

# **BUILDING DIVERSITY, EQUITY, AND INCLUSION IN THE OCEAN SCIENCES**

AUTOBIOGRAPHICAL SKETCHES



A SUPPLEMENT TO THE DECEMBER 2023 *OCEANOGRAPHY* SPECIAL ISSUE

#### **OCEANOGRAPHY MAGAZINE STAFF**

- Ellen S. Kappel, *Oceanography* Editor
- Vicky Cullen, *Oceanography* Assistant Editor
- Johanna Adams, *Oceanography* Designer

#### **SPECIAL ISSUE GUEST EDITORS**

- Ben Cuker, Hampton University
- Corey Garza, University of Washington
- Deidre Gibson, Hampton University
- Catalina Martinez, NOAA Ocean Exploration
- Wendy F. Todd, University of Minnesota Duluth
- Cassie Xu, formerly with Columbia University

#### **SPONSORS**

Support for this special issue supplement was provided by the National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), Office of Naval Research (ONR), and National Aeronautics and Space Administration (NASA).

#### **PREFERRED CITATION**

Kappel, E.S., B. Cuker, C. Garza, D. Gibson, C. Martinez, W.F. Todd, and C. Xu, eds. 2023. Building Diversity, Equity, and Inclusion in the Ocean Sciences Autobiographical Sketches: A Supplement to the December 2023 *Oceanography* Special Issue. *Oceanography* 36(4) Supplement, <https://doi.org/10.5670/oceanog.2023.36-4-supplement>.

This is an open access document made available under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution, and reproduction in any medium or format as long as users cite the materials appropriately, provide a link to the Creative Commons license, and indicate the changes that were made to the original content. Users will need to obtain permission directly from the license holder to reproduce images that are not included in the Creative Commons license.

Published by The Oceanography Society

# CONTENTS

INTRODUCTION .....	1
AUTOBIOGRAPHICAL SKETCHES .....	2
Sarah M. Aarons .....	2
Rosanna 'Anolani Alegado .....	3
Neeti Bathala .....	4
Salome Buglass .....	5
Anela Choy .....	6
Xochitl S. Clare .....	7
Jeanette Davis .....	8
Corey Garza .....	9
Deidre Gibson .....	10
Peter Girguis .....	11
Dionne Hoskins-Brown .....	12
Ambrose Jearld Jr. ....	13
Brandon Jones .....	14
Haunani Hi'ilani Kane .....	15
Catalina Martinez .....	16
Vernon R. Morris .....	17
Michael Navarro .....	18
Jacqueline L. Padilla-Gamiño .....	19
Noelani Puniwai .....	20
Christina Ravelo .....	21
Mei Sato .....	22
S. Kersey Sturdivant .....	23
Wendy F. Todd .....	24
Lisa D. White .....	25
Dawn Wright .....	26

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

# *Oceanography*

VOL. 36, NO. 4, DECEMBER 2023



BUILDING DIVERSITY, EQUITY, AND INCLUSION  
IN THE OCEAN SCIENCES

[READ THE SPECIAL ISSUE](#)



# INTRODUCTION

Welcome to the online supplement to the special issue of *Oceanography* magazine on [Building Diversity, Equity, and Inclusion in the Ocean Sciences](#). As part of this project, we present a series of one-page autobiographical sketches written by ocean scientists from diverse backgrounds and modeled on the sketches published in the two Women in Oceanography special issues of *Oceanography* ([March 2005](#) and [December 2014](#)). The motivation was similar: people are fascinated by stories—by learning what the scientists do, how they faced challenges along the way, and what they find rewarding about their work. By including these personal journeys, the autobiographical sketches complement the many articles in the special issue that describe programs that focus on building diversity, equity, and inclusion in the ocean sciences and the lessons the leaders of those programs have learned as they have attempted to address structural and cultural obstacles encountered by underrepresented and marginalized scholars.

We sent out targeted invitations to contribute sketches in an attempt to capture a range of career stages and paths, including those of guest editors of the special issue (see sketches contributed by Corey Garza, Deidre Gibson, Catalina Martinez, and Wendy Todd). Most contributors provide examples of how they are nurturing diversity in the ocean sciences through teaching, developing and implementing programs, mentoring and championing others, or writing children's books. Nearly all talk about the importance of support of family and community in enabling their careers, as well as mentors who believed in their abilities.

In our invitation letter, we asked potential contributors to provide roughly 500 words that focus on some/all of the following questions, although we gave them leeway to write about anything they wished.

1. Briefly, what are your scientific/research interests, and/or professional endeavors?
2. Please share anything about your background and life journey that you feel is important.
3. How did you choose your field of study?
4. What have you found most rewarding about your career and why?
5. What have been your greatest career challenges? How have you responded to these challenges?
6. How have you balanced your career and personal life? How has this balance influenced your career choices and your personal life?
7. Are the conditions for underrepresented scholars in your area of the field different now than when you began your career? If so, how has that affected your work?
8. Is there any advice you would like to provide for young oceanographers and other scholars from diverse backgrounds?

The handful of autobiographical sketches shared here display only a fraction of the depth, richness, complexity, and challenges faced by scholars from underrepresented and marginalized groups in the ocean and geo sciences. There are so many more stories to be told; I hope that this collection inspires others to write about their journeys.

  
— Ellen S. Kappel, Editor



Sarah, her partner Nick, and their son Cas on a windy but beautiful evening in Anchorage, Alaska, during the summer of 2023. Photo credit Sarah Aarons

## Sarah M. Aarons

Sarah M. Aarons ([saarons@ucsd.edu](mailto:saarons@ucsd.edu)) is Assistant Professor, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA, USA.

I work to understand the chemical evolution of Earth's surface in the past and present. Our group tracks the chemical changes in mineral dust transported in the atmosphere and deposited over the ocean, ice sheets, and land. We have started to measure nontraditional stable isotope compositions of seawater and marine sediments to probe the utility of these new proxies. I have always been fascinated by using isotope geochemistry to track changes in material or its history and applying it to understand past climates. I stumbled upon this field of study through a combination trying new classes and meeting welcoming mentors at the right academic transitions. Receipt of several fellowships both during my PhD and as a postdoctoral researcher allowed me to continue in this field. I am currently an assistant professor at Scripps Institution of Oceanography.

The field of isotope geochemistry is one of the least accessible and diverse subfields of the geosciences. Trace metal clean labs and mass spectrometers are very costly, so our ability to conduct this research is constrained by whether we have these facilities at our institutions or whether our advisors have close working relationships with those that do. Maintaining relationships with supportive collaborators who can facilitate research helped me to stay active in the field of isotope geochemistry and to branch out into new subfields.

I am an Iñupiaq (Alaska Native), born and raised in Alaska. My mom was born in a one room cabin with no running water or electricity, and her and her family and our ancestors before that relied on the land for subsistence. We grew up spending so much time outside and becoming intimately familiar with small subtle nuances in the environment that gave us clues about where the best berry patches or fishing spots were. Both my parents fostered my love of science and were always encouraging of my academic path. I experienced the loss of my mom during graduate school, which emphasized the importance of prioritizing what is most important to me: my family. I now have a partner who is wholly supportive of my career, and having this equal partnership in raising our child has allowed me to maintain my commitment to both science and personal values.

Since graduate school, I see more and more women in our field and more diversity in the people who are earning PhDs and being appointed to faculty and research positions. When I started graduate school, I did not know of any other Indigenous Earth scientists, and now there is an active and supportive cohort of them. Seeing more representation and having trusting relationships with people who understand and validate my experiences has helped me immensely. Having people who I trust and can rely on for advice and guidance throughout this journey is invaluable. I am thrilled to see the new and exciting science that is emerging from a more inclusive cohort of scientists and the structural shifts that are happening to make this field a more welcoming environment.

## Rosanna ‘Anolani Alegado

Rosanna ‘Anolani Alegado ([rosie.alegado@hawaii.edu](mailto:rosie.alegado@hawaii.edu)) is Associate Professor, Department of Oceanography, Director, Hawai‘i Sea Grant Ulana ‘Ike Center of Excellence, and Co-Director, SOEST Maile Mentoring Bridge Program, University of Hawai‘i Mānoa, Honolulu, HI, USA.

*I ola Kanaloa,<sup>1</sup> i ola kākou: In the thriving of Kanaloa, we all will thrive.* Social justice, equality, aloha ‘āina: these tenets are embedded in the fiber of my being. I was born and raised in Hawai‘i at the heart of the largest and most ancient ocean on Earth. As a child of grassroots community activists and scholars, I was ingrained with a clear and unique view of the social issues faced by the ‘ōiwi (Native Hawaiian), local, and immigrant communities. I have carried this upbringing into all stages of my life, as both a community member and a scientist.

*Mai ke kai, mai ke ola: From the ocean comes life.* I center a critical ‘ōiwi perspective on research by training scholars to draw upon multiple knowledge systems to address key problems and empower communities to understand and protect their resources. I direct the [ME\\*E Lab](#), which applies contemporary and ‘ōiwi methodologies within a [One Health](#) framework to understand eco-evolutionary processes influencing the microbiomes of Indigenous seascapes.

*Kūlana Noi‘i: A kanaka ‘ōiwi-centered framework for ethical research with communities.* My research and service are rooted in meaningful academic collaborations and partnerships with Indigenous communities. Together with community partners, I was involved in co-developing [Kūlana Noi‘i](#), a process for building and sustaining equitable relationships between researchers and communities. It has been very exciting to see the He‘eia National Estuarine Research Reserve adopt and adapt Kūlana Noi‘i in guiding their research protocols with community partners. As part of supporting ethical research practices, I feel a strong obligation to advocate for Indigenous data sovereignty for Native peoples to avoid extraction of customary knowledge.

*E noke mau: Be persistent.* When the School of Ocean and Earth Sciences and Technology (SOEST) hired me 10 years ago, I was the first kanaka ‘ōiwi tenure-track faculty member in its 35-year history. At the time, it was not always clear that my colleagues understood or valued the work that I did. Nevertheless, I realized the significance of my work to the Native Hawaiian community and to other young researchers in ocean sciences and persisted.

