** KELSI M. RUTLEDGE**

 Ph.D. Candidate, graduation: March 2023

 National Defense Science and Engineering Fellow

 University of California Los Angeles, LA, CA 90095

 Contact: (828) 702-0201, kelsi.rutledge@gmail.com

APPOINTMENTS

2023- **Postdoctoral Researcher Caltech**

2025 Project: *Characterizing vertical swimming, payload capacity, and performance envelope of biohybrid robot jellyfish as future ocean monitoring platforms*

 Advisor: John Dabiri

EDUCATION

Sept. 2018- **Ph.D. in Ecology and Evolutionary Biology\* University of California Los Angeles**

May 2023Thesis: *The morphology and fluid dynamics of chemical scent detection in stingrays*

Advisor: Malcolm Gordon and Donald Buth (deceased)

*\*Summa cum laude*

2018  **M.Sc. in Ecology and Evolutionary Biology\* University of California Los Angeles**

Thesis: *Guitarfish systematics, taxonomy, and morphology*

Advisor: Donald Buth (deceased)

*\*Summa cum laude*

2016 **B.S. Marine Biology\* University of North Carolina Wilmington**

2016 **B.S. Environmental Science\* University of North Carolina Wilmington**

Honors Thesis:*Fish use of created vs. natural oyster reefs (Crassostrea virginica)*

**\****Magna cum laude*

SCIENTIFIC PUBLICATIONS

10. **Rutledge, K.M.**, Gordon, M.S., Dabiri, J. 2023. Stingray nostril geometry passively enhances odor capture. *In prep.*

9. **Rutledge, K.M.**, Murphy, C.T., Eldredge, J., Gordon, M.S. 2022. The fluid dynamics of chemical scent detection in stingrays and their relatives. *In Revision at the Journal of Experimental Biology.*

^8. **Rutledge, K.M.,** Ramarapu, R. 2022. A tail of two swimmers: ontogenetic growth in rays (Elasmobranchii: Batoidea) with robust tails. *In Revision at the Journal of Morphology.*

7. **Rutledge, K.M**. 2022. Sniffing out stingray noses: the functional morphology of Batoid olfaction. *Journal of Integrative and Organismal Biology.* Obac043. <https://doi.org/10.1093/iob/obac043>

6. Lin, M., Simons, A. L., Curd, E. E., Harrigan, R. J., Schneider, F. D., Ruiz- Ramos, D. V., Gold, Z.,Osborne, M. G., Shirazi, S., Teia, M. Schweizer, T.M., Moore, T.N., Fox, E.A., Turba, R., Garcia-Vedrenne, A. E., Helman, S. **K.M., Rutledge**, K., Mejia, M. P., Marwayana, O.N., Munguia Ramos, M. N., Meyer, R. S. 2020. Landscape analyses using eDNA metabarcoding and Earth observation predict community biodiversity in California. *Ecological Applications*. 31(6):e02379. <https://10.0.3.234/eap.2379>

5. **Rutledge, K.M.** 2020. First Record of Gorgona Guitarfish (*Pseudobatos prahli*) off the Baja California Peninsula with Updated Key to the Guitarfishes of the Gulf of California. *Journal of Fish Biology*.

<https://doi.org/10.1111/jfb.14585>

4. Gordon, M.S., Lauritzen, D.V., Wiktorowicz, A.M., **Rutledge, K.M.** 2020. Aracaniform Swimming: a swimming mode used by deep-water boxfishes (Teleostei: Tetraodontiformes: Aracanidae). *Physiological and Biochemical Zoology Special Issue: Biomechanics*, 93(3): 235-242.

<https://doi.org/10.1086/708163>

**+**3. **Rutledge, K.M.** 2019. A new guitarfish of the genus *Pseudobatos* (Batoidea: Rhinobatidae) with key to the guitarfishes of the Gulf of California. *Ichthyology and Herpetology,* 107 (3): 451-463.

<https://doi.org/10.1643/CI-18-166>

**\***2. **Rutledge, K.M.**, Summers, A. P., Kolmann, M.A. 2019. Killing them softly: ontogeny of jaw mechanics and stiffness in mollusk-feeding freshwater stingrays. *Journal of Morphology*, 280: 796-808.

