

JAMIE KNAUB

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EDUCATION

PhD	Florida Atlantic University (FAU) , Integrative Biology Boca Raton, FL Florida Atlantic Biomechanics Laboratory	2020 - Present
MSc	Florida Atlantic University (FAU) , Biology Boca Raton, FL Florida Atlantic Biomechanics Laboratory	2020 - 2022
BSc	University of North Carolina Wilmington (UNCW) , Marine Biology Wilmington, NC University Honors, Vertebrate Anatomy and Biomechanics Laboratory	2014 - 2017
	University of Alaska Anchorage (UAA) , Kachemak Bay Campus Homer, AK Semester by the Bay - Study Away Program	2016

GRANTS AND SCHOLARSHIPS

Awarded - External	Amount	Year
Student Travel Fellowship – ToScA/NoCTURN	\$1,800	2025
Charlotte Magnum Student Support Grant – SICB	\$550	2025
Mini-grant for Service-Learning and Civic Engagement – UAA KPC	\$1,000	2024
Fellowship of Graduate Student Travel - SICB	\$2,000	2024
Charlotte Mangum Student Support & Broadening Participation Grant – SICB	\$1150	2024
Division of Vertebrate Morphology Travel Grant - ICVM	\$620	2023
Charlotte Mangum Student Support Grant – SICB	\$345	2022
Travel Grant – Society of Marine Mammalogy	\$210	2021
Jim Elliot Award – ToScA	\$4,000	2021
Charlotte Magnum Student Support & Broadening Participation Grant – SICB	\$350	2021
Ernest F. Hollings Undergraduate Fellowship – NOAA	\$26,000	2016
External Total	\$38,025	
Awarded – Internal: Florida Atlantic University		
ECOS Publication Grant	\$1,650	2025
Dean Perry College of Science Graduate Scholarship	\$1,000	2025
ECOS Graduate Student Research Grant	\$2,040	2024
Graduate Grant	\$2,400	2024
Rosalyn E. Schonzeit Scholarship	\$500	2023
Graduate Fellowship for Academic Excellence	\$5,000	2023
Newell Doctoral Fellowship	\$5,000	2023
Graduate Research Assistant Award	\$1,000	2022
National Save the Sea Turtle Foundation Scholarship	\$1,000	2022
Newell Doctoral Fellowship	\$5,000	2022
Vincent Saurino Fellowship	\$3,775	2021
Cares Grant	\$700	2020
Graduate Grant	\$2,400	2020
Internal Total	\$31,265	

AWARDS

External

Tomography for Scientific Advancement Meeting – Best Student Poster	2025
SE & Mid-Atlantic Marine Mammal Symposium – Best Ph.D. Presentation	2025
SE & Mid-Atlantic Marine Mammal Symposium – Runner up Best Ph.D. Presentation	2024
SICB Stephen A. Wainwright Student Research Award	2024
JEOL SEM/TEM/EPMA Image Contest – 1 st place	2022
Tomography for Scientific Advancement Meeting - Runner-up for Best Lightning Talk	2021
JEOL NeoScope SEM Image Contest – 1 st place	2021

Internal

FAU Three Minute Thesis (3MT) Championship – Runner up	2025
FAU Three Minute Thesis (3MT) Preliminary Heat – Runner up	2025
FAU Art of Science Photography Contest – Honorable Mention	2024
FAU Art of Science Photography Contest – 1 st place “Student in the Lab” Submission	2023
FAU Art of Science Photography Contest – Honorable Mention	2022
FAU Art of Science Photography Contest – 1 st place “In the Lab” Submission	2021

PUBLICATIONS

Articles

Knaub J.L., Passerotti, M., Natanson L.J., Meredith, T., and Porter, M. 2024 Vertebral morphology in the tail-whipping common thresher shark, *Alopias vulpinus*. *Royal Society Open Science* 11:231473.231473. <http://doi.org/10.1098/rsos.231473>

Gignac, P.M., et al. 2024 The Role of Networks to Overcome Large-scale Challenges in Tomography: The Non-Clinical Tomography Users Research Network. *Tomography of Materials and Structures*, 100031. <https://doi.org/10.1016/j.tmater.2024.100031>

Coronel-Zegarra, A., **Knaub, J.L.**, Merk, V., and Pandya, A. Submitted. Leveraging deep learning-assisted semantic segmentation for imaging coral skeletons. *Journal of Structural Biology*

Knaub, J.L., Pawlik, E., Biordi, M., Passerotti, M., Natanson, L.J., Meredith, T., and Porter, M. Submitted. Skeletons of swiftly swimming sharks: Three-dimensional analysis of lamniform vertebral morphology and mineral architecture. *Journal of Anatomy*

Dempsey, C., **Knaub, J.L.**, and Koch, M. Submitted. Wetland Plant Aerenchyma Identified using Micro-Computed Tomography: Tropical Seagrasses as a Case Study. *Aquatic Botany*

Notes

Knaub, J.L., Dolan, B., Unitt, P., Brownell, R., Meredith, T., and Porter, M. In preparation. Preserving a periled porpoise through pixels: Digitization of a vaquita skeleton, the world's most endangered marine mammal. *Marine Mammal Science*

Photography Credit

Paig-Tran, E. M., Porter, M. E., Ferry, L. A., & Whitenack, L. B. (2022). How to build a shark: Biomechanics and bioinspiration. In *Biology of sharks and their relatives* (pp. 59-103). CRC Press.