I have been privileged to have the strong support of my community, and this support has driven me forward. I have also been fortunate to have the support of my family. The first five years of my faculty position was rocky—my husband was still practicing law in California, and I had to raise our four-year-old and a nine-month-old mostly on my own. Our families helped care for our children, enabling me to establish and grow my research and lab.

Over the past 10 years, I’ve seen a tremendous improvement in the number of Native Hawaiian and Pacific Islanders (NHPI) majoring in the geosciences, pursuing graduate degrees, and attaining tenure-track faculty positions in SOEST. These new generations of NHPI in SOEST have reinforced my determination to continue to work toward transforming the geosciences and training scholar-practitioners.



<sup>1</sup> Kanaloa is one of the four principal deities in Hawaiian culture and embodies natural cycles, processes, and organisms related to the open ocean and aquifers. The island of Kaho‘olawe is also a sacred body form of Kanaloa.



## Neeti Bathala

Neeti Bathala ([neeti.bathala@alumni.duke.edu](mailto:neeti.bathala@alumni.duke.edu)) is Visiting Faculty in Environmental Science, Villanova University, Villanova, PA, USA.

As a dedicated career academic, I have spent almost two decades in higher education specializing in ecology and environmental science with a focus on tropical and marine ecosystems. My passion for teaching spans diverse student groups, from undergraduates to postgraduates. I am currently in the role of Visiting Faculty in Environmental Science at Villanova University.

Growing up near New Jersey's coastline, the ocean's constant presence fueled my fascination and respect for its mysteries. This early connection shaped my career focus on studying and safeguarding marine ecosystems and the environment.

My initial academic exposure to ocean sciences was when I spent a summer at the Duke Marine Lab in Beaufort, North Carolina. This experience ignited my passion for ecology and fieldwork, offering invaluable insights into the connection between land and sea and shaping my dedication to ocean conservation. Continuing my academic journey, I engaged in conservation research in Costa Rica with the Organization for Tropical Studies. After completing my PhD in ecology at the University of Georgia, I expanded my expertise in marine ecosystems through studies in Belize, the Galápagos Islands, and Hawai'i.

Navigating the ecological sphere as an Indian American woman involved confronting dual challenges stemming from both gender and race biases. There were pervasive assumptions casting doubt on my ability to excel in rigorous fieldwork. Initial networking limitations were linked to the underrepresentation of Indian Americans in the environmental field. It is gratifying to witness strides in the representation of diverse women, particularly in ocean science. These experiences have inspired me to be a community-based educator, reaching beyond academia to serve as a representation and role model. My objective is to inspire and support individuals in pursuing their dreams through education, irrespective of their age, ethnicity, or access.

Outside of the academic realm, I continue to be deeply committed to empowering women in STEM. Inspired by students' yearning for early exposure to science, I have authored award-winning children's books<sup>1</sup> on citizen science and ocean species. My books consistently showcase a young, diverse girl as a burgeoning scientist, broadening access to the wonders of our natural world for young learners. By nurturing STEM interest at a young age, I aim to diversify graduate recruits and shape future environmental leaders and educators.

In ecology, we recognize that diversity in ecosystems fosters strength and resilience. I uphold this principle in my professional pursuits, fortunate to have had mentors who endorse it as well. My aim is to reciprocate this support for my students, fostering an environment that values and embraces diversity. While strides toward inclusivity have been made, challenges persist for underrepresented scholars. The changing landscape has spurred intensified efforts for equitable opportunities. Community-based education and service remain pivotal aspects shaping my work in addressing these challenges.

To aspiring oceanographers and diverse scholars: embrace your uniqueness, seek supportive mentors, and persist in your journey. Your voice matters: believe in your abilities and pursue your passions fully.

Neeti Bathala diving with a curious sea turtle in a bleached and damaged reef offshore of Honolulu, Hawai'i.

<sup>1</sup> *Moonlight Crab Count and Adventures Through the Garden Gate*



## Salome Buglass

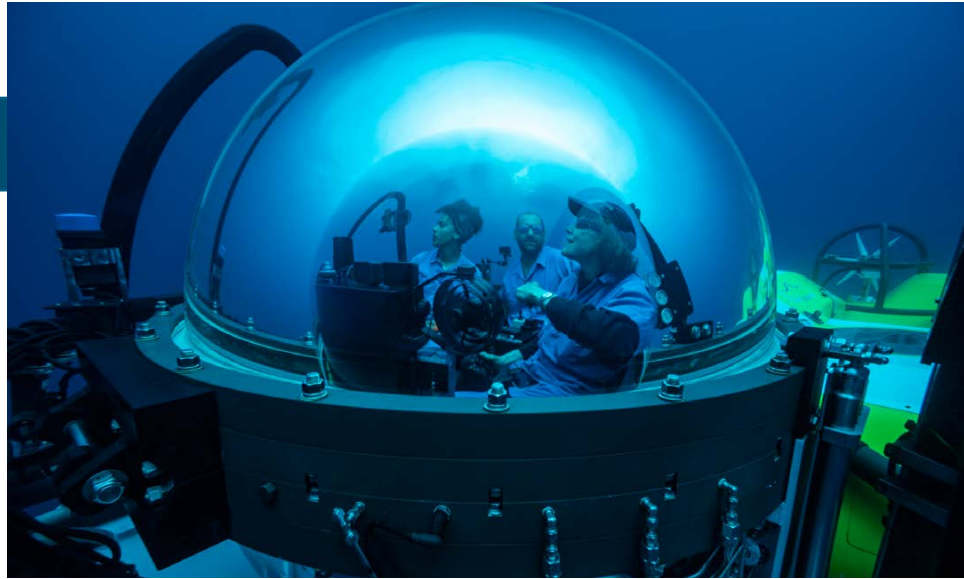
Salome Buglass ([salomebu@gmail.com](mailto:salomebu@gmail.com)) is a PhD candidate, University of British Columbia, Canada, and Research Scientist, Charles Darwin Foundation, Puerto Ayora, Galápagos Islands, Ecuador.

From an early age, I developed an affinity for the ocean. As my family moved many times across different countries—almost always to coastal towns—amid this perpetual change, the seas emerged as a grounding constant in my life. However, the idea of becoming a marine scientist only struck me in my late twenties. The lack of diverse role models probably did not help, nor did my academic struggle, having changed schools seven times, navigated three languages, and dealt with dyslexia. Nevertheless, these difficulties helped me develop valuable skills, such as knowing when to seek help and building a supportive network.

Although I pursued BSc and MSc degrees in geography, all my research projects, theses, and hobbies revolved around the marine biome. Naturally, I seized the opportunity to work as a marine ecologist at the Charles Darwin Foundation in the Galápagos Islands. After working on several diverse projects, I joined the Deep-sea and Seamounts Research Project, where I got a chance to cultivate my passion for studying unknown marine communities in the ocean's darker and deeper parts. It also allowed me to participate in oceanographic expeditions using state-of-the-art submersibles and remotely operated vehicles (ROVs), gaining first-hand experience collecting data and samples from remote deep-sea ecosystems.

Although this career journey has led to incredible experiences, it has also brought significant challenges, as I had to endure a fair amount of misogyny. At many points, I was tempted to opt out. I now recognize that this dilemma is common among women, particularly women of color, and they often end up leaking out of the STEM pipeline. However, the uncomfortable, unjust, and frustrating situations I faced fueled my drive to persevere and to stand up for myself and others. One of the proudest moments in my career was securing a National Geographic grant that enabled me to lead my own study exploring shallow seamount habitats using affordable ROVs. This ultimately led to the discovery of unknown mesophotic kelp forests. I was deeply curious about how kelp forests could grow with so little light, and I wanted to elucidate their ecology further. In 2020, I decided to pursue a PhD to help me get to the bottom of this and break the glass ceiling hanging over me at the time.

Starting a PhD during the peak of the Black Lives Matter movement was quite a roller-coaster ride. As an Afro-Caribbean Latina, the flood of information and new vernacular profoundly impacted and empowered me. It also filled my mailbox with requests for science talks and DEI media campaigns. At times, I felt flattered, but at others, I felt tokenized and used, as I was often asked to provide my contributions for free while helping diversify institutions' media touchpoints. Although this visibility and the perceived need to "diversify academia" has opened doors, it also fuels my impostor syndrome, often preventing me from recognizing the merits of my own accomplishments. Nevertheless, I embrace the increase in media and scientific interest, as I hope it will help me and others to pursue careers in the field of marine sciences, challenge stereotypes, and inspire those not represented in current traditional depictions of women of color.



Salome Buglass and Sylvia Earle inside the DeepSee submersible descending to the newly discovered mesophotic kelp forest at 70 m depth in the Galápagos to collect samples. Photo credit: ROLEX/Franck Gazzola





Participants from RR2104, a deep-sea food web and education cruise, gather in front of R/V *Roger Revelle* in June 2021.

## Anela Choy

Anela Choy ([anela@ucsd.edu](mailto:anela@ucsd.edu)) is Associate Professor, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA, USA.

My family and ancestors are from lands and islands spread across and within the largest, deepest ocean on Earth. I am a fifth-generation person of Hawai'i, who grew up in a way that felt half in and half out of the ocean. I have always been surrounded by a community of ocean protectors, explorers, naturalists, and scientists. However, these individuals are not

the practicing Western types of scientists who I now work alongside in the oceanographic community. They are swimmers and divers who would take us out into the reefs and ocean beyond, surfers and water people who intimately know individual waves and how they bend differently when the wind or swell direction shifts. From a young age, this community has nurtured in me a deep love and respect for the ocean and for its inhabitants, and I now work as a biological oceanographer and deep-sea biologist, striving to share this same regard for the sea with others.