<https://doi.org/10.1002/jmor.20984>

1. **Rutledge, K. M.**, Alphin, T. & Posey, M. 2018. Fish utilization of created vs. natural oyster reefs (*Crassostrea virginica*). *Estuaries and Coasts*, 41 (8): 2426-2432.

<https://doi.org/10.1007/s12237-018-0433-4>

\*Top 10% downloaded paper for that year in the respective journal

+Altmetric: 435, Journal name changed in 2020 from *Copeia* to *Ichthyology and Herpetology*

^Mentored student

TECHNICAL REPORT

**Rutledge, K.M.** 2021. Current underwater chemical sensors and the potential for bioinspired designs. *Bioinspired Research Lab Technical Report 1513*. Naval Undersea Warfare Center Division Newport, Rhode Island.

PRESENTATION AWARDS

2022 **1st place**: Graduate Marine Biology Poster Award, Annual Biology Research Symposium, UCLA

2022 **1st place:** UCLA “Grad Slam” Graduate Student Thesis Presentation Competition, UCLA **$5,000**

2021 **1st place:** Graduate Marine Biology Poster Award, Biology Research Symposium, UCLA

2020 **1st place**: Graduate Marine Biology Poster Award, Biology Research Symposium, UCLA

2019 **1st place**: Best Graduate Student Poster Award, Biology Research Symposium, UCLA

2018 **1st place**: Best Graduate Student Poster Award, Biology Research Symposium, UCLA

2017 **3rd place:** Best Graduate Student Poster Award, Biology Research Symposium, UCLA

2017 **1st place:** AIFRB Best Poster Award, Southern California Academy of Sciences Annual Conference

2016 Honorable Mention: Poster Award, Student Research and Creativity CSURF Showcase, UNCW

GRANTS AND FELLOWSHIPS total: ~$540,000

2023 National Science Foundation (NSF) EAGER Grant **$300,000**

Co-author: *Characterizing vertical swimming, payload capacity, and performance envelope of biohybrid robot jellyfish as future ocean monitoring platforms*

2022 University of California Support **$7,500**

2021Office of Naval Research (ONR) Naval Research Enterprise Fellowship **$11,000**

2020 University of California Support **$7,500**

2020 University of California Research Grant **$1,500**

2020Department of Defense (DOD) National Science and Engineering Fellowship **$200,000**

