Boat US Certification: State of California & Texas	2013 & 2019

Boat Operating:

Boston Whalers (< 19'): Experience since 2013. Over 200 operating hours.
22' Twin Vee Catamaran: Experience since 2015. Over 50 operating hours.
26' V-hull Parker: Experience since 2015. Over 25 operating hours.

SOCIETIES AND ORGANIZATIONS

American Institute of Fisheries Research Biologists (AIFRB) Student Member	2015 - present
American Society of Ichthyologists and Herpetologists (ASIH) Student Member	2014 - present
American Elasmobranch Society (AES) Student Member	2014 - present
Southern California Academy of Sciences (SCAS) Member	2014 - present
Western Society of Naturalists (WSN) Student Member	2013 - present
Marine Biology Student Association (MBSA) Member	2010 – 2014
University Honors Program Student Association (UHPSA)	2010 – 2014
Alpha Omicron Pi (AOII) Sorority Member	2010 – 2014

LEADERSHIP POSITIONS

American Elasmobranch Society Student Affairs Committee Member at Large	2017 – present
North Eastern Pacific Shark Symposium (NEPSS) Meeting Organizer	2016
Marine Biology Student Association (MBSA) Treasurer	2014
Marine Biology Student Association (MBSA) President	2013
Alpha Omicron Pi (AOII) Vice President of Academic Development	2012 – 2013