I work to understand the highly diverse and poorly known animal assemblages that live in deep open ocean waters offshore of our continental shelves, finding the connections and processes that bridge these varied inhabitants and their habitats. My colleagues and I study the composition of deep-sea food webs, asking which species live at different depth horizons and how they move vertically and interact with other species. We look into the stomachs of fishes and apply a targeted combination of biochemical tracers, such as isotopes and trace metals, as we try to understand the key feeding relationships that impact ocean biogeochemistry and connect directly to human societies through fishing, climate change, and pollution. We are a seagoing group and have the tremendous privilege of traveling far offshore on research vessels, working in large science teams of diverse participants where all jobs, big and small, are purposeful and important. Sampling the full food web at depth requires specialized instrumentation and long days together on the back deck and in the labs. We are working to broaden the participation of who can sail for science, as well as making our spaces at sea safer and more welcoming in order to allow for students from more walks of life to thrive.

In Hawai'i, I attended public schools where the curriculum required learning how to get along, have fun, and succeed with people from a rainbow of different backgrounds and cultures. My high school was down the street from one of the most prestigious private schools in the state, where great diplomats like President Obama were educated. Our crowd, however, was a rowdy mix of daughters and sons of first- and second-generation immigrants from Korea, Micronesia, Vietnam, American Samoa, and the Philippines, among other places, as well as Native Hawaiians who live every day with American colonialism and the illegal overthrow of their nation. I liken navigating diverse social landscapes such as this to navigating the multi-faceted landscape of academia, especially as we all strive to be more inclusive and welcoming of diverse perspectives and people. I am deeply motivated by the great privilege and challenge of trying to build new spaces within this academic ecosystem, especially in seagoing oceanography where our ocean voyages are deeply enriched by those who perhaps couldn't or didn't envision themselves as sailors and scientists before.

## Xochitl S. Clare

Xochitl S. Clare ([xochic@uw.edu](mailto:xochic@uw.edu)) is Postdoctoral Researcher, Washington Research Foundation Fellow, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, USA.

I am a first-generation Afro-Latina marine biologist and performing artist. Lack of diversity in marine science is often due to the fact that ocean exploration remains exclusive to those with ocean access. For me, this was no exception. Growing up in California, it is to the surprise of many that I spent most of my life far from the sea. Financial challenges made it difficult to afford swimming lessons or ocean camps. My immigrant single mother kept my aquatic dreams afloat through bright books and media.

Despite these challenges, to be able to embark on scuba training, I learned to swim as an adult five years ago. Since then, I have cultivated strong aquatic mentors and became a scientific diver. Having those who reminded me that I belong in the water has helped me reach my aquatic dreams. Always seen as a “different” face in marine science, today I serve as an ambassador for diversity. I ensure that the ocean conservation biology projects I lead are inclusive to all backgrounds so we may better heal our blue backyards.

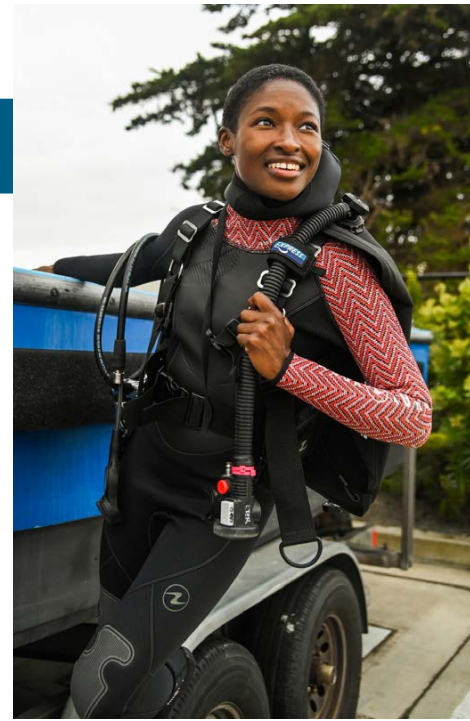
Specifically, I use my unique cultural lens and background in performance to direct and write for the stage and film. I first embarked on my simultaneous training in marine science and theater and film at the University of California, Santa Cruz, where I obtained two degrees in 2017, one in theater arts and the other in marine biology. I earned my PhD in applied eco-physiology at the University of California, Santa Barbara (UCSB), working in the Hofmann Lab, and I also participated in the UCSB Coastal Media Project.

My current eco-physiology and scientific storytelling work involves understanding impacts of environmental stress on ocean resources in the Pacific Northwest and in Placencia, Belize, where I hold heritage, in collaboration with educators and nonprofits that are advocating for conservation in Belize.

I have seen that stakeholder collaborations in coastal communities require time devoted to masterful communication. While I am an eco-physiologist, I employ a holistic approach, with community building and wellness at the core of my work.

Embracing your difference is a journey. Today, my multifaceted explorations of the natural world allow me to do truly interdisciplinary science. In doing interdisciplinary work, I have learned that we must boldly cross lines and merge minds in order to invent new ways to serve our planet.

It is easy to ignore opportunity simply because it seems out of the range of your discipline, but being uneasy, being uncertain—a special space of vulnerability—is where giving and sharing happens best. Giving differently means pushing past fears of what and whom we do not understand to create a brighter future. Expect what you give, give what you expect. We need to give “differently” if we want to see change.



Xochitl S. Clare, photographed in her scuba gear, is an ambassador for diversifying marine science. Photo credit: Chris Knudson



## Jeanette Davis (Dr. Ocean)

Jeanette Davis ([jeanette.davis@hamptonu.edu](mailto:jeanette.davis@hamptonu.edu)) is Assistant Professor, Marine and Environmental Science Department, Hampton University, Hampton, VA, USA.

I often compare my research to the forensics drama TV series Crime Scene Investigation (also known as CSI), where a detective goes onto a crime scene with the hope of detecting DNA a suspect has left behind. Similarly, as a marine microbiologist, I explore the ocean with the hope of detecting the DNA that organisms leave behind in their environments, a practice called environmental DNA or eDNA.

For example, I used eDNA to characterize bacteria associated with tropical sea slugs, work that ultimately led to the discovery of a marine microbe that helps fight cancer (this research is described in a *Science* paper). During my nearly decade-long career at the National Oceanic and Atmospheric Administration (NOAA), I helped implement eDNA as an “alternative net” to traditional trawl nets deployed from research vessels to collect specimens for estimating species abundance for fisheries management. This work was key to my receiving a Women of Color – Technology Rising Star Award. I also used this tool to identify and monitor invasive species, which led to my being the recipient of the North American Invasive Species Management Association – Rita Beard Visionary Leadership Award. I am now a new assistant professor in the Marine and Environmental Science Department at Hampton University (HU), where I’m using eDNA to assess microbial communities and their roles in bioremediation of the local Hampton River. Along the way, I have enjoyed engaging in this technique over a spectrum of topics with various scientists, managers, and stakeholders, including members of Congress.

As a graduate of HU, it is an honor to return to my “home by the sea” where I was first introduced to marine science. HU is the first place I was surrounded by people who looked like me and who loved science. In response to the challenge of lacking a sense of belonging over the course of my career, I have managed to create opportunities to be helpful to others who may be interested in marine science. Instead of being part of contentious conversations, I actively cultivate spaces of safety for people of color to explore science through children’s literature (twice I’ve been an Amazon bestselling author for diverse children’s science books, *Jada’s Journey Under the Sea* and *Science is Everywhere: Science is for Everyone*). I participate in and help to facilitate trainings and mentorship for the Association for the Sciences of Limnology and Oceanography Multicultural Program, and I served as a movie consultant for the Oscar Award winning film *Black Panther: Wakanda Forever*. I also participate and mentor in outstanding organizations such as Black Women in Ecology, Evolution and Marine Science (BWEEMS). I’ve learned as a woman of color that I don’t have to wait for change. I can simply create it. The advice that I would give to young oceanographers and scholars from diverse backgrounds is you’re not limited by people’s narrow perceptions of science. Show up authentic and brilliant, and you’ll have the greatest impact.

While I don’t think conditions for underserved scholars in marine science have changed since I began my career, I’ve noticed that *we* have changed. We have learned to prioritize well-being and create balance between personal life and career. We are releasing the burden and distraction of teaching people who uphold systems that maintain status quo and are centering our science and mental health. I am very hopeful for the field of oceanography and think as more people of color share their science and stories, we will build communities of safety and create new experiences for scientists of color.

“Dr. Ocean” is shown conducting research in her graduate lab at the Institute of Marine and Environmental Technology, University of Maryland Center for Environmental Science, Baltimore, MD, USA.



## Corey Garza

Corey Garza ([cgarza2@uw.edu](mailto:cgarza2@uw.edu)) is Associate Dean of Diversity, Equity and Inclusion, College of the Environment, and Professor, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, USA.

I am a marine landscape ecologist who uses drones, GIS, and statistics to study species-habitat relationships in the coastal environment. This relatively new field in the ocean sciences merges geospatial approaches with questions from the field of ecology to improve understanding of the processes that structure ocean ecosystems. I also serve as the Associate Dean of Diversity, Equity, and Inclusion in the College of the Environment at the University of Washington. In this position I work to improve the diversity of our students, faculty, and staff as well as to create an environment that is inclusive to people of all backgrounds.

I grew up in a large Mexican-American family in an East Los Angeles neighborhood known as Boyle Heights. My interest in the ocean originally developed as a young boy watching Jacques Cousteau documentaries with my family on Sunday evenings. Los Angeles is often associated with sun and surf, but our part of the city was far removed from the ocean, and those documentaries were my gateway to the ocean. Although the beach was 30–40 minutes away, I was fortunate to have access to local natural history museums and their outreach programs. Later in life, as I prepared to graduate high school, I made the decision to go to college. This was a big step, as nobody in our family had ever gone to college. I was fortunate to have my family's support in this endeavor even though it was a large unknown for us.

