

Miguel Montalvo

Virginia Institute of Marine Science | William and Mary
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CURRENT POSITION:

PhD Student January 1, 2022 – present
Hilton Lab, Virginia Institute of Marine Science | William & Mary

EDUCATION:

Bachelor's Degree in Marketing May 2018
University of South Florida, St. Petersburg, Florida

Associate in Arts Degree May 2015
State College of Florida, Bradenton, Florida

RESEARCH PROJECTS:

PhD Student January 1, 2022 – present
Virginia Institute of Marine Science | The College of William & Mary

- Preorbital elongations across the teleostean fishes: definition, variation, and taxonomic distribution.
- Osteology of Paleorhynchidae from Pakistan, with a review of the taxonomy of the family and comments on their relations to other billfishes.
- Consequences of elongation: teeth in billfishes and their ontogenetic development.
- Design and benchmarking of a novel non-passive but simple eDNA sampling device.
- Characterization of the orbital region and eye musculature of billfishes.
- Development of jaws and feeding in the hogchoker *Trinectes maculatus*.
- Sorting and identifying larval fishes from ichthyoplankton samples.

Marketing and Audience Contractor October 2020 – October 2021
National Museum of Natural History, Smithsonian

- How audience data is stored and used within the museum, and how to improve and connect repositories to increase the impact and reach of the institution's mission.

Research Volunteer July 2018 – December 2021
National Museum of Natural History, Smithsonian

- Ontogenetic development of the stromateoid pharyngeal sac.
- Distribution of the levator externus 4 (LE4) muscle throughout anguilliform taxa.

AWARDS:

Friday Harbor Laboratory's scholarship April 2024

Inaugural recipient of The Billfish Foundation's Russel M. Nelson Science Scholarship April 2024

Reves Center's International Student Achievement Award March 2024

Virginia Institute of Marine Science's John Olney Award July 2023

Reves Center's International Student Opportunity Scholarship March 2023

American Society of Ichthyologists and Herpetologists' Cashner Award May 2022

PRESENTATIONS:

Joint Meeting of Ichthyologists and Herpetologists in Pittsburg, Pennsylvania July 2024

- **M. Montalvo**, & E.J. Hilton. 2024. Review and update of the fossil history of billfishes (Istiophoriformes, Xiphiidae) [poster].

North American Paleontological Convention in Ann Arbor, Michigan October 2023

- **M. Montalvo**, & E.J. Hilton. 2024. Review and update of the fossil history of billfishes (Istiophoriformes, Xiphiidae) [talk].

Society of Vertebrate Paleontology, Cincinnati, Ohio October 2023

- E.J. Hilton, L. DeHaan, S. El-Sayed, **M. Montalvo**, H. Saad, & M. Friedman. 2024. Teleostean fishes from the Middle Eocene Habib Rahi and Domanda formations in Pakistan. [poster].

Joint Meeting of Ichthyologists and Herpetologists in Norfolk, Virginia July 2023

- **M. Montalvo**, L.M. Habegger, K. Cisz, K.E. Bemis, & E.J. Hilton. 2023. Morphology, ontogeny, and replacement of teeth on the bills and lower jaws of billfishes (Istiophoriformes) [poster].
- Palmgren, L., **M. Montalvo**, & E.J. Hilton. 2023. Comparative anatomy of the eye muscles and heater organ of Istiophoridae. [poster].

RELEVANT COURSES:

Larval Fishes Course at the Muséum National d'Histoire Naturelle October 2022

EXPERIENCE:

Graduate Student January 1, 2022 – present

Virginia Institute of Marine Science | The College of William & Mary

- Participated in undergraduate career panel with undergraduate students. Including doing a short presentation about career path and talking directly with groups of students.
- Participated in sampling, sorting, determination, and preservation of freshwater rivers of western Virginia using electrofishing for capturing.
- Created 3D models of billfish dentition by reconstructing and segmenting micro-CT scans of osteological specimens, and reproduced them in a variety of thermoplastics using a 3D printer.
- Curated and prepared ontogenetic series of istiophoriid and xiphiid larvae to understand the development of teeth in those animals. I prepared the specimens via clearing and staining.
- Imaged specimens using high resolution z-stacking microscopy, including cleared and stained specimens, preserved specimens, fecal matter specimens, etc.
- Carefully dissected and preserved eyes from large billfish specimens to describe their eye musculature.
- Showcased my research to a wide public audience at the Marine Science Day using frozen, preserved, and osteological specimens, as well as 3D printed models.
- Measured preserved fish specimens at the collections of the Smithsonian National Museum of Natural History, to assess the methodology for studying preorbital elongations along the teleost fish lineage.
- Sorted and imaged fossil fish specimens from the Domanda and Habib Rahi formations from Pakistan from early to mid-Paleogene housed at the University of Michigan Museum of Paleontology.
- Aided in the successful running of an undergraduate course at VIMS' Eastern Shore Laboratory as a