SELECTED PRESS FEATURES

Sun Sentinel, “FAU researcher’s 3D scans may help save endangered vaquita porpoise” 29 Jan 2025.
<https://www.sun-sentinel.com/2025/01/28/fau-lab-tech-digitizes-skeleton-of-endangered-porpoise-is-her-work-the-last-hope-for-a-species-facing-extinction/?share=igsehoesonnhdoneo2zn>

Ecomagazine, “Preserving a Species on the Brink of Extinction” 14 January 2025.
<https://ecomagazine.com/news/research/preserving-a-species-on-the-brink-of-extinction/>

Scienmag, “Digitizing Hope: Collaborative Efforts Avert Extinction for Endangered Species” 14 Jan 2025
https://scienmag.com/digitizing-hope-collaborative-efforts-avert-extinction-for-endangered-species/#google_vignette

FAU News Desk, “Digitizing Hope: Preserving a Species on the Brink of Extinction” 14 January 2025.
<https://www.fau.edu/newsdesk/articles/rare-vaquita-specimen-scan>

New York Times, “Fear the Tails, Not the Jaws, of These ‘Weirdo’ Sharks” 24 January 2024.
https://www.nytimes.com/2024/01/24/science/thresher-sharks-tail.html?unlocked_article_code=1.QE0.H3Nw.-BrncJ6Rexjv&smid=url-share

Forbes, “The Biomechanics of Thresher Shark Tails Revealed” 24 January 2024.
<https://www.forbes.com/sites/melissacristinamarquez/2024/01/24/the-biomechanics-of-thresher-shark-tails-revealed/?sh=6ef9a77015ce>

FAU News Desk, “Study uncovers mechanics of ‘tail-whipping’ in thresher sharks” 17 January 2024.
<https://www.fau.edu/newsdesk/articles/shark-tail-whipping-study>

Science Daily, “Study uncovers mechanics of machete-like ‘tail-whipping’ in thresher sharks” 17 January 2024. <https://www.sciencedaily.com/releases/2024/01/240117143648.htm>

JEOL, “Suiting Up with NanoSuit for Imaging in the SEM” 2023.
<https://www.jeolusa.com/NEWS-EVENTS/Blog/suiting-up-with-nanosuit-for-imaging-in-the-sem>

MEDIA APPEARANCES & FEATURES

NSF Science Now, “Thresher Shark: Sleek, Poetic... and Deadly” 9 July 2024.
<https://youtu.be/NhwWzF3RfpQ?si=ZYwHFZK12UKLQ8Fv>

Save Our Seas World of Sharks, “Thresher sharks: the biomechanics of tail-whipping” 2 May 2024.
<https://saveourseas.com/worldofsharks/podcast/thresher-sharks-the-biomechanics-of-tail-whipping>

Wow in the World, “Shark Tail” 29 April 2024.
<https://tinkercast.com/podcasts/wow-in-the-world/shark-tail/>

Once an Owl, Always An Owl, “Episode 18 - For the Love of Sharks, Research at FAU Lab Schools” 11 November 2022. <https://directory.libsyn.com/episode/index/show/29465de3-76c5-41f4-9df7-0f469db3a340/id/25168239>

SERVICE

Marine Mammal Stranding and Population Assessment Volunteer Aug. 2021 - Present
Harbor Branch Oceanographic Institute, Florida Atlantic University, Fort Pierce, FL

- Assist in response to live and dead strandings of marine mammals

Stranding Program Volunteer Aug. 2014 – Nov. 2018
Marine Mammal Stranding Program, UNCW, Wilmington, NC
Homer Stranding Network, Alaska SeaLife Center/U.S. Fish and Wildlife Service, Homer, AK

- Aided in response to live and dead strandings of marine mammals
- Collected data and completed necessary paperwork (Level A, Human Interaction, etc.)
- Assisted with necropsy protocols and sample collection, see more under *Stranding Experience*

Community Outreach

Guest Lectures

- FAU Marine Science Seminar 2022, 2024, 2025
- FAU High School Research Course 2021, 2022, 2023, 2024, 2025
- Noyo Center for Marine Science Seminar Series 2021
- FAU Laboratory Schools Research Summer Skills Workshop 2021, 2023, 2024, 2025

Outreach and Education

- Minorities in Shark Science (MISS) Career Panelist 2025
- AAUW Tech Trek Summer Camp Career Panelist 2025
- Delray Library Shark Snippets 2025
- FAU Science Fest 2023, 2024
- Lagoonfest 2023, 2024
- Sharkfest 2023
- FAU Diversity in Science Day, Sophomore Social 2022, 2023
- Science Olympiad 2021, 2022, 2024
- AAUW Tech Trek Summer Camp Instructor 2021
- Explore FAU Day 2021

Reviewer Experience

- Editorial Reviewer
 - Integrative Organismal Biology
- Peer Reviewer
 - Journal of Anatomy
 - Royal Society Open Science
 - Royal Society Proceedings B: Biological Sciences

WORK EXPERIENCE

Research Assistant, Bioimaging Lab Jan. 2021 – Present
FAU Lab Schools, Boca Raton, FL

- Operate, maintain, and manage lab equipment and designated software
- Assist students (elementary, middle, and high school), undergraduate, graduate, post-graduate, professor and external users in the operation of lab equipment and independent projects
- Facilitate collaborations with internal (FAU) and external researchers
- Maintain lab in accordance with health and safety protocols and standards
- Provide assistance and expertise in micro-CT projects and collaborations (CT machine authorized user)
- Manage long-term data organization and storage