I attended California State University, Los Angeles (CSULA), where I majored in biology and was fortunate to be mentored by Carlos Robles. At the time, Carlos was the only marine scientist on the CSULA faculty. He taught me the skills I would need to be a scientist and was the first person to make me aware of the lack of Hispanic/Latinx marine scientists and the importance of creating opportunities for those underrepresented in science. After graduating from CSULA with my bachelor's degree, I entered the doctoral program in ecology, evolution, and marine biology at the University of California, Santa Barbara (UCSB). While I enjoyed my experience there, I also saw how few students of color were in my program. Toward the end of my academic career at UCSB I started to think about how I could increase opportunities for others who are underrepresented in the ocean sciences.

Once graduating from UCSB and completing two postdoctoral positions, I spent the first 15 years of my faculty career at California State University, Monterey Bay (CSUMB). This was an enriching environment where I developed programs that supported the inclusion of groups historically underrepresented in the sciences. My time at CSUMB was a formative one that allowed me to broaden my view of diversity, think about how people have many intersecting identities, and develop programs that were inclusive of multiple identities. I use these approaches in my current position at the University of Washington.

Since my time as a student, conditions have improved. Today I see a much broader diversity of people in ocean graduate programs and at conferences. Efforts to include a diversity of people, and their perspectives, are much more intentional than they were in the past. However, we still have work to do in seeing that diversity is represented in ocean science leadership positions. I feel we are now at a point where efforts to improve diversity in the ocean sciences will begin to facilitate the entry of diverse people and their perspectives into leadership positions—and the ocean sciences will be the better for it.



Corey Garza conducting drone surveys of the coastal environment in British Columbia, Canada. Photo credit: Madison McKay



## Deidre Gibson

Deidre Gibson ([deidre.gibson@hamptonu.edu](mailto:deidre.gibson@hamptonu.edu)) is Endowed Professor and Chair, Marine and Environmental Science, Hampton University, Hampton, VA, USA.

As I reflect on my journey in marine science in the final stretch of my career, I often compare it to the winding path of the Mississippi River. Though I enjoyed boating, fishing, and crabbing with my family while growing up in New Orleans, I never thought about a career in the field of oceanography—I had never seen a marine scientist who looked like me, nor had I been exposed to anything like it before. Like most of my generation, the image of marine science was Jacques Cousteau. I did not know about scientists of color, such as Ernest Evert Just (twentieth century marine biologist) and Daniel Pauly (preeminent fisheries scientist).

As an undergraduate at the University of New Orleans, I was trying to find my way in science, so I took a scuba diving class. That training opened my eyes to a field that I hadn't thought about before. I decided to pursue oceanography as a career and transferred to Shoreline Community College in Seattle, Washington, where I earned associates degrees in marine biology and oceanography. I transferred to the University of Washington (UW), where I was told that I was the first black undergraduate to enter the program. Astounding!

After earning my bachelor's degree in oceanography in 1991 from UW, I moved back home and worked for five years as a research technician at the Louisiana Universities Marine Consortium, with a short leave to work as a NOAA National Marine Fisheries Service Observer in the Bering Sea. Oh, the stories I could tell! But it gave me the confidence and training to move on to the next level. I earned my PhD in 2000 in marine science from the University of Georgia and at the Skidaway Institute of Oceanography where I was, once again, the first African American to enter the program.

My journey to becoming an oceanographer was filled with questions about my place in this field. It wasn't until I first attended an Association for the Sciences of Limnology and Oceanography (ASLO) meeting in through the ASLO Multicultural Program (ASLOMP) where I saw students and scientists who looked like me. My participation in this program changed my career path and provided reassurance that I belonged in this place. I obtained a postdoc at the University of Connecticut-Avery Point, and while I was there I was featured in a Discovery Channel documentary on mid-water mysteries. I was hired at Hampton University as a research assistant professor, and was promoted, tenured, and became chair all at the same time. I am now the Endowed Professor of Marine and Environmental Science. I was nominated as the first Black member of the ASLO Board, where I served as chair of the Diversity Committee, and became the first Black member to co-chair an ASLO conference (in New Orleans in 2013). I recently received the ASLO Sustaining Fellow Award and now serve on many professional boards and committees of oceanographic institutions and national organizations like the National Sea Grant Advisory Board.

All of these accomplishments have been highlights of my career, but the most important work has been training the next generation of Black and Brown marine students who enter our humble home at Hampton University to embark on the journey that I began 37 years ago. NSF and NOAA-supported programs such as DREAMS I & II, COSEE, and COSIA; the NOAA LMRCSC; and my research grants have all provided research and professional development opportunities for students at Hampton University, paving the way for them to enter graduate school and the workforce, and even to come back home to Hampton University.

As I think about my journey that mirrors the meandering path of the mighty Mississippi River, it's been a helluva ride!



## Peter Girguis

Peter Girguis ([pgirguis@oeb.harvard.edu](mailto:pgirguis@oeb.harvard.edu)) is Professor of Organismic and Evolutionary Biology, Harvard University, Cambridge, MA, USA.

I was born in Fresno, California, to Egyptian immigrants who came to the United States to pursue their dreams. Shortly thereafter we moved to Downey, California, a small quiet town at the heart of the aerospace capital of the world. My father is an agricultural biochemist, and my mother was an aerospace engineer. I was an anxious child who struggled both academically and socially, unsure of who and what I was. Will I ever be a good student? Can I ever learn to read as well as other kids? Am I Egyptian, American, or something else entirely? I was, however, sure of one thing: that I was going to be a disappointment to my parents and myself.

Throughout my life, there have been many people who've helped me weather my toughest moments. They gave me two gifts that are truly priceless: their support and their time. One such person was my fifth-grade teacher. She saw me struggle at school, but—for reasons I did not understand at the time—chose to tutor me, free of charge, after school. She rightly deduced that I would enjoy geometry, so that became the focus of our after-school time. Despite my self-doubt, she entered me in the local junior high math competition. I was dismayed when I came in third place, as I had never won anything in my life. I will always remember that moment, and until today her unqualified faith in me is electrifying. She was the first person, beyond my family, to tell me I had something to offer this world, even when I didn't believe it myself.

Time and again throughout my life, someone stepped up to help when I needed them most. A high school senior helped me, a quirky freshman, with my rampant anxiety. A college professor invited me to join his research group despite my lackluster performance in his class. Even now, as a tenured professor, I have colleagues who are always there for me when I need advice (I'm looking at you, Colleen Cavanaugh and Andy Knoll). For years I thought that asking for help or advice was a sign of intellectual weakness. But I have come to believe, and have fully embraced the idea, that each of us inextricably depends on the support of others. This is the most important part of my story: it is not my story alone, but it is the story of many who gave their support and time to help me see my own self-worth, and ultimately to be my best self.

Today, I am a professor of biology at Harvard University. My lab works to better understand the adaptations of marine animals and microbes to their environments, and in turn how their metabolic activity shapes local and global biogeochemical cycles. Our science is the product of a dedicated team of scholars of all career stages and from many different walks of life. Notably, our research is extremely interdisciplinary and accordingly every lab member (myself included) learns from and depends upon other lab members. Though this interdependency can be difficult, it forces each of us to reckon with our limitations, and it also builds our strengths. Each day I strive to remind the team that each of us has something wonderful to offer science and society and that—perhaps counterintuitively—we depend upon one another to become the best versions of ourselves. I am proud to say that many lab members, past and present, do for others what so many have done for me over the years: provide support and, when appropriate, guidance in an effort to better understand our world through genuine, robust, and enduring friendship and collaboration.



Peter Girguis standing in front of two rocket nozzles recovered from the Space Shuttle solid rocket boosters. Photo courtesy of Ben Girguis



## Dionne Hoskins-Brown

Dionne Hoskins-Brown ([dionne.hoskins-brown@noaa.gov](mailto:dionne.hoskins-brown@noaa.gov)) is Research Fishery Biologist, Habitat Ecology Branch, Population and Ecosystems Monitoring Division, NOAA Southeast Fisheries Science Center, Miami, FL, USA.

I was born in tidewater Virginia to outdoor parents. My grandmother fished in the James River every Wednesday. Instead of vegetables, she kept saltwater and cleaned fish in her crisper drawer. My dad was corporate, so we moved a lot. We ended up in Savannah, Georgia, where I was introduced to saltwater via a neighborhood cove. I shrimped with my mother and caught amazing things that I did not

know lived in estuaries. Encouraged by my family's environmental ethos, I attended what was then Savannah State College and majored in marine biology. My fascination with invertebrates—their incredible morphologies and physiologies—continued through graduate school at the University of South Carolina where I studied under Steve Stancyk. Most of my professional work has focused on invertebrate fisheries and essential habitat in the southeastern United States. In recent years, I have incorporated the stories of families like mine into narratives that acknowledge African Americans as coastal citizens.

Because I attended an HBCU (Historically Black College or University) and came from a family that appreciated nature, I did not immediately identify with the unique status I attained by being a Black woman majoring in marine biology. I appreciate how diversity in the marine sciences has increased, but it saddens me that, 30 years later, the same grant programs for underrepresented minorities that funded my internships still fund my students today—with the same diversity goals.

My first bit of advice to young scientists is to identify and challenge your weaknesses early. And do not allow your self-esteem to disintegrate just because they exist. You can display your greatest intellectual creativity if you do self-work early. My mid-career challenges came from not following my own advice. Impostor syndrome hindered me in my thirties despite many successes. I worked with difficult individuals with elitist and racist beliefs, and I absorbed their opinions of my ability. The internal pressure caused me to overwork and compromise my health. Only after many years did I see that my critics were not happy either. They considered themselves to be consummate scientists, and even through their meanness and lack of collegiality, I saw they were not professionally content either. I adjusted and decided to be happy with myself—to firmly assess what I needed to improve, and to release what would not change. I started treating myself the way I would treat my students. Not surprisingly, it was a healthier strategy and naturally increased my work-life balance.

Unlike many professionals, I have held just one position as Research Fishery Biologist for NOAA Fisheries. Yet, because I am based at a university—yes, Savannah State University—I have had government and academic experiences in this one role. Working with incredible colleagues, I use my strongest talents to promote stewardship of our living marine resources. This, and being comfortable with myself, as both a chief scientist and lead learner, are the most rewarding parts of my career.

