



Center for
Marine Biodiversity
& Conservation

Annual Report

July 1, 2020 - June 30, 2021



UC San Diego



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OCEANOGRAPHY

Our Mission

The Center for Marine Biodiversity and Conservation (CMBC) seeks to facilitate the translation of science to ensure its effective use in maintaining the integrity of ocean ecosystems in the face of unprecedented global change.

Note from the Director

It was with limited fanfare that CMBC reached a milestone this year, passing our 20th year of activity here at Scripps Oceanography. Given the recent challenges facing us all, we were content to use this milestone as a time for reflection of the successes in-hand and the opportunities ahead.

The CMBC community came together this past year, finding creative ways to maintain research programs, adapt teaching curricula, and tailor programming in the new global climate. We include updates on some of these efforts in this annual report, and more is still to come. From my perspective, the most impressive part from the past year was the steadfastness and sustained focus of our CMBC community. With countless personal and professional struggles upon each of us, we watched people adapt to current conditions -- teaching over video, attending international meetings in the middle of the night, and providing continued support to colleagues at home and abroad. Thank you to the entire community for coming together to advance our shared, ocean-facing objectives.

The global challenges that face the ocean and its biodiversity remain, however, and the need for ocean science and learning is only growing. I take inspiration from the international call to action that aligns with the third decade of CMBC activities. Responding to the global need for more reliable and actionable knowledge about the ocean, this year the United Nations launched the *Decade of Ocean Science for Sustainable Development* (2021-2030). Our CMBC community is committed to make this into as impactful of a decade of ocean learning and action as possible.

It is only with the support from our broader CMBC community that we can continue to provide knowledge and leadership on ocean issues. Thank you all for your sustained involvement with CMBC and with the ocean species and ecosystems that bring us all inspiration.

Looking forward to seeing you all as soon as we can,



Stuart Sandin

Professor, Oliver Chair in Marine Biodiversity and Conservation Science
Director, Center for Marine Biodiversity and Conservation (CMBC)
Scripps Institution of Oceanography, UC San Diego

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Cover photo: Students taking measurements in the field. Courtesy of Dick Norris.

Updates

Marine Conservation and Technology Facility (MCTF)

The new Marine Conservation Technology Facility (MCTF) is slated to become the ‘epicenter’ of CMBC. The original NOAA Southwest Fisheries Science Center is being transformed into a modern facility that will provide invaluable physical infrastructure to support current and expanding programming from the CMBC community. While the affiliated faculty, students, and staff of CMBC will maintain their presence in buildings and departments across the SIO and broader UC San Diego campus, MCTF will provide a second home for meetings, convenings, and other events. Further, MCTF will contribute to the continued evolution of SIO campus, providing new undergraduate and graduate teaching and research facilities for the entire SIO community. Construction is well underway and completion and move-in are scheduled for early 2022. Keep an eye out for future announcements about the opening of our new building and opportunities to visit in-person.



A rendering of the new facility. Photo courtesy of Safdie Rabines Architects

NSF INCLUDES Planning Grant Award

The unequal participation by, and historic lack of institutional support for, underrepresented minority (URM) students, faculty, and researchers has been well documented in not only academia at large, but specifically in the marine and geosciences. This is just one of the symptoms of systemic racism in the United States and around the world. Over the past year, UC San Diego and Scripps have fortified existing efforts, and undertaken new initiatives and listening sessions to improve and engrain our community’s commitments to anti-racism, inclusivity, equity, and diversity.