Rescue Biologist, Rescue Team

Feb. 2019 – Aug. 2020

Clearwater Marine Aquarium, Clearwater, FL

- Accomplished tasks to maintain stranding preparedness and monitored 24/7 stranding hotline
- Responded to strandings including monitoring, first response, triage, and transport
- Participated in live animal health assessments, supportive care, rehabilitation, release, and monitoring efforts of marine mammals and sea turtles
- Conducted training workshops for stranding volunteers, interns, law enforcement, and the public
- Conducted necropsies, wrote and reviewed necropsy reports, and carried out actions for disposal, sample processing, and storage
- Assisted in organizing and cataloging of stranding data and related databases

Naturalist & First Mate

May 2018 – Nov. 2018

Wrightsville Beach Scenic Tours, Wilmington, NC

- Registered First Mate with Coast Guard Consortium, assisted with boating duties including docking, navigating, fueling, etc.
- Provided historical, cultural, and ecological information of Wrightsville Beach to guests on board
- Identified sea birds, fish, invertebrates, marine mammals, and other wildlife encountered

Research Technician, Center for Marine Science

Aug. 2015 – July 2018

Shellfish Research Hatchery, UNCW, Wilmington, NC

- Participated in daily procedures such as sanitation, data collection, and aquaculture care
- Participated in monthly and annual growth assessments of oysters, clams, and scallops
- Executed research-based experiments regarding water quality, growth, feeding, and spawning

RESEARCH EXPERIENCE**Graduate Researcher**

Aug. 2020 - Present

Dissertation: "Lessons from Cartilage and Bone: Variation of Vertebral Architecture in Marine Megafauna"

Florida Atlantic University, Boca Raton, FL

PI: Dr. Marianne Porter, Florida Atlantic Biomechanics Laboratory

- Examination and study of skeletal anatomy and vertebral morphology in sharks and cetaceans
- Dissection, preparation, and imaging of vertebral samples
- 3D data reconstruction, renderings, and analyses including geometric morphometrics, volume segmentation, measuring morphometrics and meristics
- Statistical analysis to compare morphology and mineral architecture in a biomechanical, ecological, ontogenetic, and phylogenetic context
- Onboarding, mentoring, and supervision of undergraduate researchers in independent research projects (see mentoring section)
- Managing laboratory responsibilities
 - Manage and maintain lab and members in accordance with FAU Environmental Health and Safety standards
 - Coordination of outreach events and development of educational materials
 - Participate in field sampling efforts, maintain field response equipment and manage sample storage, organization, distribution, and disposal
- Assistance in elasmobranch field work including fishing, handling, collection of measurements and samples, satellite and camera tagging, etc.

3D Morphology and Microstructure of Shell Bone in Sea Turtles

Florida Atlantic University, Boca Raton, FL

PI: Jeanette Wyneken, Ivana Lezcano

- Performed micro-CT scans and image reconstruction of sea turtle shell bone to examine shell morphology and microstructure
- Assessed 3D bone parameters (thickness, separation, isotropy, etc.,) across species

3D Morphological Assessment of Shark Dermal Denticles

Florida Atlantic University and FAU High School, Boca Raton, FL

PI: Dr. Marianne Porter

- Performed scanning electron microscopy (SEM) and micro-CT scanning of shark skin
- Quantified and examined denticle density and morphology (crown width and height, ridge height and angle, and percent overlap)

Neuroanatomy of Deep-Sea Slickheads, *Leptoichthys*

Florida Atlantic University and FAU High School, Boca Raton, FL, Harbor Branch

Oceanographic Institute, Fort Pierce, FL

PI: Dr. Jon Moore

- Performed standard and contrast-enhanced micro-CT scans of *Leptoichthys* specimens
- Segmented neuroanatomy to examine differences across specimens and age classes

Petra III Beamtime: “3D organization of mineralized shark cartilage under mechanical load”

Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany

PIs: Dr. Marianne Porter and Dr. Vivian Merk

- Performed synchrotron x-ray nano-tomography (phase-contrast and absorption scanning)
- Examined shark vertebral cartilage from four species across ontogeny during five-day beam time

Undergraduate Intern

Aug. 2016 – Aug. 2017

NOAA Hollings Fellowship Project: “Following Food: Humpbacks, Herring, and Homer, AK”

Alaska Islands and Ocean Visitor Center, Homer, AK

Advisor: Kris Holderied, NOAA National Ocean Service

- Participated in oceanographic cruises to collect plankton and water samples in Kachemak Bay
- Analyzed anomalies in oceanographic trends from 2012-2016
- Identified both intra and inter-seasonal movement of humpback whales in the Gulf of Alaska
- Created an energetics model to assess predation on forage fish populations

UAA Internship: “Marine Skeletal Articulation and Preparation of *Orcinus orca*”

Kenai Peninsula College, Kachemak Bay Campus, Homer, AK

Advisor: Lee Post

- Studied osteology and anatomy of marine and terrestrial mammals through gross dissection, bone cleaning protocols, and skeletal articulation
- Created an osteological photographic atlas including standard operating procedures for measuring and photographing bones
- Preparation and participation in the articulation of a killer whale specimen

UAA Internship: “GIS mapping of killer whale encounters in Prince William Sound, Alaska”

North Gulf Oceanic Society (NGOS), Homer, AK

Advisor: Dan Olsen

- Created maps for killer whale encounter track lines in Prince William Sound
- Reviewed and corrected errors in historical GIS maps

Undergraduate Researcher

Jan. 2016 - Dec 2017

University of North Carolina Wilmington

PI: Dr. Ann Pabst, Vertebrate Anatomy and Biomechanics Laboratory

Thesis: "Prevalence of the trematode *Campula* in bottlenose dolphins (*Tursiops truncatus*) in Southeastern North Carolina"

- Analyzed the prevalence of *Campula* in *T. truncatus* across three time periods, relative to the 2013-2015 Mid-Atlantic Bottlenose Dolphin Unusual Mortality Event, and across life history
- Investigated the gross effect of *Campula* on tissues such as the pancreas, liver, and bile duct