PI: *The morphology and fluid dynamics of chemical scent detection in stingrays*

2019 Sigma Xi Grant in Aid of Research **$1,000**

2019 Grant in Aid of Research (GIAR) Society for Integrative and Comparative Biology **$1,000**

2019 University of California Los Angeles Travel Grant **$2,300**

2019 University of California Los Angeles Research Grant **$1,000**

2018 Friday Harbor Laboratories Wainwright Fellowship **$2,700**

2018 University of California Los Angeles Research Grant **$2,000**

2018 Society for Integrative and Comparative Biology Housing and Travel Grant **$600**

2017 University of California Los Angeles Fellowship **$750**

2017 American Society of Ichthyologists and Herpetologists Travel Grant **$600**

RESEARCH AWARDS

2023 Uncommon Bruin: UCLA Campus Wide Winner

2020 Life Science Excellence Award Winner for Research Paper **$500**

2020 Lasiewski Award in Recognition of Outstanding Research in Organismal Biology **$250**

2019 UCLA Faculty Women’s Club Scholarship and Departmental Nominee **$3,000**

TEACHING AWARD

2021 Schechtman Award in Recognition of Outstanding Service as a Teaching Associate **$250**

PRESENTATIONS **+**INVITED SPEAKER \*\*AWARD GIVEN

2023 Society for Integrative and Comparative Biology Austin, Texas

2022 Seminar at Whitney Marine Biological Laboratory+  St. Augustine, FL

2022 APS Division of Fluid Dynamics Conference Indianapolis, IN

2022 UCLA Sloan Fellowship Film and Science Symposium+ UCLA

2022 NDSEG Fellowship Awardee National Conference Boston, MA

2022 Association for the Sciences of Limnology and Oceanography Virtual due to COVID-19

2022 UC Campus Wide Grad Slam Thesis Competition+  San Francisco, CA

2022 UCLA Grad Slam Thesis Competition\*\* Los Angeles, CA

2022 Association for Sciences of Limnology and Ocean Sciences Virtual due to COVID-19

2022 Society for Comparative and Integrative Biology Phoenix, AZ

2021 UCLA Annual Biology Research Symposium\*\* Virtual due to COVID-19

2020 UCLA Annual Biology Research Symposium\*\* Virtual due to COVID-19

2020 Society for Comparative and Integrative Biology Austin, TX

2019 International Congress of Vertebrate Morphology Prague, Czech Republic

2019 UCLA Annual Biology Research Symposium\*\* Los Angeles, CA

2019 Southern California Academy of Sciences Annual Conference Los Angeles, CA

2019 SICB DVM Dwight Davis Award Competition Tampa, FL

2018 FHL Fish Biomechanics Research Project Friday Harbor Labs, San Juan Island

2018 UCLA Annual Biology Research Symposium\*\* UCLA

2017 Southern California District Board AIFRB Annual Meeting**+** Los Angeles, CA

2017 Joint Meeting of Ichthyologists and Herpetologists Austin, TX

2017 UCLA Annual Biology Research Symposium\*\* UCLA

2017 Southern California Academy of Sciences Annual Conference**\*\***  Los Angeles, CA

2016 Student Research and Creativity CSURF Showcase**\*\*** UNC-Wilmington

RESEARCH EXPERIENCE

August 2021- **Visiting Researcher at Caltech** Pasadena, CA

2022 Description: Conducting experimental fluid dynamic and flow visualization experiments (particle image velocimetry) on chemical scent detection in stingrays

 Mentored by: Dr. John Dabiri

May 2021- **Naval Bioinspired Research and Development Lab Intern** Newport, RI

August 2021 Description: At Naval Undersea Warfare Center assisting with the development of classified research projects, obtained “Secret” clearance, fluid dynamics experiments, 3D printing

 Mentored by: Dr. Christin Murphy

2018-2022 **Ichthyology Collections Research Assistant** UCLA Ichthyology Museum Collection, CA

Description: Maintained and managed fish museum collection, research with fish specimens, assisting with specimen maintenance and loans

July 2018- **Fish Biomechanics Intern** Friday Harbor Labs, San Juan Island, WA

August 2018 Description: Research course designed to teach the fundamentals of fish biomechanics and fluid dynamics while students research an independent project. My project resulted in publication #2 on this CV.

Mentored by: Dr. Adam Summers

June 2013- **Research Technician**, Benthic Ecology Lab Center for Marine Science, Wilmington, NC

2016 Description: Worked on a variety of lab projects: impacts of grain size and porosity for beach renourishment, benthic infaunal assessment and analysis, oyster reef restoration and artificial reef building (USACE), fish communities around oyster reefs, oyster population health assessment, NOAAPoplar Island Restored Marsh Analysis; Cape Fear River Environmental Monitoring

2015-2016 **Honors Thesis Research Project** Center for Marine Science, Wilmington, NC

Description: Undergraduate research thesis comparing fish utilization of artificial oyster reefs to natural oyster reefs; deploy breder traps and seine net to catch resident and transient nekton; resulted in publication #1.

Mentored by: Dr. Martin Posey

2015-2016 **St. James Coastal Erosion Outreach Intern** St. James Plantation, Southport, NC

Description: Build and manage a bagged oyster reef as a “living shoreline” to prevent wetland erosion on the intracoastal waterway with community scientists, speak with locals, donors, and shareholders about coastal erosion issues and oyster reef restoration

2014-2016 **Ichthyology Lab Intern** Center of Marine Science, Wilmington, NC

Description: Sediment sorting, identifying invertebrates, fish identification, gill net, seine net, assist with the process of fish preservation for university museum

TEACHING EXPERIENCE

12 quarters, 2 semesters, 22 sections of teaching experience

Teaching evaluations overall mean score: 8.5/10 (+/- 0.4 SD)

**Guest Lecture**, UCLA

2022 1 hr 15 minute lecture and activity on science communication for a general audience