## Ambrose Jearld Jr.

Ambrose Jearld Jr. ([ajearld@aol.com](mailto:ajearld@aol.com)) is Retired, NOAA Northeast Fisheries Science Center, Woods Hole, MA, USA.

I came of age during segregation and chose my profession when it was still legal to deny individuals opportunities to study science due to the color of their skin. Nonetheless, I was able to forge a productive career in science and resource management. My success in science grew out of my passion for exploring the natural world around me, my early childhood on my family's North Carolina farm, and my teenage years in Annapolis, Maryland.

I had confidence and excelled in navigating both worlds—segregated Black America and segregated White America. Sometimes I played by the rules and sometimes I broke them, and a number of times I was in the right place at the right time when an opportunity commensurate with my interests and dreams opened up. I was fortunate to have mentors and family, immediate and chosen, who supported me throughout my education and profession.

In 1967, a leading aquatic scientist who was committed to human and civil rights recruited me to graduate school in the newly formed Oklahoma State University (OSU) Fish and Wildlife Research Unit. There I earned a master's degree, and after a two-year stint in the Army, returned to OSU for a PhD studying the social and reproductive behavior of a species of Anabantid fish. After graduate school, I taught at two Historically Black Colleges and Universities before moving to NOAA Fisheries where I researched fish age and growth.

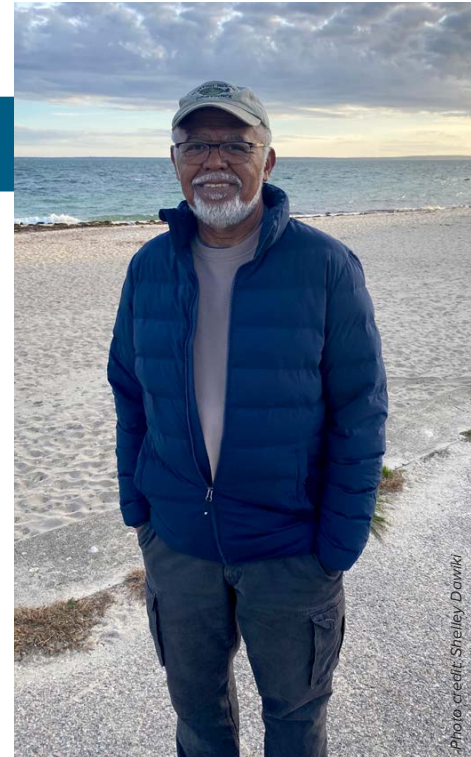
One of the most rewarding aspects of my career was travel, meeting other scientists, and experiencing different cultures. I have also enjoyed mentoring students and creating programs to increase diversity in fisheries science. One notable program I founded and directed is the Woods Hole Partnership in Education Program, a 10-week summer internship that introduces underrepresented groups to the marine and environmental sciences.

I've had more than a few career challenges over the decades, and some of the most difficult to overcome were related to race. Particularly debilitating was navigating the low expectation others often had of me because of my skin color. Some colleagues and administrators were unable to view me as one who could play a role in moving the frontiers of science along.

Upward mobility in the science culture was impossible for me beyond a certain point, no matter how well I performed. I recognized this early on and decided from the beginning to perform all my duties and responsibilities as required, seek what else interested me, and be as supportive to my family as I could, a decision that led me to do considerable DEI work. Today I am probably better known for my DEI contributions than for my science—a testament to the fact that our profession is more comfortable acknowledging that a person of color can excel at “soft skills” and less willing to acknowledge scientific achievement.

While an African-American scientist starting out today will encounter far less outward discrimination than when I did when I began my career in the 1960s, the barriers still exist, in more subtle but still toxic ways. Research science still practices backroom politics that enables advancement for some scientists and not for others.

One piece of advice I offer young scientists and scholars is to study the history of science and its part in the genocide of Indigenous populations and their enslavement. Educate yourself about the intersectionality of racism, slavery, and science. While learning this history, remain confident, get up every time someone pushes you down, and lift as you climb. Finally, I would challenge everyone, especially rising scientists, to create diverse and inclusive networks, to broaden your viewpoint, and to be part of forging a new way of thinking.







## Brandon Jones

Brandon Jones ([mbjones@nsf.gov](mailto:mbjones@nsf.gov)) is program director for talent development and broadening participation efforts, Directorate for Geosciences, National Science Foundation, and President-Elect, American Geophysical Union.

As a child, science was always fascinating to me, and the application of science was really sparked through my family, particularly my grandparents who would take me fishing around Ohio when I was young.

Given the kinds of critters I was seeing in the lakes, rivers, and streams in a midwestern state, I used to wonder what kinds of creatures could be in the ocean.

My science trajectory really got focused while attending The Lincoln University, Pennsylvania, and even more so in grad school at the University of Delaware's College of Earth, Ocean, and the Environment, where I earned both my master's and doctoral degrees in marine science. During those graduate school years, I worked in a lab that studied the early life history stages of invertebrates, mainly crabs, and that work provided important data for the management of the blue crab industry on the East Coast of the United States. My main research focus was on the physical and biological mechanisms that influence the transport and recruitment of larval crab swarms in Delaware Bay.

My graduate advisor, Chuck Epifanio, practiced holistic mentoring before it was chic. He was intentional about creating an inviting culture in his lab. Chuck was clearly ahead of his time as far as mentoring, offering guidance, and providing the professional development information that we all needed as early career scientists. He was very much about meeting us where we were and understanding how to help us get where we wanted to go. But even with Chuck's example, being the only student of color in the college was challenging. The feelings of isolation were real and at times had me contemplating whether I was making the right career choice. However, with firm support from my family and Chuck's example of building bonds to create community in the workspace, I persevered, and now I try to integrate those values in my professional life decades later.

In my role with the American Geophysical Union (AGU), I help to implement the organization's strategic plan, specifically around issues related to climate change impacts and increasing the general population's awareness of how scientific discoveries benefit society. As someone who has championed diversity and inclusion throughout my career, my current professional and volunteer responsibilities allow me to promote research and learning cultures that value a strong sense of belonging and acceptance.

What excites me about my work now is figuring out how to translate research for nonscientists and highlight important scientific discoveries that are critical for societal advancement and preservation of the planet. I believe my work at the National Science Foundation and with the AGU is helping to highlight the importance of scientific products for societal benefit.

## Haunani Hi'ilani Kane

Haunani Hi'ilani Kane ([hkane@hawaii.edu](mailto:hkane@hawaii.edu)) is Assistant Professor, Earth Sciences Department, University of Hawai'i at Mānoa, Honolulu, HI, and Chair of the Multiscale Environmental Graphical Analysis (MEGA) Lab, Hilo, HI, USA.

During my junior year of high school, I participated in a marine science field trip with Nainoa Thompson, a Hawaiian navigator who has been influential in revitalizing traditional voyaging practices across the Pacific. Floating in Maunalua Bay, Nainoa challenged us to observe the world around us: "Where is the wind coming from? The swells? Is the tide rising or falling? Where is the moon?" That day he reminded us that our kūpuna (ancestors) observed all of these elements and more to navigate thousands of miles and find Hawai'i. In this moment, I was filled with pride of my ancestors and immense love for my home. This was the moment that inspired me to become a scientist.

Since then, I have navigated two worlds, and I have worked tirelessly to find balance as a Hawaiian voyager, surfer, and scientist. My experiences voyaging on traditional canoes and surfing with my family and friends have inspired my approach to and the purpose of my research. I am a coastal geologist by trade. My research combines coastal geomorphology, paleoenvironmental reconstructions, spatial analysis, and the perspectives of a Native islander to investigate how islands, reefs, and island people are impacted by changes in climate. I study climate change out of necessity and as a means of survival.

While in graduate school, I was often discouraged with how islands and island people were portrayed in the climate sciences. We, as islanders, were the subject, not the authors, of research. Much of my work has focused upon increasing representation and diversity in the ways that we view our island homes in the face of climate change. I wanted to find a way to strengthen the voice of our island people. To shift the narrative, and collectively view our ancestral relationships to our islands as a means for strengthening our resilience and abilities to adapt climate change. I wanted to create opportunities for more island people to learn and to share their perspectives in the climate sciences.

One of my proudest academic accomplishments to date has been organizing a Native Hawaiian research cruise to Papahānaumokuākea, the largest natural and cultural marine protected area in the United States. In collaboration with community members, we were able to create an experience for five Native Hawaiian students to reflect on their shared kuleana (responsibility) as Native scientists while also learning important fieldwork skills such as how to conduct surveys of topography and coral reefs. Students worked and learned alongside members of the community as an important component of this experience, and together we sailed to our study sites, which allowed everyone to learn navigation and basic sailing skills. It is my dream that this course can become a regular offering to both university students and community members.

If by chance this is read by a Hawaiian or Native scientist who is deep in the academic system, please remember you are not alone. We are the product of resilient ancestors.



Haunani Kane and Kalo Daley prepare to return to Hawai'i aboard the Hawaiian voyaging canoe Hikianalia. Photo credit: Philamer Batangan and the Polynesian Voyaging Society





## Catalina Martinez

Catalina Martinez ([catalina.martinez@noaa.gov](mailto:catalina.martinez@noaa.gov)) is Equity Advisor, NOAA Ocean Exploration, Narragansett, RI, USA.

I didn't have a direct path to ocean sciences. I grew up in Providence, Rhode Island, in a hard-working, traditional Cuban immigrant family that didn't believe education was important for girls. Despite my lack of schooling, I was always fascinated by nature, especially water bodies—even puddles! I wanted to know what lived in them and what the bottom looked like. Looking back, my love of the natural world was ever present.

Leaving home as a teenager, I started the long journey toward obtaining the education and life of my choosing. I chipped away at my education for many years while working multiple jobs at a time. I had several impactful work experiences, including helping to start an alternative middle school that served children at serious risk of dropping out, and advocating for women and children who were victims of abuse. I acquired new skills and perspectives that translated well for all that was to come.