Directed Independent Study: "Musculoskeletal Design in Cetaceans"

PI: Dr. Ann Pabst, Vertebrate Anatomy and Biomechanics Laboratory

- Reviewed literature on cetacean anatomy, and muscular and skeletal morphology
- Studied major muscle groups to understand mechanics of movement and identified origins and insertions of axial muscles
- Participation in cetacean necropsies to examine muscular and skeletal anatomy across species

ORAL PRESENTATIONS

First name listed indicates presenting author, *indicates high school student, **indicates undergraduate student

Simonitis, L.E., **Knaub, J.L.**, and T. Meredith. Submitted. *Beyond Broader Impacts: making curriculum-based outreach last past your grant completion*. Society for Integrative and Comparative Biology (SICB), Portland, OR

Clark, A.E., Felder, G., **Knaub, J.L.**, Biordi, M., Fernandez, I.**, Passerotti, M., and M. Porter. Submitted. *Stiff competition: morphology and mechanics of lamniform shark vertebrae*. Society for Integrative and Comparative Biology (SICB), Portland, OR

Porter, M., Felder, G., Clark, A., Biordi, M., Fernandez, I.**, **Knaub, J.**, and M. Passerotti. 2025. *How to build a fast fish: mako vertebral mechanics*. Joint Meeting of Ichthyologists and Herpetologists: American Elasmobranch Society, St. Paul, MN

Simonitis, L., **Knaub, J.**, Hendrickson, K., and T. Meredith. 2025. *See-through Science: Bridging K-12 Education and University Research through CT Imaging*. Tomography for Scientific Advancement (ToScA), New York, NY

Napora, K., Meredith, T., Hendrickson, K., Ayers-Rigsby, S., **Knaub, J.**, and L. Simonitis. 2025. *Developing Interdisciplinary Climate Change Education via Experiential Archaeology Learning: A Collaborative Case Study from Southeast Florida*. Annual Meeting of the Society for American Archaeology, Denver, CO

Knaub, J., Davila, J.**, Rittmaster, K., Thayer, V., Blackburn, J., Lovewell, G., Boege Tobin, D., Dolan, B., Meredith, T., and M.E. Porter. 2025. *Scanning the Seas: Micro-CT analysis of cetacean vertebrae and digital preservation of an elusive vaquita*. Southeast and Mid-Atlantic Marine Mammal Symposium (SEAMAMMS), Jacksonville, FL

Knaub, J. 2025. *Scanning the Seas: Micro-CT Analysis of Cetacean Vertebral Bone*. FAU Three Minute Thesis, Boca Raton, FL

Dempsey, C.**, **Knaub, J.**, and M. Koch. 2025. *Using micro-computed tomography to investigate internal structure of tropical seagrasses: A case study from Florida Bay*. Southeastern Estuarine Research Society (SEERS), Fort Pierce, FL

Knaub, J., Pawlik, E., Biordi, M.**, Frazier, D., Uribe Mejia, M., Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2025. *On your (land)mark, set, go!: 3D mineral structures vary in shark vertebrae based on swimming style*. Society for Integrative and Comparative Biology (SICB), Atlanta, GA

Knaub, J., Rittmaster, K., Thayer, V., Blackburn, J., Lovewell, G., Meredith, T., and M.E. Porter. 2024. *Variation of trabecular microstructure in modern cetacean vertebrae*. Southeast and Mid-Atlantic Marine Mammal Symposium (SEAMAMMS), Beaufort, NC

Pawlik, E., Oliveira, M.**, Alerte, M.**, Arnaldy, S.**, **Knaub, J.**, Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2024. *Wedges have edges: Phylogenetic relationships in vertebral morphology of carcharhiniform sharks*. FAU Undergraduate Research Symposium, Boca Raton, FL

Knaub, J., Biordi, M.**, Frazier, D., Uribe Mejia, M., Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2024. *Speedy, stiff, sharks: Vertebral morphology and 3D microstructure of lamniform sharks*. Society for Integrative and Comparative Biology (SICB), Seattle, WA

Porter, M.E., Uribe-Mejia, M., **Knaub, J.**, Clark, A., and D. Frazier. 2023. *Regional mechanical properties of mineralized cartilage from shark vertebrae*. International Congress for Vertebrate Morphology (ICVM), Cairns, Australia

Knaub, J. and M.E. Porter. 2023. *Regional variation of epiphyseal fusion and trabecular architecture in cetacean vertebrae*. Symposium: "Functional morphology and biomechanics of trabecular bone: Insights across organisms and scales" – International Congress for Vertebrate Morphology (ICVM), Cairns, Australia

Knaub, J. and M.E. Porter. 2023. *Thanks for the support: Quantifying vertebral morphology variation in marine megafauna*. Tomography for Scientific Advancement (ToSCA) North America, University of Texas, Austin, TX

Knaub, J. and M.E. Porter. 2022. *Lessons from Cartilage and Bone: Variation of Vertebral Architecture in Marine Megafauna*. Proposal Defense – Boca Raton, FL

Knaub, J. and M.E. Porter. 2022. *Mineral architecture in thresher shark (*Alopias vulpinus*) vertebrae*. Society for Integrative & Comparative Biology (SICB), Phoenix, AZ

Knaub, J. and M.E. Porter. 2021. *Jim Elliot Award Proposal: Vertebral Variation in Marine Megafauna*. Tomography for Scientific Advancement (ToSCA) Europe, *Virtual*

Knaub, J. 2021. *Sharks have got your back*. FAU Three Minute Thesis, Boca Raton, FL *Virtual*

