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Department of Marine Biology, Texas A&M University at Galveston, Texas

EDUCATION

- Ph.D. Marine Biology, Texas A&M University at Galveston** **August 2019 - present**
Advisor: Dr. R. J. David Wells, Shark Biology and Fisheries Science Lab **Expected Graduation:**
Dissertation: Trophic structure and food web dynamics of a subtropical estuary **May 2023**
Secondary Curriculum: Graduate Certificate in GIS, Department of Geography (12 credits)
- M.S. Biology (emphasis in Marine Biology), California State University, Long Beach** **August 2019**
GPA: 4.0
Degree Honors: Biological Sciences Department Honors, Biological Sciences Outstanding Thesis Award
Advisor: Dr. Chris Lowe, CSULB Shark Lab
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

- Y. Yang, H.G. Yeh, W. Zhang, C.J. Lee, **E.N. Meese**, C.G. Lowe. 2020. Feature extraction, selection and K-nearest neighbors algorithm for shark behavior classification based on imbalanced dataset. *IEEE Sensors Journal*.
<https://doi.org/10.1109/JSEN.2020.3038660>
- E.N. Meese**, C.G. Lowe. 2020. Daytime sheltering behaviors of California horn sharks (*Heterodontus francisci*). *Environmental Biology of Fishes* 103(6):703-717. <https://doi.org/10.1007/s10641-020-00977-6>
- E.N. Meese**, C.G. Lowe. 2020. Active acoustic telemetry tracking and tri-axial accelerometers reveal fine-scale movement strategies of a non-obligate ram ventilator. *Movement Ecology* 8(1):1-8. <https://doi.org/10.1186/s40462-020-0191-3>
- E.N. Meese**, C.G. Lowe. 2019. Finding a resting place: How environmental conditions influence the habitat selection of resting batoids. *Bulletin of the Southern California Academy of Sciences* 118(2):87-101.
<https://doi.org/10.3160/0038-3872-118.2.87>
- T. Adam, C.A. Griffiths, V. Leos-Barajas, **E.N. Meese**, C.G. Lowe, P.G. Blackwell, D. Righton, R. Langrock. (2019). Joint modeling of multi-scale animal movement data using hierarchical hidden Markov models. *Methods in Ecology and Evolution* 10(9):1536-1550. <https://doi.org/10.1111/2041-210X.13241>

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 *2019 IEEE Green Energy and Smart Systems Conference (IGESSC)* (pp. 1-6).
- W. Zhang, A. Martinez, **E.N. Meese**, C.G. Lowe, Y. Yang. Deep convolutional neural networks for shark behavior analysis. In *2019 IEEE Green Energy and Smart Systems Conference (IGESSC)* (pp. 1-6).

RESEARCH EXPERIENCE

- Food Web Ecology of a Subtropical Estuary** **2019 – present**
Advisors: Dr. R. J. David Wells, Dr. Greg Stunz
Responsibilities: Quantify spatio-temporal trends in isotopic signatures of primary producers and consumers (invertebrates, teleosts, elasmobranchs) within Matagorda Bay, Texas via bulk stable isotopes and compound-specific amino acid isotopes. Coordinate field work sampling and process laboratory samples for isotope analysis.
- Fine-Scale Movements and Behaviors of Horn Sharks (*Heterodontus francisci*)** **2015 – 2019**
Advisor: Dr. Chris Lowe
Responsibilities: 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 (*Carcharodon Carcharias*)

2015 – 2019

Advisor: Dr. Chris Lowe

Responsibilities: 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.

Undergraduate Independent Research, University Honors Program, CSULB

2013 – 2014

Advisors: Dr. Chris Lowe, Terri Iler

Responsibilities: 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

Responsibilities: 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

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

NSF Project Assistant: Multi Robot Systems for Tracking Shark Populations

2016 – 2017

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

Responsibilities: 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

Responsibilities: Managed aquarium husbandry, boat care and handling, specimen collecting for marine lab education and miscellaneous research projects.

Research Assistant, California State University Long Beach Shark Lab

2015

Supervisor: Dr. Christopher Lowe

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

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

2015

Supervisor: Adriana Bell

Responsibilities: Administration duties, otter trawl and vessel safety demonstrations for 75' R/V Yellowfin, assist with miscellaneous research projects.

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

2014

Supervisor: Gabrielle Dorr

Responsibilities: 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

Undergraduate Courses:

Ichthyology, Texas A&M University at Galveston, Teaching Assistant

2020 - present

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, Teaching Assistant	2015 – 2018
Mentoring:	
CSU Catalina Semester Undergraduate Directed Research Projects: 16 students	2017
Undergraduate Students (Independent research, Honors Program research): 6 students	2016 – 2018

HONORS AND AWARDS

Fellowships:

TAMUG 2-Year Competitive Graduate Student Fellowship	2019
<i>Description:</i> Merit-based award for tuition, fees, and Graduate Assistantship position.	
USC Wrigley Graduate Fellowship	2016 & 2017
<i>Description:</i> Merit-based award for research facility housing at the USC Wrigley Institute for Environmental Studies. Participated in education and outreach events and presentations for the facility.	