My inherent curiosity and fascination with nature led me to explore the coastline in Rhode Island, and I fell in love with the ocean. I wanted to learn everything I could about this mysterious, dynamic system and all the weird and wonderful creatures that existed because of it. Once I got to a point where I could enter college full time, I decided to study biological science, even though I had very little academic preparation.

As a nontraditional, Latina, older student, I met faculty and staff who became my mentors, friends, and champions, and through their powerful networks, had opportunities beyond my wildest imagination, including studying coral reef fish in the Caribbean. These connections led me to graduate school, where I studied fish reproduction for my first master's degree in oceanography, and quickly realized that I needed to incorporate the "human" aspect of science back into my journey. I then completed a second master's degree in marine affairs, which led me to the prestigious Sea Grant Knauss Fellowship that catalyzed my two-decade career with NOAA Ocean Exploration (OE). I spent many years with NOAA OE working to help develop the telepresence-enabled operating models now employed on various expeditions to explore the ocean and also to mitigate the barriers to entry, persistence, advancement, and success for minoritized and marginalized groups in STEM. As a lifelong learner, I went back to college a few years ago and completed an MBA, and I'm currently training to become a professional coach.

I overcame tremendous odds to find my way into a STEM career, but I remain the exception and not the rule, so I'm committed to lowering the bar for all those who come after me. From my new position as Equity Advisor for NOAA OE, I can do this work more fully and focus my energy on identifying and mitigating barriers, developing new opportunities, and opening doors that might otherwise remain closed, while helping to ensure a more diverse, inclusive, equitable STEM environment for those to come. I have no doubt that the next generation of diverse scholars will lead us into a more innovative and hopeful future if given the chance, as we all reimagine a better way forward, together.

## Vernon R. Morris

Vernon R. Morris ([vernon.morris@asu.edu](mailto:vernon.morris@asu.edu)) is Foundation Professor and Associate Dean, Knowledge Enterprise and Strategic Outcomes, New College of Interdisciplinary Arts and Sciences, Arizona State University, Phoenix, AZ, USA.

I am a geophysical scientist who applies physical chemistry techniques to understanding the reactivity and microphysics of airborne particulates. I have led over 25 observational field campaigns in seven countries and in three ocean basins over the past 20 years.

I focus largely on two environmental regimes: (1) the tropical Atlantic Ocean, across which mineral dust aerosols originating from the Saharan desert travel and influence regional scale air chemistry, cloud microphysics, food security, and human health, and (2) densely populated urban zones in the United States, in sub-Saharan Africa, and in the Philippines. One of my multi-year field campaigns, the AERosols and Ocean Science Expeditions (or AEROSE), has led to the generation of the most extensive set of in situ observations of the Saharan Air Layer in the tropical Atlantic. These data have been used for improved satellite retrievals of ocean properties; data assimilation for hurricane and tropical storm forecasts; validation of numerical weather prediction models; and improved parameterizations for atmospheric chemistry models. Early in my research career I discovered the first observed “roaming radical reaction,” which led to me being credited with starting a new subfield of chemical physics.

My career trajectory has been determined more by a multitude of unexpected encounters, seized opportunities, and seemingly wrong turns rather than any long-term plan. I enrolled in a small liberal arts college with no idea what major to select. I double majored in chemistry and mathematics because of a freshman year conversation that resulted from a physical collision with a chemistry professor in a campus building hallway. That professor offered me a research job on the spot that was the difference between dropping out that semester and graduating four years later as a new parent. I completed my PhD degree five years after that with a personal commitment to expand opportunities for individuals who had encountered similar challenges and racial traumas that I had to endure as the lone and first African American to earn a PhD from my graduate program.

Nearly 30 years of educational and professional experiences have confirmed my belief that my success as a leader in my field of study and in the academy is an act of resistance to a dominant culture of White privilege and exclusion. Overt racism has become more muted, but the structural aspects remain largely intact. I continue to advocate for change, and I have demonstrated how that change can be realized through the programs that I have created and sustained. For example, the graduate program that I designed and launched in 1996 has produced more African American PhDs in atmospheric science than the combined output of all other atmospheric science programs in the United States.

I’m proud of this work, but concerned that scientists who pursue mentoring, program building, and community engagement are often seen as good at those tasks instead of being good at science, rather than in addition to them. I’ve felt the impact of this widespread belief in my own career. Successful mentoring, program building, and community engagement require scientific acumen. My activities in this vein have been strengthened by my research skills, and my research has also been strengthened by these other activities, enabling me to ask questions and propose research methods not being done elsewhere.



Vernon Morris performs scientific demonstrations for middle school students at a charter school in Washington, DC. Photo credit: Kimberly Smith



Michael Navarro in Southeast Alaska. In the background is Áak'w T'áak Sít', known briefly as Mendenhall Glacier. Áak'w T'áak Sít' is the original and correct name for the glacier and translates to "the glacier behind the little lake."

## Michael Navarro

Michael Navarro ([monavarro@alaska.edu](mailto:monavarro@alaska.edu)) is Associate Professor of Marine Fisheries, Department of Natural Sciences, University of Alaska Southeast, Juneau, AK, USA.

I harbor a deep passion for the ocean, and metaphorically, saltwater courses through my veins. I am lucky to be able to work with the ocean in Southeast Alaska as a guest of the Lingít Kwáan on Lingít Aaní (Tlingit peoples on the land of the Tlingits). In my role as a biological oceanographer and Associate Professor of Marine Fisheries at the University of Alaska Southeast, I delve into the intricacies of climate change, continental shelf ecology, emerging fisheries, and seafood security, utilizing forage species like herring and squid as models.

My bond to the ocean tracks back to a moment in the early 1990s during my high school years at Long Beach Polytechnic, California. While on an overnight field trip at Catalina Island Marine Institute, my first experience snorkeling at night was the catalyst. Amidst the darkness, the spectacle of bioluminescent organisms in the seawater, the distant city lights of Los Angeles, and the brilliance of stars converged, forging a profound connection to the life in the ocean and to the universal uniqueness of life in general. I was hooked.

Presently, my focus on studying squid not only leads me to new, exciting, and under-explored oceanic realms but also contributes to addressing knowledge gaps crucial for stabilizing food security and aiding communities. I thrive on acquiring new knowledge through the scientific method and am equally devoted to guiding emerging scientists into the realm of oceanography.

My journey in oceanography is interwoven with the love and support of my family and friends, and these relationships are the foundation for both my identity and my scientific pursuits. Drawing strength from my Chicano heritage, I leverage qualities of community, endurance, and determination to create needed space for others also from under-recruited communities interested in gaining a career in the ocean sciences. The ocean, a global connector of peoples, brings me the joy of collaborating with people worldwide, fostering meaningful connections that transcend boundaries and culminate in inspiring scientific collaborations.

While oceanography spans vast geographical and cultural landscapes, there remains a pressing need for greater scholastic recognition and opportunities, particularly for Chicanos, Latinos, and Indigenous peoples. It is imperative to provide avenues for these under-recruited groups to make merit-based contributions officially acknowledged through publication and funding. By doing so, all oceanographers will benefit because we will improve both the quality and capacity for oceanography as a whole. New clusters of impactful discoveries will inspire scientific growth to reach new heights.

Aspiring oceanographers, I implore you to follow your scientific curiosities, as they are integral to your intellectual development. These curiosities will lead you to other scientists who share your passions and to niches within oceanography where you can find meaningful work. Also, take the time to establish clear work boundaries, as these will protect your work-life balance. Be bold and explore the unknown. In doing so, you may discover that your family, culture, and core values are with you throughout your scientific journey. Dare to swim in the dark, and you may find the most illuminating discoveries of all.



## Jacqueline L. Padilla-Gamiño

Jacqueline L. Padilla-Gamiño ([jpgamino@uw.edu](mailto:jpgamino@uw.edu)) is Associate Professor, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, USA.

I am a marine biologist working on ecophysiology and reproduction of marine animals and algae. Originally from Mexico, I earned my bachelor of science degree in oceanography from the Universidad Autónoma de Baja California. Seeking further education, I traveled to the United States for MS and PhD degrees, and I am currently an associate professor at the University of Washington.

From my early years, a deep fascination with the ocean, and its creatures fueled my curiosity. At first, I was not sure I wanted to become a scientist or teach at a university—when I was young, I never met a scientist, so it was a foreign concept. The first significant challenge in my scientific journey was leaving my family in Guadalajara to pursue my career in Ensenada, a city far away from home. In Mexico, it's common for people to stay close to home for college, so my decision required considerable courage and passion to follow my dream. I am immensely grateful for the support of my mother in embarking on this adventure.

Studying near the ocean and discovering the marvelous creatures of the sea during my undergraduate years was fantastic. Engaging in various research projects provided me with diverse experiences that solidified my commitment to a career in marine biology. Following my undergraduate studies, I pursued graduate education in the United States. The initial period was challenging, particularly due to immersion in a new language and a different culture along with the complexities of scientific study. Graduate school was a voyage of self-discovery and empowerment. Two of my most significant achievements were designing and conducting my experiments and developing confidence in my ideas.

Throughout my career, I have had the opportunity to visit many places worldwide and establish connections with friends, peers, and mentors from different backgrounds and perspectives. My partner has given me incredible support for the last 20 years. Many significant academic milestones coincided with defining moments in our lives—meeting in college, marrying during graduate school, the birth of our first child during my postdoctoral research, and the arrival of our second child when I accepted a faculty position at the University of Washington.

Like any sea, life is not always calm. Storms of change tested us both professionally and personally. Yet, in the face of adversity, we find strength in doing what we love and always find time to be together as a family. Responding to challenges requires openness, creativity, the courage to embrace complexity, and hard work.

Being a scientist from an underrepresented background can present unique challenges, but it also offers the opportunity to bring diverse perspectives and contribute to the advancement of science in meaningful ways. To those on a similar path, I offer this: navigate with confidence, seek and give support, and embrace your unique perspective. In doing so, you not only empower yourself but contribute to a tapestry of voices shaping the future of science. Your journey has the potential to inspire positive change for generations of scientists yet to come.