Knaub, J., Heerdegen, I., Ruddy, B., Ingle, D., and M.E. Porter. 2021. *Quantifying Mineral Architecture in Lamniform Shark Vertebrae*. Tomography for Scientific Advancement (ToSCA) North America, *Virtual*

Knaub, J. and K. Holderied. 2017. *Following Food: Humpbacks, Herring, & Homer, AK*. NOAA Scholarship Program, Silver Spring, MD

Knaub, J. and D.A. Pabst. 2017. *Prevalence of the trematode *Campula* in bottlenose dolphins (*Tursiops truncatus*) in Southeastern North Carolina*. Honors Thesis Defense - Wilmington, NC

POSTER PRESENTATIONS

First name listed indicates presenting author, *indicates high school student, **indicates undergraduate student

Epstein, H.** , **Knaub, J.L.**, Meredith, T., and M. Porter. Submitted. *Scanning Scaley Shark Skin: Quantifying 3D variation in denticle morphology of bonnethead sharks*. Society for Integrative and Comparative Biology (SICB), Portland, OR

Newton, I., Islam, R., Nering, D., Adams, S., Harkas, E., **Knaub, J.**, and X Comas. 2025. *Exploring the Impacts of Saltwater Intrusion into the Pore Structure of Freshwater Peat Soils using Laboratory Techniques*. Geological Society of America Annual Meeting, San Antonio, TX **abstract accepted**

Newton, I., Islam, R., Nering, D., Adams, S., Harkas, E., **Knaub, J.**, and X Comas. 2025. *Investigating the Impacts of Saltwater Intrusion in the Pore Structure of Tropical and Boreal Freshwater Peat Soils Using X-ray CT and Ksat Measurements*. Advancing Earth and Space Science Annual Meeting, New Orleans, LA **abstract accepted**

Napora, K., Meredith, T., Hendrickson, K., Simonitis, L., **Knaub, J.**, Hindle, T., Ayers-Rigsby, S., Lecher, A., Watson, A., Fenn, M., Sullivan, J., and P. De Witt. 2025. *Developing a Collaborative Experiential Archaeology Program for K-12 Education: A Case Study from Florida Atlantic University Laboratory Schools*. Abstract submitted for Conference on Public Archaeology 2025

Knaub, J., Davila, J.** , Rittmaster, K., Thayer, V., Blackburn, J., Lovewell, G., Meredith, T., and M.E. Porter. 2025. *Verte-break it down: Morphological and microstructural variation in the postcranial axial skeleton of bottlenose dolphins*. Tomography for Scientific Advancement (ToScA), New York, NY

Newton, I., Islam, MD R., Adams, S., Nering, D., Harkas, E., **Knaub, J.**, and X. Comas. 2025. *Exploring the Role of Saltwater Intrusion in the Pore Structure of Freshwater Peat Soils Using Laboratory Techniques*. Greater Everglades Ecosystem Restoration Conference, Coral Springs, FL

Davila, J.** , **Knaub, J.**, and M.E. Porter. 2025. *Flex and Flow: Vertebral morphology of bottlenose dolphins*. FAU Undergraduate Research Symposium, Boca Raton, FL

Jarek, K.** , Wood, J., **Knaub, J.**, and M.E. Porter. 2025. *Shaped for Speed: Vertebral morphology in mako shark keels*. FAU Undergraduate Research Symposium, Boca Raton, FL

Pawlik, E., Oliveira, M.** , Alerte, M.** , Arnaldy, S.** , **Knaub, J.**, Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2025. *Swimming in tip-top shape: 3D vertebral morphology of carcharhiniform shark vertebrae*. Society for Integrative and Comparative Biology, Atlanta, GA

Epstein, H.* , Hagood, M., **Knaub, J.**, and M.E. Porter. 2025. *Zooming in on Bonnetheads: Quantifying sexual dimorphism in denticle morphology*. Society for Integrative and Comparative Biology, Atlanta, GA

Yadlapally, R.* , Abdallah, Z.* , Napora, K., **Knaub, J.**, and T. Meredith. 2024. *Scanning Electron Microscopy of Subannual Bands*. FAU Undergraduate Research Symposium, Boca Raton, FL

Epstein, H.* , Hagood, M., **Knaub, J.**, and M.E. Porter. 2024. *Dermal denticle morphology of bonnethead (Sphyrna tiburo) shark skin*. FAU Undergraduate Research Symposium, Boca Raton, FL

Sagon, K.* , **Knaub, J.**, Hagood, M., and M.E. Porter. 2024. *Exploring the relationship between shark denticles and environment*. FAU Undergraduate Research Symposium, Boca Raton, FL

Juno, L.*, Moore, J., **Knaub, J.**, Cook, A., Meredith, T., and T. Sutton. 2024. *The occurrence, neuroanatomy, and morphometrics of slickhead Leptoichthys in the Gulf of Mexico*. Gulf of Mexico Conference (GOMCON), Tampa, FL

Pawlik, E.**, Oliveira, M.**, Alerte, M.**, Arnaldy, S.**, **Knaub, J.**, Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2024. *Wedges have edges: Phylogenetic relationships in vertebral morphology of carcharhiniform sharks*. Society for Integrative and Comparative Biology, Seattle, WA

Knaub, J., and M.E. Porter. 2023. *Back(s) in action: 3D morphological assessment of mineral microstructure in lamniform shark vertebrae*. FAU Graduate and Professional Student Association (GPSA) Research Day, Boca Raton, FL

Sagon, K.*, Porter, M., Hagood, M., and **J. Knaub**. 2023. *Exploring the relationship between shark denticles and the environment*. FAU Undergraduate Research Symposium, Boca Raton, FL