Recognizing the active role our teaching programs need to play in improving the experience and outcomes of all students, especially our Black, Brown, Indigenous, and other minoritized groups, a team of CMBC faculty and staff, led by **Jeff Bowman** (Assistant Professor, Scripps Oceanography), was awarded a planning grant from the National Science Foundation INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science) program. The planning grant project supports the establishment of new partnerships and a strengthening of existing partnerships across programs at Scripps, UC San Diego, and California State University (CSU). The CSU system has been hugely successful at welcoming and serving URM students and we have been grateful to learn from them and work together through a series of listening sessions and workshops. The planning grant effort will wrap up Fall 2021 with submission of a large grant proposal to implement new training and fellowship opportunities in 2022. Beyond this one proposal, we will continue to pursue funding opportunities and grow existing and new partnerships to champion and embody the principles of equity, diversity, and inclusion. *Special thanks to other participating faculty, notably **Anela Choy**, **Amina Schartup**, and **Fonna Forman**, for their leadership in this project.*

Sustainable Seafood - PriceSmart Latin America

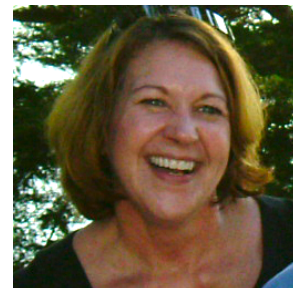
Sustainable seafood has long been a pillar of our work at CMBC. CMBC is building off our 2018-2019 partnership with PriceSmart to support their vision to offer quality and sustainable seafood products to their members. Our 2021-2023 project will expand out the 2018 baseline study of seafood sourcing to 13 additional countries across PriceSmart's Caribbean and Latin American stores. We will provide systematic and scientific assessments of available global and local markets, as well as recommendations and training for buyers based on the results.

Global Links for Islands and Marine Restoration (GLIMR)

CMBC partnered with Island Conservation to convene a research working group on the topic of impacts of invasive species (and their removal) on terrestrial-marine ecosystem interactions. Recent studies have indicated that management actions on islands can be linked to shifts in adjacent marine ecosystems, but the generality of this linkage remains unexplored. We have linked the academic strength of SIO with the management focus of Island Conservation to establish the state of the science in the field, identifying the 'known and unknown' in our understanding of land-sea connections on islands. With a grant from The Nature Conservancy and support from our donors, CMBC and Island Conservation has partnered with over 20 academics and practitioners to review literature on island-ocean interactions and identify areas for additional research. CMBC students **Natalia Erazo** (Ph.D. candidate), **Mariela Rios-Alcubilla** (MAS MBC '21) and **Ceiba Becker** (MS candidate) have been instrumental throughout the entire project.

Personnel

CMBC said "fair winds and following seas" to **Penny Dockry**, our Center's Operations Manager of 18 years, upon her retirement in June 2020. Penny was with CMBC since the beginning and was critical to making every program dreamed up by our enthusiastic leadership into reality. Penny's legacy is woven into the fabric of CMBC, and we are grateful for all she gave of her professional career and personal spirit to the Center.



Allison Kellum was hired in August 2020 as the new CMBC Operations Coordinator and has been working hard to fill our organization's central role, serving as a hub for researchers, students, and our partners on all projects, initiatives, and events. Allison is an MAS MBC '18 alumna with over 10 years of experience in education, program administration and management, policy, communications, and the public sector. Allison is now splitting her time between her home office and Hubbs Hall, she is best reached via email: akellum@ucsd.edu.

Events

For much of the past year CMBC has been operating remotely. We were very proud to continue our flagship public events and deliver new programming in virtual formats. Moving to virtual has opened the door for new audiences and levels of engagement with existing Center members and friends.

Fishing for the Future/Salty Cinema LIVE!

January 28, 2021

Our Salty Cinema alumni team and CMBC program staff worked in partnership with Scripps Institution of Oceanography's Development to host a two-part event around the theme of sustainable seafood. The 2021 *Fishing for the Future: Salty Cinema LIVE!* program included a ticketed fine dining experience - to benefit the construction of the new MCTF building - coupled with a free public multimedia livestream. The entire program centered on the perennial question - "*how do consumers decide what seafood to eat?*" and reached over 8,000 people from a global audience in 10 countries.



Our esteemed panelists were **Veta Wade** (Fish 'N Fins Inc., Aqua Monserrat), **Ian Urbina** (The Outlaw Ocean Project and *New York Times* journalist), **David Price** (PriceSmart Inc.), **Bren Smith** (Greenwave, Thimble Island Ocean Farm), **Sara McDonald** (Seafood Watch, Monterey Bay Aquarium & CMBC visiting scholar). The panel was moderated by CMBC Director, **Stuart Sandin**. A [recording is available on CMBC's YouTube channel](#).