Exploring the intertidal zone in Puget Sound, Washington, with daughter Malena and son Tristan. Photo credit: Pablo Duarte-Quiroga



Supporting marine restoration and stewardship activities in Hawai'i is Noelani's kuleana as a kanaka (Native Hawaiian) scientist (photo taken on Kaho'olawe, Hawai'i).

## Noelani Puniwai

Noelani Puniwai ([npuniwai@hawaii.edu](mailto:npuniwai@hawaii.edu)) is Associate Professor of Mālama 'Āina, Kamakakūokalani Center for Hawaiian Studies, University of Hawai'i at Mānoa, Honolulu, HI, USA.

*Where does the Ocean begin?* Seemingly a simple question, this query has lead me on a deeper journey to explore my Islands of Hawai'i and how people broadly connect with the ocean, and to expand my unconscious and physical understanding of the ocean. I was raised on Moku O Hawai'i, in the tidepools of Kapoho, the lava benches of Ka'ū, and the black sand beaches of Hilo One. My love for these places has shaped me, and in my current job in Hawaiian studies, I share my passion and understanding of the ocean through the courses I teach and through my research supporting Hawaiian coastal communities.

I have lived the dream: working on large research vessels; diving deep in submersibles; analyzing hours of video collected by remotely operated vehicles; scuba diving to assess reef, fish, and invertebrate health; modeling ideal surf quality; practicing hula; paddling wa'a (canoes); walking the coastline; and conducting coastal transects to understand ecological abundance. Trained by many amazing, dedicated mentors, both at home and away, it was a journey not typical for Native Hawaiians. Although many Hawaiian kids say they want to be marine scientists when they grow up, I found there were few Hawaiian (or other Indigenous) marine scientists or oceanographers to follow, and few jobs to support or entice students into this field. To be a marine scientist, I was expected to leave home, to travel and study broadly. I did that, briefly, but I came back and developed a stronger purpose and vision for my career. Raising my children and advancing my research within marine ecology and ocean management, I began to see how our individual, modern science practices were limiting our understanding of the ocean and instead recognized the depth of knowledge in my ancestral ways of knowing. I knew that to realize my goal, not only of being a scientist but also of being someone working toward the health and abundance of my ocean, I needed to find more tools and more allies and to build on my cultural foundation.

Our ocean is suffering from a lack of care, not a lack of science. I am so grateful for my colleagues who have joined me on this path, seen this larger vision of how science has the kuleana (obligation) to ensure our ocean's health and survival. My passion for the ocean has taken me around the world and deep within my culture, fighting for the kai (coastal ocean) and a decolonial approach to research. This new paradigm of socio-oceanography recognizes the intimate connections that many cultures around the world have to our ocean. Through our ancestral practices, our ways of knowing, my people are reclaiming our space as leaders of ocean health and management. My kids know that they can be scientists, that their ancestors were scientists. I am excited to be witness to this next generation of students caring for Moananuiākea (broad Pacific ocean), who bring with them their culture, their kuleana, their aloha, and their spirit to ensure a healthy, abundant oceanic future.



## Christina Ravelo

Christina Ravelo ([acr@ucsc.edu](mailto:acr@ucsc.edu)) is Distinguished Professor, Ocean Sciences Department, University of California, Santa Cruz, CA, USA.

I am a paleoceanographer and have been a faculty member in the Ocean Sciences Department at the University of California, Santa Cruz, for over 30 years. In many ways, this is the perfect job for my interests and goals. I get to do my part to fulfill the educational mission of a public minority serving institution, to advance a scientific field that fascinates me, and to serve and support my professional community. My personal identity as a scientist is complicated. I am the daughter of immigrants; my parents, one from Cuba and the other from the Philippines, met each other and decided to settle in the United States. My very large extended family of over 20 *tias*, *titas*, *tios*, and *titos*, and countless cousins, stayed in their home countries, and so while growing up in the Los Angeles area my strongest sense of belonging was with my immediate family and various immigrant groups. Starting as a girl interested in math and science, and then taking all the steps to develop into an established scientist, has been a journey of learning how to cope with a deep sense of dissonance between my own cultural identity and the cultural norms that I had to learn to be successful in academia. I experience many of the well-known internal psychological barriers for women of color in the academy—impostor syndrome, stereotype threat, identity interference. This is on top of having to deal with harassment, exclusion, and structural and implicit bias. Despite all of this, I am not bitter, and in fact, I am incredibly grateful for my amazing family, friends, and colleagues who give me the space and security to be myself.

I am often asked what I have had to do to meet challenges and to strike a healthy work-life balance. The only consistent strategy that seems to work for me, and maybe many like me, has two components. One is perseverance and resiliency—work incredibly hard and efficiently, over-prepare, and know that you must go above and beyond with extreme determination to prove yourself. The second is community—find those who give you a safe space to cry, laugh, vent, struggle, regroup, innovate, and hope. I see this as a strategy of survival. In my experience, much of the programming to advance equity and inclusion in STEM focuses on elements that help minoritized scientists assimilate into the difficult academic landscape: teach the hidden curriculum, provide special opportunities and mentoring, set up identity affinity support groups, encourage socialization to fit in, etc. However, this strategy of survival does not directly dismantle academic systems that are built on the behavioral norms and values of the majority. Nor has this strategy made significant strides in increasing the numbers of people of color in oceanography.

As I reflect on my career, I am thankful for all the support I have had that has enabled me to do what I love in teaching, research, and service to my communities. And I have hope that we can dismantle the current structures that favor one group over others and create a just system with expanded cultural norms that harnesses the power of diversity.



Christina at sea on International Ocean Discovery Program (IODP) Expedition 389, Drowned Hawaiian Reefs. Photo by Marley Parker for ECORD/IODP



Mei, her husband Wei-Cheng, and their son Kaito enjoy a visit in Taiwan, Wei-Cheng's home country.

## Mei Sato

Mei Sato ([msato@whoi.edu](mailto:msato@whoi.edu)) is Assistant Scientist, Woods Hole Oceanographic Institution, Woods Hole, MA, USA.

My research focuses on understanding how animals respond to various biological and physical environments and how the changes in their behavior and distributions affect predator-prey interactions in coastal ecosystems. I focus on mid-trophic level organisms such as zooplankton and fish, key species in the food web linking primary producers and top predators. I enjoy the interdisciplinary

nature of my research as I work to understand the complex interactions between biology and physics. Collaborations across disciplines, including with physical oceanographers, engineers, and fishers, form the essential and exciting component of my research.

Growing up in Japan, the ocean was a part of my life, ranging from swimming and fishing to the cultural importance of eating seafood and learning to prepare for tsunamis. I was first interested in ocean science through a local fisherman who had an aquaculture oyster farm near my hometown, Sendai. He planted trees on the mountain located upstream of his oyster farm to protect "his" ocean by providing nutrient-rich water to keep his oysters healthy. His efforts made me realize the importance of understanding the connectivity between marine and terrestrial ecosystems. My interest in biological-physical interactions was developed through my master's project in Maine, studying the behavioral response of zooplankton to tides using acoustics. I deployed a small, cabled observatory system off the dock of the Darling Marine Center for continuous time-series observations over a few months.

Since then, I've pursued my career as an oceanographer across three different countries (Japan, Canada, and the United States) both in academia and industry. Consequently, my husband (who works in the healthcare field) and I struggled to find a place where both of us could work. We ended up having a long-distance relationship for over 10 years, sometimes across the continent and sometimes across the Pacific Ocean. While it took us much longer than we expected to settle together in the same city, we chose to prioritize developing our careers during this time. I started my tenure-track position at the Woods Hole Oceanographic Institution during the middle of the COVID-19 pandemic. Relocation from Canada to the United States during the pandemic provided additional uncertainties and challenges for my husband as he was reestablishing his career in a different country. His compromise, patience, and incredible support have made it possible for me to pursue my career.

We now have a three-year-old son who has brought so much joy to our lives. My greatest challenge now is how to balance my fieldwork and family. In addition to full support from my husband, I have prioritized seagoing research over attending conferences. I've also proposed research projects in the New England region (closer to home) to minimize the time away from my family. I am grateful for the continuous support and advice received from past advisors and colleagues as I navigate these challenges. My son is beginning to understand my passion for ocean science through pictures of marine life I have encountered during cruises and finding hermit crabs at the beach together. In addition to tremendous joy, my family gives me the courage and energy to move forward.

## S. Kersey Sturdivant

S. Kersey Sturdivant ([kersey@inspireenvironmental.com](mailto:kersey@inspireenvironmental.com)) is Principal Scientist, INSPIRE Environmental, Newport, RI, USA.

As a science-loving inlander, I grew up believing terrestrial science was my calling. A few memorable insect encounters disabused me of this idea, so I pivoted to ocean science. As an undergrad at the University of Maryland Eastern Shore, I completed several ocean science internships to explore different focus areas while completing my bachelor of science degree in marine biology. What I learned: from worms to sea turtles, I loved it all.

At the College of William & Mary's Virginia Institute of Marine Science (VIMS), while completing my PhD on the effects of hypoxia on muddy bottoms and marine worms, I had the good fortune of working with Bob Diaz. As my advisor, Bob challenged me to grow as a scientist. He introduced me to sediment profile imagery (SPI), a technology that I went on to iterate through the development of Wormcam videos of life beneath the seafloor and socialize as Twitter's own Dr. Wormy McWormface. I didn't know it at the time, but SPI technology would have an outsized influence on my career and life journey.

Following graduate school, I spent two years at NOAA before reentering academia at Duke University. While many people had cautioned me that academia is unwelcoming to would-be boomerangers, I wasn't deterred. As a Black scientist, after all, one becomes accustomed to showing up in unexpected places.