Grants:

	Description	Award Amount	Year
Texas Sea Grant Grants-in-Aid of Graduate Research Program	Merit Based	\$2,500	2020
American Elasmobranch Society Donald R. Nelson Behavior Research Award	Merit Based	\$1,000	2017
Richard B. Loomis Graduate Research Grant	Merit Based	\$500	2017
Southern California Tuna Club Graduate Grant Recipient	Merit Based	\$1,500	2016
Southern California Academy of Sciences Research Grant Recipient	Merit Based	\$2,000	2016
Graduate Dr. Donald J Reish Grant Recipient	Merit Based	\$1,000	2016
Undergraduate Dr. Donald J Reish Grant Recipient	Merit Based	\$500	2013

Scholarships:

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

Awards and Recognition:

CSULB Biological Sciences Outstanding Thesis Award	Nominated		2020
CSULB Biological Sciences Outstanding Graduate Researcher	Nominated	\$100	2019
American Elasmobranch Society (AES) Travel Award	Need Based	\$1,000	2018
CSU Coast Student Travel Award	Need Based	\$500	2017
American Elasmobranch Society (AES) Travel Award	Need Based	\$500	2017
Western Society of Naturalists (WSN) Travel Award	Need Based	\$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	Need Based	\$500	2014
Southern California Academy of Sciences Best Poster Honorable Mention		\$250	2014

Academic Honors:

CSULB Graduate Biological Sciences Departmental Honors	Nominated		2018
CSULB Undergraduate Biological Sciences Departmental Honors	Nominated		2015
Presidents List (GPA \geq 3.75)			Dec 2014, May 2014, Dec 2013, Dec 2010
Dean's List (GPA \geq 3.50)			May 2011

PRESENTATIONS AND POSTERS

*Presenter listed first, * indicates presentation award.*

Scientific Presentations:

- C.G. Lowe, E. Burns, **E.N. Meese**, K. Lyons, C.F. White, J. Anderson, B. Stirling, J. O'Sullivan, S. Jorgensen, C. Winkler, E. Garcia Rodriguez, O. Sosa-Nishizaki. (Nov 2019). The importance of trans-boundary collaborative research on highly migratory White Sharks. Ann. Mtg. Western Society of Naturalists, Ensenada Mexico.
- 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.

Media Appearances:

California State University Student Spotlight, "Save the Sharks": <https://www2.calstate.edu/csu-system/news/Pages/Save-The-Sharks.aspx>

Quartz, In the Deep, "Catching sharks by hand": <https://www.facebook.com/watch/?ref=external&v=166574177270248>

CSULB News Hub, "Horn sharks, sea urchins and kelp forests": <https://www.youtube.com/watch?v=wtrJM92rE-M>

Fins United, Behind the Fins Profile: <https://www.finsunited.co.nz/bite-blog/behind-the-fins-emily-meese>

AES Nelson Award Winner Profile: <https://elasmobranch.org/blog/award-winner-q-emily-meese>

EDUCATION AND OUTREACH

CSULB Shark Lab White Shark Education and Outreach program	2017 – 2019
<u>Supervisor:</u> Dr. Chris Lowe	
<u>Responsibilities:</u> 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 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
<u>Supervisors:</u> Dr. Chris Lowe (CSULB) and Capt. Spencer Salmon (Horizon Charters)	
<u>Responsibilities:</u> Collaborate and advise computer scientist on creation of custom shark recognition software program 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
<u>Supervisors:</u> Dr. Chris Lowe (CSULB) and Jill Grace (K-12 Alliance at WestEd)	
<u>Responsibilities:</u> Contributed to 8 th 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.	
<u>Curriculum:</u> https://www.nextgenscience.org/resources/middle-school-understanding-white-sharks	

SOCIETIES AND ORGANIZATIONS

Texas Chapter American Fisheries Society (TCAFS) Student Member	2020 – present
TAMUG Galveston Graduate Student Association Member	2019 – present
American Institute of Fisheries Research Biologists (AIFRB) Student Member	2015 – present
American Elasmobranch Society (AES) Student Member	2014 – present
American Society of Ichthyologists and Herpetologists (ASIH) Student Member	2014 - present
Southern California Academy of Sciences (SCAS) Member	2014 - 2019
Western Society of Naturalists (WSN) Student Member	2013 - 2019
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 AND SOCIETY SERVICE

Galveston Graduate Student Association Social Media Officer	2020 – present
American Elasmobranch Society (AES) Student Affairs Committee T-shirt committee	2020 – present
American Elasmobranch Society (AES) 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

CERTIFICATIONS

AAUS Scientific Diver (100 ft depth rating, > 300 scientific dives), SBSA's Motorboat Operator Training Certification (MOTC), US Sailing Safe Powerboating Certification, 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 (CA and TX), State of CA Defensive Driving Certification

BOATING EXPERIENCE

Certifications:

US Sailing Safe Powerboating Certification	2019
Boat US Certification, Texas	2019
SBSA's Motorboat Operator Training Course (MOTC) Certification	2017
Boat US Certification, California	2013

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.
 22' Jones Brothers Bateau: Experience since 2019. 50 operating hours.

RELEVANT SKILLS

Lab Techniques:

- Stable Isotope Laboratory Preparation
- Fish otolith removal, processing, and reading
- Operating Brett-type flume respirometer to quantify metabolic rates of fishes
- Water chemical analysis
- Marine animal husbandry

Field Methods:

- Active acoustic telemetry tracking via VEMCO VR100 receiver and VH110 directional hydrophone
- Passive acoustic telemetry: designing and managing acoustic arrays, telemetry data, VEMCO VRAP system, etc.
- Animal tracking technology: acoustic transmitters (VEMCO), accelerometers (Cefas, Technosmart), miniPat tags (Wildlife computers)
- External tag package development for fishes
- Boat maintenance: outboard engines, general maintenance
- Animal capture techniques: Seines, gill nets, entanglement nets, hook and line
- Animal handling and euthanasia techniques
- Field specimen collection and transportation

Computing:

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

RELEVANT LINKS

ORCID: <https://orcid.org/0000-0003-4928-4297>

Google Scholar: <https://scholar.google.com/citations?user=BDsr6mAAAAAJ&hl=en>