We thank Mary Yang for her current support of Salty Cinema, as well as our alumni team for their incredible artistic and scientific vision and talent. Many thanks to our local sponsors at The Fishery and Cutwater Spirits for providing delicious food and beverages to our at-home dining-experience attendees. Entering 2021-2022 we plan to resume a more regular schedule for these twice-annual film screening and panel discussion events.



Salty Cinema is intended to be a community supported forum. If events like these are of value to you and the community and you have the ability, please contribute to our costs.

Clockwise from top left: Veta Wade, Ian Urbina, Bren Smith, Stuart Sandin, Sara McDonald, and David Price.

Click [here](#) to support the future of Salty Cinema.

Annual Knowlton-Jackson Lecture

February 4, 2021

We were glad to be able to hold our postponed 2020 Annual Knowlton-Jackson Distinguished Speaker in Marine Biodiversity and Conservation Lecture on February 4, 2021, via Zoom Webinar.

Our alumni speaker, **Dr. Mike Navarro (Ph.D. '14)**, focused his talk on climate change impacts on forage fish in southeast Alaska, work that Dr. Navarro completes while helping to develop resilient researchers from highly impacted rural communities. Dr. Navarro highlighted not only the indigenous heritage and stewardship of his now-home of coastal Alaska, but also the importance of going beyond “interdisciplinary research” of Western-centric academia and colonial perspectives, to true partnership and co-production of knowledge.

Dr. Patricia Majluf was this year’s Distinguished Speaker and shared her journey from being a dedicated research scientist through to applying that research to action as Peruvian Vice-Minister of Fisheries, and now Vice President for the Peruvian chapter of Oceana, the largest international NGO fully dedicated to protecting the global oceans. Dr. Majluf detailed her quest to revolutionize the anchoveta fishery in Peru, made possible by creative partnerships including chef and graphic designers, shifting the way Peruvians eat and manage their fisheries resources.

We reached 162 viewers day-of and held several meet-and-greets with 20+ graduate students (Ph.D., M.S., and MAS MBC) to connect directly with our speakers. A [recording is available on CMBC’s YouTube channel](#).

We offer sincere thanks to Margaret Leinen for her warm welcome, Sarah Mesnick for her expert moderation of the Q&A, and Nancy Knowlton and Jeremy Jackson for their initial vision and continued generous support of this speaker series.

Plastics Awareness Global Initiative (PAGI), Scripps-Rady Ocean Plastic Pollution Challenge

January - June 2021

Building off of the learnings and success of our 2018 Plastics Awareness Global Initiative (PAGI) four-day workshop and public events, CMBC members **Ayelet Gneezy** (Professor, Rady School of Management) and **Stuart Sandin** created the [Scripps-Rady Ocean Plastic Pollution Challenge \(Challenge\)](#). This 6-month accelerator program focused on building a community of ocean leaders. We invited students and colleagues to join this program with a goal to identify effective, evidence-based approaches to curb the flow of plastic into the ocean, with a specific focus on marine conservation and marine cultural preservation areas along California’s coast.

The inaugural program ran January - June 2021, and participants engaged in a series of short courses, team research, and a multi-day challenge to pitch solutions to a panel of judges. The Challenge attracted 280 applicants, and 50 talented, diverse, and open-minded professionals and graduate students were chosen to participate: 21 for the short course component only, and 29 for the full program. Participants spanned 9 countries, and several had current or alumni associations with UC San Diego. The June 8,

2021, Challenge finale where teams pitched their proposals attracted a global audience from 27 countries, including 394 registrants and 223 unique viewers day-of. The recording can be viewed [here](#).

This multi-stage program provided skills in solving complex problems, space for participants to build a systems perspective of the plastic pollution problem, and interdisciplinary teams to break out of their silos and develop new strategies. The Challenge focused on systemic, upstream solutions to reduce plastic production and reduce the proliferation of plastic waste. Course moderators, panelists, research mentors, and judges lent their expertise from a wide variety of institutions and sectors, including Pew Charitable Trusts, California Ocean Protection Council, the State Water Resources Control Board, NOAA Marine Debris Program, Tijuana River National Estuarine Research Reserve, American Museum of Natural History, Smithsonian Institution, Harvard Business School, elected officials, and many others.