At Duke, I matured as a scientist thanks to the wonderful tutelage of my career mentor, Cindy van Dover. Cindy guided me toward broadening my scientific focus and impact and encouraged my interest in science communication, whether as a senior correspondent at Southern Fried Science or through my active Twitter presence. During my three years at Duke, I also co-created OpenCTD and Oceanography for Everyone, an initiative that promotes and develops open-source oceanographic equipment. I also fulfilled a longtime goal of publishing a comprehensive guide on how to get into graduate school in the sciences with Cambridge University Press.

When I departed Duke in 2015 to start INSPIRE Environmental, a consulting company based around the SPI camera, few understood my decision to leave academia again. But here I had the opportunity to build an organization and shape its science, values, and culture from the ground up. It was a risk—but an irresistible one that has been transformative to my expertise as a scientist and entrepreneur. Today, INSPIRE continues to facilitate North America's offshore wind revolution, and the company is at the forefront of shaping best practices for environmental monitoring in support of the development of offshore wind.

In 2022, we completed the sale of INSPIRE to a UK-based offshore wind company. I continue to serve on the senior leadership team and steer the company toward global influence in offshore wind development. Most recently, I received a two-year appointment to the National Academy of Sciences 2025–2035 Decadal Survey of Ocean Sciences and have completed multiple professional speaking engagements. Outside of work, I am an avid traveler, surfer, skier, scuba diver, classical pianist, and enthusiastic mentor to young people exploring unconventional—or unexpected—career paths.



Kersey loves sharing his passion for science with others. Here he is discussing ocean science with students during an invited visit.





## Wendy F. Todd

Wendy F. Todd ([wtodd@d.umn.edu](mailto:wtodd@d.umn.edu)) is a Dr. Howard Highholt Endowed Professor at the University of Minnesota Duluth in the Departments of American Indian Studies and Earth & Environmental Science. She is an Alaska Native Haida from the small rural community of Hydaburg, Alaska, and grew up subsisting on the ocean.

Living in a coastal tribal community unknowingly set the stage for my life as a geoscientist and oceanographer. The interdisciplinary nature of ocean science was reflective of my training in traditional knowledge and its holistic nature from childhood; it made sense to choose a field of study that is culturally relevant. The most rewarding facets of my career are the ability to advocate for the environmental health of coastal tribal communities, to use both traditional knowledge and ocean science in my research, and to mentor Indigenous science scholars. Each of these facets provides a pathway that did not exist when I was a student and one that I hope will empower tribal communities, demonstrate the relevance of traditional knowledge, and provide a safe space for young academics to be their whole selves, as Indigenous scientists.

The greatest career challenges have been alienation as the only Native faculty in the science department and the related lack of an Indigenous science community, tokenization of identity, and the use of deficit language and the expression of uniformed opinions about traditional knowledge. These challenges have taught me to “own” my identity as an Indigenous scholar. I have done that by raising awareness of the harm imposed on diverse scholars when introduced using race, which is often a silent indicator that one holds a position because of race or ethnicity and not scholarship. I have focused my career on demonstrating the importance and relevance of traditional knowledge systems and addressing the resistance of the science community to using multiple knowledge systems simply because they are not Western based. How are we doing science if we reject knowledge?

Last year, I began instructing a new course on traditional knowledge systems and STEM for science majors at the University of Minnesota Duluth. In 2020, with funding from the US National Science Foundation, I founded the Indigenous Geoscience Community to create a safe space for all Indigenous scientists to come together in a supportive and collaborative network of scholars and cultural practitioners to celebrate the diversity within Indigenous knowledge. The beauty of my research is that it is closely associated with my personal life as a Haida scientist, allowing me to maintain a work-life balance. My research site is on tribal land and has a rich cultural history that supports my research findings. This wasn't always the case, and only by understanding my cultural responsibility as a Haida woman did I begin to make a conscious effort to have balance in my life. It has allowed me not only to have balance but also to redefine the concept of a successful career. Science disciplines are slowly changing due to the increase in diverse scholars entering the field, ensuring that equitable educational, research, and career opportunities are available to all science scholars. For young scholars, I encourage you to redefine success to fit your career goals, find a mentor who helps you flourish, and recognize your value in your chosen career field.



## Lisa D. White

Lisa D. White ([ldwhite@berkeley.edu](mailto:ldwhite@berkeley.edu)) is Director of Education and Outreach, University of California Museum of Paleontology, University of California, Berkeley, CA, USA.

My scientific interests include micropaleontology (fossil diatoms and foraminifera), Earth and ocean science education, and developing strategies to increase diversity, equity, inclusion, and access in paleontology and oceanography. Currently, I am the Director of Education and Outreach at the Museum of Paleontology at the University of California, Berkeley. Prior to coming to UC Berkeley in 2012, I had a 22-year career at San Francisco State University as Professor of Geosciences, including four years as Associate Dean of the College of Science and Engineering.

My career pathway has been anything but direct, and my first major in college was not Earth or ocean science. Growing up in San Francisco in the 1970s with two older sisters and parents who were active in civil rights and social justice, I was more interested in culture and music, the visual arts, and photography. Drawn to landscape photography, I had ambitions to be the African-American female Ansel Adams. Curious about how landscapes form, I took a physical geology class for a general education requirement as an undergraduate at San Francisco State. I became completely fascinated with Earth science, and soon thereafter changed my major to geology.

As I moved along in the major, I was fortunate to intern at the US Geological Survey (USGS), where my interests in paleontology and oceanography began to develop. When I discovered the field of paleoceanography, I thought what better way to combine the two disciplines most fascinating to me. At the USGS I met my first female mentors and witnessed their struggles as women geoscientists in the 1980s. I admired the ways in which they forged ahead, managing and overcoming obstacles at every turn. It further drove my motivation to continue my training in pursuit of a career in geoscience.

While in graduate school at the University of California, Santa Cruz, I got my first taste of seagoing research as a shipboard scientist onboard the International Ocean Discovery Program (IODP) drillship *JOIDES Resolution*. Two months in the Japan Sea as part of a team of IODP scientists was intimidating at times, and the voyage had daily challenges rooted in both ship hierarchy and IODP culture. As an African-American woman and early career scientist trying to navigate a lengthy expedition, I often felt like I barely had a voice.

Thirty years and multiple expeditions later, I am part of a community of diverse Earth and ocean scientists focused on recruiting and retaining individuals traditionally under-represented in our discipline. From co-leading the STEMSEAS (STEM Student Experiences Aboard Ships) program for undergraduates on exploratory oceanographic cruises to directing the VOICES (VOICES of Integrating Culture in the Earth Sciences) program, these efforts promote belonging, inclusion, and a much-needed cultural shift in the way we train future ocean scientists.

I enjoy living in my hometown of San Francisco where access to the ocean, the mountains, and my favorite parks is a stone's throw in any direction. My roots run deep in the Bay Area and the time I spend with my wide circle of friends and family provides balance between my career and personal life.



Lisa White with Morehouse College student Leland Jones during a STEM Student Experiences Aboard Ships expedition onboard E/V *Nautilus* in the Saanich Inlet, British Columbia.



## Dawn Wright

Dawn Wright ([dwright@esri.com](mailto:dwright@esri.com)) is Chief Scientist of the Environmental Systems Research Institute (Esri) and Professor of Geography and Oceanography, Oregon State University, Corvallis, OR, USA.

What a time we're living in—in terms of the sheer power and impact of women's voices! As Physics Nobel Laureate Donna Strickland noted upon receiving her prize, "We need to celebrate women physicists because they're out there...I'm honored to be one of those women."

So too is the case with oceanography. We need to celebrate the women of oceanography because we're also out there. And I'm exceedingly proud and honored to be part of a field that is literally saving the world. For me, it all started in the Hawaiian Islands where I was raised. My summers included many hours spent in the waves, but also with ample time for reading. The book that captured my imagination above all others was Robert Louis Stevenson's *Treasure Island*. And Flint's treasure map, in particular, fascinated me: the shapes of the landforms, the colors, the arrow pointing north. Not only was I set on a permanent heading toward a love of pirates and pirate lore—I also wanted to know how to make maps myself.

This curiosity ended up launching my career of making real treasure maps of the ocean floor. I studied geology as an undergraduate at Wheaton College, then oceanography at Texas A&M University for a master's degree. Next, I became a seagoing marine technician for three years aboard the scientific drilling vessel *JOIDES Resolution*. And then, while a doctoral student at the University of California, Santa Barbara, and a few years after the deep-sea vehicle *Argo I* was used to discover the wreck of RMS *Titanic*, I was presented with some of the first geographic information system (GIS) data sets collected by *Argo I*. It was then that I became acutely aware of the potential of using GIS to analyze and make treasure maps to bring scientific insight into the deepest ocean. This has been a driving force in my work while completing oceanographic fieldwork in some of the most geologically active regions on the planet, including the East Pacific Rise, the Mid-Atlantic Ridge, the Juan de Fuca Ridge, the Tonga Trench, and American Samoa. And then in 1991, I became the first Black female to dive to the deep ocean floor in a research submersible. On July 12, 2022, thanks to explorer Victor Vescovo and his Caladan Oceanic team, I was proud to become the first Black person of any gender to dive to Challenger Deep, while also successfully operating a portable side-scan sonar at full ocean depth.

It has all seemed liked a pirate's dream adventure, with its share of privations as well as thrills. But key to this, dear reader, especially for a woman of color, is to bravely and unabashedly be yourself; believe in yourself; wisely choose good shipmates and allies; boldly hoist the flag of freedom, inclusion, courage, and integrity; and be (paraphrasing Oliver Wendall Holmes) determined not to go to the end with your music still inside of you, no matter what the stage of your life or profession! Please feel free to explore more at <https://dusk.geo.orst.edu/>.

Dawn Wright practices entry and exit from the submersible *Limiting Factor* before making her dive to Challenger Deep on July 12, 2022. Photo credit: Kate Wawatai, Caladan Oceanic, with Dawn's iPhone







1 Research Court, Suite 450-117  
Rockville, MD 20850 USA  
[tos.org](http://tos.org)

DECEMBER 2023