2020 1 hr 15 minute lecture on sensory biology and biomechanics of fishes

**Teaching Associate**, UCLA

Spring 2020 Introduction to Marine Science Lab 109L

Winter 2020 Animal Physiology Lab 170

Fall 2019 Introduction to Marine Science 109

Winter 2019 Animal Physiology Lab 170

Winter 2018 Vertebrate Morphology and Biomechanics Lab 110

Spring 2018 Systematics 130

**Teaching Assistant**, UCLA

Fall 2017 Introduction to Marine Science Lab 109L

Summer 2017 Session C Ecology, Evolution and Biodiversity LS1

Summer 2017 Session A Ecology, Evolution and Biodiversity LS1

Spring 2017 Introduction to Oceanography 25

Winter 2017 Ecology, Evolution and Biodiversity LS1

Fall 2016 Introduction to Marine Science 109

**Undergraduate Teaching Assistant**, UNC-Wilmington

Spring 2016 Ichthyology Lab

Fall/Spring 2016 Ichthyology Lab

OUTREACH AND MENTORSHIP

**Students directly mentored**:

*Raneesh Ramarapu* (2020-2022): direct mentor for undergraduate honors thesis

*Elva Garcia Vela* (2019-2020): independent research project on animal physiology

*Melissa Vasquez* (2016-2019): introduction to lab work (morphometrics, collections) and coding (R)

2023-Present **The Pink Labcoat** Pasadena, CA

Description: During my post-doc at Caltech, I am creating an afterschool program for girls in STEM. We will have monthly on-campus visits to underserved, Title 1 schools.

2023 **Zoom into Elementary School Classrooms** Virtual

Description: gave presentations to two elementary schools (Texas and North Carolina) on careers in marine science and bioinspired design

2022 **Girls in Ocean Science Conference** Santa Barbara, CA

Description: conference speaker for middle school girls interested in ocean science; presented lecture and led hands-on activity using museum specimens

2019-Present **Outreach Associate for the Journal of Integrative and Organismal Biology (IOB)** Virtual

 Description: Writing inclusive blog posts to summarize recently published journal articles

 ([Link](https://iobopen.wordpress.com/author/kelsirutledge/))

2018-2020 **Building Engineers and Mentors (BEAM)** Los Angeles, CA

 Description: Weekly visits to underrepresented elementary student’s classroom to teach fun science and engineering-based activities

2017-2018 **Minds Matter Mentor** Los Angeles, CA

Description: Mentor a low-income high school student as they transition to a university

November 4th **Exploring Your Universe with BNC** Los Angeles, CA

2018, 2019 Description: Largest UCLA Science Festival open to the public, catered towards elementary and middle school kids, run and design EEB Booth

April 9th 2018 **iDigBio UCLA Representative** Los Angeles, CA

Description: NSF funded “Broadening Diversity Workshop” with the goal of introducing undergraduate students, especially those in underrepresented populations, to museum and biodiversity science careers

2014-2016 **Coastal Erosion Outreach Intern** Wilmington, NC

Description: Inform the public and local benefactors of coastal erosion issues and marsh ecosystem services; lead citizen scientists on oyster reef building event

2013-2014 **Aquarium Education Volunteer** Fort Fisher Aquarium, Fort Fisher, NC

Description: Supervise select exhibits and basic marine life care; teach guests about marine life throughout the aquarium

PROFESSIONAL SOCEITIES

Association for the Sciences of Limnology and Oceanography (ASLO)

American Physical Society (APS) Division of Fluid Dynamics (DFD)

Society of Comparative and Integrative Biology (SICB)

Southern California Academy of Sciences (SCAS)

American Society of Ichthyology and Herpetology (ASIH)

American Elasmobranch Society (AES)

Association for the Sciences of Limnology and Oceanography (ASLO)

SKILLS

8 years working in a formal scientific lab setting, leading and managing projects, mentoring students

**Programming Languages:** R (advanced), MATLAB (intermediate)

**Certifications**: CPR/First Aid adult and child certified, Padi Open Water Dive Certified

**Government Security Clearance**: “Secret” Navy Contractor Clearance, 2021

**Software:** COMSOL, 3D Slicer, AutoCAD, Meshmixer, Solidworks, Fiji, Adobe Illustrator, Microsoft products

**Museum and Collections Experience:** Maintaining UCLA research and teaching ichthyology collection, collaboration with LACM, Scripps, Bell Museum, Harvard Museum

**Technologies:** CT and uCT scanning, 3D Printing, Arduino, florometer, sediment grabber, particle sizer

**Lab Skills:** Experimental fluid dynamics methods, dye visualization, PIV, laser safety training

**Field Skills:** Fish sampling techniques: seining/gill netting/trawling, familiar with dissecting and identifying coastal fishes, benthic assessment and live history (i.e. spat racks, quadrats), oyster reef restoration: metrics and condition indices, building and maintaining created oyster reefs, identification of oyster reef and surf zone associated invertebrate fauna, water quality monitoring TSS and chl-a, comfortable on/driving a boat