teaching assistant. This involved helping and supervising students throughout the performance of their duties, as well as showcasing my research and being an engaging group leader.

Marketing and Audience Contractor

October 1, 2020 – October 1, 2021

National Museum of Natural History, Smithsonian

- Searched for and catalogued repositories of internal audience data and identified, their administrators, departments, formats of the data, etc.
- Developed tools to measure audience interactions with some of the museum's public facing platforms to help leadership take more informed strategic decisions, and to help inform the wider museum internal audiences.
- Structured workflows for processing audience data for it to be saved and displayed using platforms such as Tableau and Google Data Studio, through tools like Microsoft Power Automate.
- Participated in the planning and development phases of marketing campaigns intended to showcase new exhibits, as well as to increase the museum's reach locally.
- Helped set the museum's Google Ads account for online paid marketing.

Marketing and Communications Intern

February 2019 – September 2020

National Museum of Natural History, Smithsonian

- Analyzed Instagram metrics to determine the best schedule for posting and best strategy for increasing follower base. Interesting conclusions from the study showed that the search algorithm pushed more posts to not-followers with a two-week delay, which helped explain the strong correlation between increased number of posts and follower gain spikes two weeks afterwards.
- Collected and processed video data from 30+ YouTube channels (more than 3000 videos) to ascertain why the NMNH's channel is not as successful as others. Using Python to web scrape the raw data and conduct comparative statistical analyses on variables like channel type, video length, production quality and content, I was able to conclude that NMNH, just like many other museums, do not offer consistent video content which hinders their channel's ability to recruit new loyal subscribers. This research will be used as a steppingstone for NMNH's future digital strategy in YouTube.

Research Volunteer

July 2018 – Present

National Museum of Natural History, Smithsonian

- Used dichotomous keys, species descriptions, and other publications, as well as type and voucher specimens to identify deep sea fish specimens from the Miguel Oliver research cruise which performed trawling sampling on the continental shelf of the Pacific coast of Central America in 2010. Taxa identified included myctophiform, ophidiiform, and some otomiiform fishes. Identifications were used to corroborate and settle barcode derived trees for the specimens in question.
- Stained and dissected goby specimens to identify characters used in a phylogenetic reconstruction. Staining the specimens involved using proper protocols for Alcian blue and Alizarin red intended to color and aid in distinguishing muscle, cartilage, and bony tissues. Dissections involved carefully degloving the head of the specimens to observe muscle insertion points, then carefully disarticulating and removing the right-side maxilla, dentary and operculum.
- Contributed photos of cleared and stained and dissected gill elements for a publication on a phylogenetic analysis of stromateiform fishes.
- Created prototype planktonic collection device which would allow specimens to be studied on board while still alive.

- Helped rearrange and partially curate parts of the dry coral and echinoderm collection.
- Aided with sorting and curating of marine specimens from the island of Luzon in the Philippines.

Research Volunteer

January 2016 – May 2018

Florida Wildlife Research Institute, St. Petersburg, Florida

- Helped research staff gather images of cleared and stained larval billfish specimens.
- Identified hundreds deep sea fish specimens not yet catalogued in the collection, which were part of a survey done after the Deep-Water Horizon oil spill in 2010.
- Assisted with reef forming and octocoral survey at the FWRI Marathon, Florida Keys station. The survey consisted of finding and identifying corals which had grown on terracotta tiles placed throughout the reef.
- Helped with identifying marine invertebrate specimens from the Southeast Area Monitoring and Assessment Program (SEAMAP) surveys, including slipper lobsters (family Scyllaridae) and mantis shrimps (order Stomatopoda) among other decapods, bivalves, and squids. Also aided with curating and cataloguing the specimens.
- Aided in validating IDs of the *Sternorhynchus* crabs in the collection through the use of new research published.
- Rescued and curated deep sea collection donated by Thomas L. Hopkins from the University of South Florida.