Pawlik, E.**, Oliveira, M.**, Arnaldy, S.**, **Knaub, J.**, and M.E. Porter. 2023. *Species shakedown: A phylogenetic analysis of carcharhiniform shark vertebral morphology*. FAU Science Fest Undergraduate Research Poster Competition, Boca Raton, FL

Pawlik, E.**, Oliveira, M.**, Arnaldy, S.**, **Knaub, J.**, and M.E. Porter. 2023. *Species shakedown: A phylogenetic analysis of carcharhiniform shark vertebral morphology*. FAU Undergraduate Research Symposium, Boca Raton, FL

Oliveira, M.**, Pawlik, E.**, Arnaldy, S., **Knaub, J.**, and M.E. Porter. 2023. *Grow with the flow: Variation in shark vertebral morphology across body regions and ontogeny*. FAU Science Fest Undergraduate Research Poster Competition, Boca Raton, FL

Oliveira, M.**, Pawlik, E.**, Arnaldy, S., **Knaub, J.**, and M.E. Porter. 2023. *Grow with the flow: Variation in shark vertebral morphology across body regions and ontogeny*. FAU Undergraduate Research Symposium, Boca Raton, FL

Knaub, J., Semans, S., and M.E. Porter. 2022. *Individual variation in epiphyseal plate fusion in *Orcinus orca**. World Marine Mammal Conference, Palm Beach, FL

Uribe-Mejia, M.**, Frazier, D., Clark, A., **Knaub, J.**, Heerdegen, I., and M.E. Porter. 2022. *Vertebral Morphology and Mechanical Properties of *Isurus oxyrinchus*, the shortfin mako*. Joint Meeting of Ichthyologists and Herpetologists: American Elasmobranch Society, Spokane, WA

Arnaldy, S.**, **Knaub, J.**, and M.E. Porter. 2022. *Why the weird head? Vertebral column variability between hammerhead and requiem sharks*. FAU Undergraduate Research Symposium, Boca Raton, FL

Knaub, J., Semans, S., and M.E. Porter. 2022. *Individual variation in epiphyseal plate fusion in *Orcinus orca**. FAU GPSA Research Day, Boca Raton, FL

Knaub, J., Heerdegen, I., Ruddy, B., Ingle, D., and M.E. Porter. 2021. *Mineral architecture in cartilaginous shark vertebrae*. Society of Integrative and Comparative Biology, *Virtual*

Knaub, J., Pullin, B., McLellan, W., Keenan, T., Cummings, E., McAlarney, R., Rotstein, D., Colegrove, K., and D.A. Pabst. 2017. *Prevalence of the trematode *Campula* in bottlenose dolphins (*Tursiops truncatus*) in Southeastern North Carolina*. SEAMAMMS, Beaufort, NC

Knaub, J., Pullin, B., McLellan, W., Keenan, T., Cummings, E., McAlarney, R., Rotstein, D., Colegrove, K., and D.A. Pabst. 2017. *Prevalence of the trematode *Campula* in bottlenose dolphins*

(Tursiops truncatus) in Southeastern North Carolina. Poster - UNCW Spring Student Research and Creativity Showcase, Wilmington, NC

OUTREACH PRESENTATIONS AND INVITED SEMINARS

Knaub, J. 2025. *Spooky, Scary, Skeletons, and other things from the FAU HS Owls Imaging Lab.*
Seminar – FAU High School Research Methods Course, Boca Raton, FL

Knaub, J., Pawlik, E., Biordi, M.**, Frazier, D., Uribe Mejia, M., Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2025. *On your (land)mark, set, go!: 3D mineral structures vary in shark vertebrae based on swimming style.*
Seminar – FAU Marine Science Seminar Series, Boca Raton, FL

Knaub, J. and M.E. Porter. 2024. *At the centra of it all: Examining variation in trabecular microstructure across cetacean species.*
Seminar – Semester by the Bay Marine Mammal Course, Homer, AK *Virtual*

Knaub, J. 2024. *Spooky, Scary, Skeletons, and other things from the FAU HS Owls Imaging Lab.*
Seminar – FAU High School Research Methods Course, Boca Raton, FL

Knaub, J., Biordi, M., Frazier, D., Uribe Mejia, M., Passerotti, M., Natanson, L.J., Meredith, T., and M.E. Porter. 2024. *Speedy, stiff, sharks: Vertebral morphology and 3D microstructure of lamniform sharks.*
Seminar – FAU Marine Science Seminar Series, Boca Raton, FL

Knaub, J. and M.E. Porter. 2023. *Doing just spine: Trabecular microstructure in cetacean vertebrae.*
Seminar – Semester by the Bay Marine Mammal Course, Homer, AK *Virtual*

Knaub, J. 2023. *My Research Story*
Seminar – FAU High School Research Methods Course, Boca Raton, FL

Knaub, J. and M.E. Porter. 2022. *Vertebral Variation in Marine Megafauna.*
Seminar – FAU Marine Science Seminar Series, Boca Raton, FL

Knaub, J. and M.E. Porter. 2021. *Morphology Monday: Weird Shapes, Imaging, and Bio-Inspired Design.*
Outreach Talk - AAUW Tech Trek Marine Biology Core Course, *Virtual*

Knaub, J. and M.E. Porter. 2021. *Vertebral Variation in Marine Megafauna.*
Seminar - Noyo Center for Marine Science, Fort Bragg, CA *Virtual*

Knaub, J. 2021. *My Research Story: Evolution from Falcon to Seahawk to Owl.*
Outreach Talk - FAU High School, Boca Raton, FL *Virtual*