The Scripps-Rady Ocean Plastic Pollution Challenge marks not only a new program, but also a new partnership between the CMBC at Scripps Institution of Oceanography, and the Center for Social Innovation and Impact at the Rady School of Management at UC San Diego. The interdisciplinary approach of the partnership between Scripps and Rady leveraged multidisciplinary expertise to design solutions and allowed participants to build from insights and experiences from the diverse expertise from across Scripps, Rady, and the rest of UC San Diego.

The Scripps-Rady Challenge was made possible by generous support from our philanthropic community, including Igor Korneitchouk and Ursula Korneitchouk who helped envision the initiative from its earliest stages. An immense thank you to project managers **Holly Rindge (MAS MBC '12)** and **Charlotte Stevenson** for their tireless work on the program, as well as numerous panelists, mentors, judges, research assistants, and partners.

Learn more on the [Challenge's website](#).

"Marine plastic pollution is a social-ecological problem that needs interdisciplinary perspectives to be solved."



Dr. Kristen Goodrich,
Challenge Short-Course Moderator
and Coastal Training Program Coordinator,
Tijuana River National Estuarine Research Reserve

Research Highlights

Over 100 affiliated researchers and faculty are members of CMBC. This section only scratches the surface of some of their accomplishments from the past year.

Marine Biodiversity

Greg Rouse, Professor, Scripps Oceanography and Curator of Benthic Invertebrates, **reports:**

The Spineless Lab (Greg Rouse, students, and collaborators) published 8 new species descriptions of invertebrates in 2020-2021. In one study, led by Ph.D. student Marina McCowin, three new species of deep-sea *Bathymodiolus* mussels were named from methane seeps off Costa Rica.



Cover of *Molecular Ecology* journal featuring leafy seadragon research.



Two species of *Bathymodiolus* mussels surrounding some dancing yeti crabs.

Another study, on population genetics on leafy seadragons appeared, was led by former PhD student Josefin Stiller (now at the University of Copenhagen). This study highlighted the utility of next generation sequencing methods and inferences they allow about population changes in recent time scales. Leafy seadragons live along part of the southern Australian coast and during recent Ice Ages lost much of their habitat as the sea retreated from the shallow continental shelf. Postglacial sea-level rise allowed leafy seadragons to recolonize the western part of their range from a more eastern location. In the east, shallow seabed persisted during the last Ice Age, and these increased considerably after the flooding of large bays, which resulted in strong population expansions, deeper genetic structure, and higher genetic diversity. Another study on weedy seadragons is coming soon.

McCowin MF, Feehery C & Rouse GW. 2020. Spanning the depths or depth-restricted: Three new species of *Bathymodiolus* (Bivalvia, Mytilidae) at seeps along the Costa Rica margin. *Deep-Sea Research Part I: Oceanographic Research Papers* 164:103322.

Stiller J, Fonseca RRd, Alfaro ME, Faircloth BC, Wilson NG & Rouse GW. 2021. Using ultraconserved elements to track the influence of sea level changes on leafy seadragon populations. *Molecular Ecology* 30:1364-1380.

Phil Hastings, Professor, Scripps Oceanography and Curator of Marine Vertebrates, reports:

The Hastings Lab continues its work on fish taxonomy and ecology. I described a new species of blenny, named the “Pandemic Blenny” in recognition of this challenging year. Our lab has also documented numerous unusual fish occurrences during the warm water period in the Southern California Current System 2014-2018. Most of these fish were from the Tropical Eastern Pacific (TEP) off the coast from Baja California, Sur down to the Gulf of Guayaquil, Peru. Of note, we also described the triennial migration patterns of critically endangered soupfin shark in a publication supported by numerous CMBC researchers and co-authors.