MEDIA ATTENTION (click for links)

**UCLA Newsroom**

*“*[*How a UCLA fish scientist helped the alien in Jordan Peele’s ‘Nope’ seem terrifyingly real*](https://newsroom.ucla.edu/stories/kelsi-rutledge-jordan-peele-nope-alien)*”*

**Girls in Ocean Science**

*“*[*Girls in Ocean Science Conference connects students with experts such as Kelsi Rutledge*](https://newspress.com/girls-in-ocean-science/)*”*

**Nerdist Magazine**

*“*[*NOPE’S Science Consultant Reveals The Name And Inspiration For The Movie’s Alien*](https://nerdist.com/article/nope-alien-name-revealed-science-consultant-interview-kelsi-rutledge-jordan-peele/)*”*

**WLOS News 13 Feature**

[*“NC Local Catches the Attention of Hollywood”*](https://wlos.com/news/local/nope-jordan-peele-kelsi-rutledge-caltech-research-gradslam-ucla-tc-roberson-high-school-guitarfish-pseudobatos-buthi-western-north-carolina-local-hollywood-accomplishments-rays)

**NPR Science Friday Podcast Interview**

[*“The Surprising Animal Science Behind Jordan Peele’s NOPE”*](https://www.sciencefriday.com/segments/nope-jordan-peele-animal-science-aliens/)

**UCLA College Magazine**

*“*[*Marine scientist Kelsi Rutledge explores new possibilities for bioinspired design*](https://www.college.ucla.edu/2022/07/07/kelsi-rutledge-stingrays-bioinspired-design)*”*

**UCLA Newsroom**

*[“The Fluid Dynamics of Smell: A Stingray’s Perspective), Kelsi Rutledge wins 1st Place”](https://grad.ucla.edu/life-at-ucla/events/2022-ucla-grad-slam/%22%20%5Cl%20%22%3A~%3Atext%3DCongratulations%20to%20Kelsi%20Rutledge%2C%20Biology%2CSlam%20Finals%20on%20March%209.)*

**Forbes**

[*“Stingrays Eat Food that is Harder than their own Jaws”*](https://www.forbes.com/sites/melissacristinamarquez/2019/06/02/stingrays-eat-food-that-is-harder-than-their-own-jaws/?sh=3db8c779340c)

**Spectrum 1 News**

[*“Graduate Student Discovers Species Lurking Inside a Museum****”***](https://spectrumnews1.com/ca/la-east/news/2019/09/19/graduate-student-discovers-species-lurking-inside-a-museum)

**Graduate Student Discovers Species Lurking Inside a Museum**

**Graduate Student Discovers Species Lurking Inside a Museum**

**Forbes**

[*“Say Hello to a New Relative of Sharks”*](https://www.forbes.com/sites/melissacristinamarquez/2019/09/09/say-hello-to-a-new-relative-of-sharks/?sh=17bd3fb269cf)

**Smithsonian Magazine**

[*“Scientist Lampoons Birth Announcements With Discovery of New ‘Spadenose’ Ray”*](https://www.smithsonianmag.com/science-nature/scientist-lampoons-birth-announcement-discovery-new-spadenose-ray-180973067/)

**American Scientist**

 [*“Welcome to the World Pseudobatos buthi*”](https://www.americanscientist.org/blog/macroscope/welcome-to-the-world-pseudobatos-buthi)

REFERENCES

John Dabiri

Centennial Chair Professor

Graduate Aerospace Laboratories (GALCIT) and Mechanical Engineering Department

California Institute of Technology

626-395-4450

*Postdoctoral Advisor*

Malcolm Gordon

Professor Emeritus

Ecology and Evolutionary Biology Department

University of California Los Angeles

323-646-4037

*PhD Advisor*

Adam Summers

Professor of Biology

School of Aquatic and Fishery Science

Friday Harbor Labs, University of Washington

310-864-141

*Mentor for Fish Biomechanics Course*

Christin Murphy, Ph.D.

Branch Head, Bioinspired Research and Development Lab

U.S. Navy, Undersea Warfare Center Division Newport, RI

401-239-4957

*Mentor for NREIP Internship*