Knaub, J., Chaney, A., Gonzembach, H., and M.E. Porter. 2020. *Just roll with it: Rotational strategies in animal locomotion.*
Guest Lecture - FAU High School, Boca Raton, FL *Virtual*

Knaub, J. and K. Holderied. 2017. *Following Food: Humpbacks, Herring, & Homer, AK.* Alaska
Seminar - Islands and Oceans Brown Bag Series, Homer, AK

MENTORING AND TEACHING EXPERIENCE

Klaudia Jarek

2025 – Present

Florida Atlantic University High School, high school student

Project: Offshore and coastal shape analysis of bottlenose dolphin vertebrae

- Creating image segmentations of vertebrae from micro-CT scans
- Comparing volume segmentation statistics of vertebrae from offshore and coastal dolphins and along the vertebral column

Klaudia Jarek

2024 – Present

Florida Atlantic University, undergraduate

Project: Shark caudal keel and vertebral morphology

- Using contrast enhancement and micro-CT scanning techniques (diceCT) to investigate general morphology of caudal keels in shortfin mako sharks (*Isurus oxyrinchus*)
- Measuring consecutive intervertebral joint angles and vertebral morphometrics
- Poster presentation at FAU's Undergraduate Research Symposium 2025

Janeisy Davila

2024 – 2025

Florida Atlantic University, undergraduate

Project: Trabecular bone microstructure in cetacean vertebrae

- Quantifying 3D microstructure of trabecular bone in cetacean vertebrae
- Assessing variation in centrum morphology and trabecular microstructure between coastal and offshore bottlenose dolphins (*Tursiops truncatus*)
- Poster presentation at FAU's Undergraduate Research Symposium 2025

Cameron Klopfer

2023 – 2025

A.D. Henderson University School, middle school student

Project: *Regional morphology and mechanics of shark vertebrae*

- Dissection of vertebrae from three body regions of dogfish specimens
- Quantifying morphology of vertebrae and intervertebral joints from micro-CT scans
- 3D printing of vertebrae from four shark species (nurse, blacktip, mako, and spiny dogfish)
- Mechanical compression testing of prints to examine differences in stiffness across species
- 1st Place in Animal Science, Palm Beach Regional Science and Engineering Fair 2024, 2025
- 3rd Place in Florida State Science Fair 2024, 2025

Hannah Epstein

2023 – Present

Florida Atlantic University High School, high school student

Project: *Sex differences in denticle morphology of bonnethead sharks*

- Preparation of shark skin for SEM imaging (critical point drying and sputter coating)
- SEM imaging of skin from male and female sharks
- Quantifying denticle morphology (crown length and width, percent overlap, etc.) from SEM images using ImageJ/FIJI
- Poster presentation at FAU Undergraduate Research Symposium 2024 and SICB 2025
- Undergraduate Researcher of the Year 2025

Emma Pawlik

2022 – 2024

Florida Atlantic University, undergraduate

Project: *Phylogenetic analysis of carcharhiniform shark vertebral morphology*

- Quantifying vertebral morphology across body regions among 16 carcharhiniform species using micro-CT data
- Analyzing variation in vertebral architecture in a phylogenetic context

- Poster presentations at FAU Undergraduate Research Symposium 2023, FAU Science Fest 2023, SICB 2024, and accepted poster presentation at SICB 2025
- 1st place oral presentation in Environmental, Ecological, and Marine Sciences at FAU Undergraduate Research Symposium 2024

Kyle Sagon

2022 – 2024

Florida Atlantic University High School, high school student

Project: *Habitat preference and shark skin denticle morphology*

- Preparation of shark skin for SEM imaging (critical point drying and sputter coating)
- SEM imaging of skin from species belonging to three orders of shark (*Carcharhiniformes*, *Lamniformes*, *Orectolobiformes*)
- Quantifying denticle morphology from SEM images using ImageJ/FIJI
- Poster presentation at FAU Undergraduate Research Symposium 2023 and 2024
- FAU Undergraduate Research Award Grant winner 2024

Monique Oliveira

2022 – 2023

Florida Atlantic University, undergraduate

Project: *Variation in shark vertebral morphology across body regions and ontogeny*

- Quantified morphology of carcharhiniform shark vertebrae from three species across three life stages using micro-CT data
- Poster presentations at FAU Undergraduate Research Symposium and FAU Science Fest

Sonoma Arnaldy

2021 – 2022

Florida Atlantic University, undergraduate

Project: *Vertebral column variability between hammerhead and requiem sharks*

- Examined morphology of shark vertebrae from hammerhead and requiem species using micro-CT data
- Poster presentation at FAU Undergraduate Research Symposium

Teaching Assistant, Biological Sciences

Aug. 2020 – Dec. 2020

Florida Atlantic University, Boca Raton, FL

- Taught Biodiversity Laboratory, an undergraduate course, covering organismal diversity including protists, fungi, plants, and animals. Heavy emphasis on microscopes and dissections
- Average of 24 students per section, total of 48 students
- Developed and graded quizzes, exams, and homework

PROFESSIONAL TRAINING

Nikon AX-R Confocal, FAU Laboratory Schools

Mar. 2025

Hands-on, in-person training for image acquisition and analysis using NIS Elements Software

Epilog Laser Fusion Pro, FAU Laboratory Schools

Feb. 2025

Video and in-person training for safe and proper use of the Fusion Pro 36 80W laser machine including cutter, engraving, and design creation.

SlicerMorph ALPACA Module Workshop, UF 3D Imaging Group

Nov. 2023

Workshop hosted by UF for CT dataset producers and users covering SlicerMorph ALPACA module or Automated Landmarking through Point cloud Alignment and Correspondence Analysis.