Teaching Assistant

September 2016 – December 2017

University of South Florida Kate Tiedemann College of Business

- Aided professors in computer laboratory to ensure students are engaging effectively
- Performed grading as requested following guidelines from professors and assignment criteria & expectations
- Served as the main point of contact for student issues that do not require professor intervention
- Filled in for professor a couple of times throughout the semester

Student Ambassador

May 2013 – May 2015

State College of Florida

- Performed calls to prospective students in order to help them become more acquainted with the admissions process
- Performed calls to graduating students helping them with the graduation process
- Guided students and their parents in tours through the campus
- Assisted in events such as open-houses, guiding prospective students through the admissions process
- Catalogued and scanned registrar and admissions records
- Worked hand in hand with the admissions and registrar teams to perform a variety of assignments

Research Volunteer

July 2009 – December 2009

Selby Botanical Gardens, Sarasota, Florida

- Compiled list of tepui-like formations in the Colombian flatlands for possible expeditions.
- Helped with scanning of herbarium specimens.

OUTREACH EXPERIENCE:

Virginia Institute of Marine Science, Gloucester Point, VA

January 2022 – Present

As a graduate student I help with giving tours of the collection to students, colleagues, and other

members of the public. I have also help with making videos about our collections which are featured in the institution's social media platforms.

I presented a brief account of my research and described a select number of York River fish species to an audience of middle school students at a CBNEER hosted Discovery Lab. I used real preserved specimens to aid in my presentation of the subject.

I showcased my research to public audiences at the Marine Science Day event by using frozen and osteological specimens, as well as 3D printed models.

National Museum of Natural History, Smithsonian, Washington, DC April 2023

Ran a hands-on workshop showcasing the amazing world of larval fishes. This workshop was aimed to inspire undergraduate students from diverse communities into natural science fields. The workshop consisted on sorting larval fishes out of preserved zooplankton samples under the microscope. The students received a short presentation on what ichthyoplankton is and general instructions for the activity.

National Museum of Natural History, Smithsonian, Washington, DC February 2019 – September 2020

As a marketing and communications intern at NMNH I aided the collections, education, and scientific staff's outreach efforts by taking photographs, gathering stories, coordinating campaigns, helping with proof reading, coming up with ideas and fostering collaborations. These endeavors have resulted in social media posts, website posts, Smithsonian Magazine blog articles, and upcoming Smithsonian Channel productions.

National Museum of Natural History, Smithsonian, Washington, DC December 2019

Was instrumental on reaching out to over 120k households around the DC metro area, with emphasis on neighborhoods around Title 1 public schools, via direct mailers using the United States Postal Service's Every Door Direct Mail service, with the objective of encouraging people to come to the museum. The direct mailer was designed in English and Spanish to attract a bilingual audience. This project was one of the first ones of its kind in the entire Smithsonian Institution.

National Museum of Natural History, Smithsonian, Washington, DC November 2019

Authored article featured on the Smithsonian Magazine Voices blog, about the most popular scientific discoveries of the year.

Smithsonian Congressional Science Night at NMNH, Washington, DC July 2019

Presented to members of the United States' congress, staff and their families who came to this special event at the National Museum of Natural History. My duty was to showcase a section of the Sant Ocean Hall, about deep sea fishes, flat fishes, ontogenetic development and clearing and staining.

Mote Marine Laboratory and Aquarium, Sarasota, FL January 2018 – January 2019

Throughout my time at Mote I took photos and videos and gathered stories from the scientific staff which was shared on social media, Mote's website, and magazine, as well as external publications such as the Herald Tribune, Sarasota Herald and Bradenton Herald. Also conducted several tours throughout the public and research areas of the City Key and Marine Aquaculture Park campuses.

Mote Marine Laboratory and Aquarium's Teach-A-Kid Fishing & Ecology Clinics December 2018
Aided with organizing and documenting this event, as well as presenting to some of the children in attendance.

Mote Marine Laboratory and Aquarium's OceanFest, Key West, FL April 2018
Helped to coordinate and execute this fundraising annual event. Also aided in creating collateral materials and signage.

Florida Fish and Wildlife Conservation Commission's MarineQuest, St. Pete, FL October 2017
Created poster about sponge biology and presented facts and figures about the Florida Wildlife Research Institute's wet collection. Showcased and handled a few specimens to show the public. Also, documented the event by taking photos.