Reactiv'IP IPSDK Explorer Workshop, ToScA Conference May 2023
Workshop hosted by Reactiv'IP for ToScA Conference attendees covering CT data analysis, with focus on machine learning and automatic Python script generation.

Elasmobranch Research Cruise, FAU ELASMO Lab Apr. 2022, 2023, 2024
Multi-day research cruise aboard the R/V Hogarth of Florida Institute of Oceanography demonstrating various elasmobranch fishing and tagging techniques such as drum lining, long lining, and trawling.

Dragonfly Image Processing and Segmentation Workshop, ToScA Conference May 2021
Online, intensive workshop hosted by Dragonfly ORS Systems for ToScA Conference attendees covering topics of image processing traceability, automation, segmentation, and analysis of CT datasets.

SlicerMorph 3D Morphometrics Online Short Course, SlicerMorph Project Mar. 2021
Online, intensive, short course hosted by the SlicerMorph Project developers and contributors covering import and export, segmentation, visualization, and analysis of high-resolution, biological CT data.

High-resolution X-ray CT Short Course, UTCT Oct. 2020
Online short course hosted by University of Texas High-Resolution X-ray CT Facility covering the fundamentals of acquisition, visualization, analysis, and mobilization of high-resolution X-ray CT data.

Southeast Human Interaction Workshop, National Fish and Wildlife Fund Mar. 2020
Florida Fish and Wildlife Conservation Commission (FWC), St. Petersburg, FL
Training to provide stranding network participants with knowledge to enhance human interaction (HI) identification and improve the quality and consistency of HI data collection.

Florida Boater Safety, Florida Boating Aug. 2019
Training to satisfy the requirement in Florida by the Florida Fish and Wildlife Conservation Commission to operate a vessel powered by 10 horsepower or more.

Sea Turtle Stranding and Salvage Network Workshop, FWC May 2019
Florida Sea Turtle Stranding and Salvage Network (FLSTSSN) workshop to inform network participants of data collection protocols and data forms in response to sea turtle strandings.

Necropsy Workshop, BLAST, University of Alaska Fairbanks Nov. 2016
The Biomedical and Student Training (BLAST) is a program funded by NIH provided training including marine mammal necropsy and anatomy and physiology with an emphasis on pinnipeds.

PROFESSIONAL AFFILIATIONS

Non-Clinical Tomography Users Research Network (NoCTURN)	Mar. 2023 – Present
Education and Outreach Community	
CT Facility Manager Group	
Association for Women in Science (AWIS)	Feb. 2023 – Present
International Congress of Vertebrate Morphology (ICVM)	Jan. 2023 – Present
Tomography for Scientific Advancement (ToScA)	May 2021 – Present
Society of Integrative and Comparative Biology (SICB)	Oct. 2020 – Present
Division of Vertebrate Morphology	
Division of Comparative Biomechanics	
Society for Marine Mammalogy (SMM)	Sept. 2020 – Present

SKILLS AND CERTIFICATIONS

Computer Applications/Software

Adobe Photoshop/GIMP
Davinci Resolve
Image J/Fiji
Inkscape
JMP Statistical Software
Microsoft Excel, Outlook, PowerPoint, Word
QGIS
R (RStudio) Programming
Sketchup

FAU Trainings

Cybersecurity Awareness
Diversity, Equity & Inclusion for Students
Ethics and Compliance
FAU Implicit Bias
FAU Title IX
Responsible Conduct of Research
Security Awareness for End Users
Sexual Assault Prevention for Students

Environmental Health and Safety Trainings

Animal Field Research Safety Overview
Biosafety Hazardous Waste Handling & Disposal
Bloodborne Pathogens Awareness
Fire Safety & Prevention
Hazard Communication
Hazardous Waste Generator
Laboratory Safety
Laser Safety
Mandatory General Training for All Animal Users
Non-Ionizing Radiation Safety
Radiation Safety
Wildlife Research
Working Safely with Animals
Working with Fish in Research Settings

Field and Rehabilitation Techniques

Biopsy sampling
Blood draws
Carcass recovery
Catch nets (manatees and cetaceans,
including disentanglement scenarios)
Elasmobranch fishing (gill nets, drum lines,
long lines, trawls)
Field dissection, necropsy, and sampling
Handling and restraint (sharks, manatees,
sea turtles, and cetaceans)
Hydration supplementation
Oxygen supplementation
Pit and satellite tagging
Respiratory monitoring
Stretcher and slings (sharks, manatees, and
cetaceans)

Other

PADI Open Water Scuba Certification
Certified: December 2012
PADI Whale Shark Specialty Certification
Certified: February 2015
PADI Enriched Air (Nitrox) Certification
Certified: August 2025

Vehicles, Vessels, & Trailering

Florida Boater Safety Certification
23' Dusky Marine (trailering & operation)
24' Carolina Skiff (trailering & operation)
Ford F250 Super Duty (4x4) w/ Ezy-Lift
Ford F450 Super Duty

Equipment and Research Techniques

Micro-CT imaging, 3D reconstruction, and analysis
Bruker SkyScan 1173
Software: NRecon, Dataos|X, DataViewer, CTAn, SlicerMorph, Dragonfly ORS, IPSDK Explorer
3D Printing
3D Systems Projet 2500 Plus, MakerBot Replicator 2X, Prusa MK4
Software: 3D Sprint, PrusaSlicer, MeshLab, Blender
Materials Testing
Instron E1000
Microscopy
JEOL Neoscope 6000 Plus, Nikon AX-R Confocal
Other
Digital Photography: Canon DSLR 7D, 70D, 50D, 1200D
Epilog Laser Fusion Pro 36