Photo of newly described “Pandemic Blenny,” *Coralliozetus clausus*.

- Hastings, P. 2021. The Pandemic Blenny, *Coralliozetus clausus*, a new species of tube blenny endemic to Isla del Coco, Costa Rica (Teleostei: Chaenopsidae). *Zootaxa*. 4926(2): 296-300. Press release available [here](#).
- Walker, et al. 2020. Unusual occurrences of fishes in the Southern California Current System during the warm water period of 2014–2018. *Estuarine, Coastal and Shelf Science*. 236 (2020) 106634
- Nosal, A., D. Cartamil, A. Ammann, L. Bellquist, N. Ben-Aderet, K. Blincow, E. Burns, E. Chapman, R. Freedman, P. Klimley, R. Logan, C. Lowe, B. Semmens, C. White, and P. Hastings. 2021. Triennial migration and philopatry in the critically endangered soupfin shark (*Galeorhinus galeus*). *Journal of Applied Ecology*. <https://doi.org/10.1111/1365-2664.13848>

Brice Semmens, Associate Professor, Scripps Oceanography, reports:

The Grouper Moon Project, a long-term conservation research and monitoring program in the Cayman Islands aimed at recovering critically endangered reef fish, produced several peer-reviewed publications that, collectively, tell a story of sustained conservation success.

The first of these, published in PNAS, uses two decades of observations at fish spawning sites to reconstruct population growth following protections. The press release for the study is [here](#).

Another [study](#) demonstrated that this population growth was driven largely by a single recruitment pulse (a single year when a large number of baby grouper settled in the islands) -- and highlighted the need for long-term, sustained protections in order to spur recovery. That is, because recruitment is sporadic for this species, protections should be designed to allow for infrequent recruitment events, in addition to population growth following such events.

Finally, we published long-term acoustic tagging and movement data from the same population to demonstrate that fish maintain the same territories over multiple years (see article, [here](#)). In doing so, we demonstrated that spatial protections (MPAs) are likely to benefit individuals within them across much of their life, allowing them to become large “super-spawners.”

Michael F. Tillman, Research Associate, Scripps Oceanography, reports:

I am continuing to serve on the U.S. Delegation to the International Whaling Commission and advising on matters pertaining to aboriginal substance whaling. I continue serving as a commissioner appointed to the U.S Marine Mammal Commission.

Sustainable Seafood

Sarah Mesnick, *Ecologist and Science Liaison, Southwest Fisheries Science Center, NOAA Fisheries and Adjunct Professor, Scripps Oceanography*, **reports:**

Dr. Mesnick hosted and participated in several virtual meetings/workshops about sustainable seafood engaging with the local seafood community and beyond on developing zero waste techniques for fisheries. Dr. Mesnick continues to provide leadership for CMBC's Sustainable Seafood Initiative.

Notably, Dr. Mesnick and her team started *Fishful Future*. This collaborative project brings together scientists, fishers, chefs, processors, and entrepreneurs to investigate a wide range of opportunities that can help move San Diego toward zero waste in the seafood industry. The project is funded by a grant from NOAA Fisheries' Saltonstall Kennedy Program. **Oriana Poindexter** (co-PI), Sarah Mesnick (partner) guide the project and they invite participation across the CMBC community. Projects include fostering both culinary and non-culinary solutions to secondary cuts and seafood by-products that are currently undervalued or discarded.



CMBC executive committee members, Sarah Mesnick and **Jen Smith**, taught *Sustainable Seafood: Science, Management, and Public Perception*, a graduate level course covering wild-caught and farm-raised seafood. The course provided a broad overview of the biology, science, management, communication, opportunities, and constraints around food from the sea. They were joined by a fabulous group of practitioners who shared their experiences, and evolution of their involvement and thinking, with the students. Highlights were visits from Tolowa Di-nee Nation and native Hawaiian practitioners, visits with local fishers, and an online cooking competition judged by San Diego award winning chefs.

Jeremiah Minich, *Lecturer, Scripps Oceanography*, **reports:**

I spoke remotely at an aquaculture meeting hosted in Norway. I also published three papers highlighting the role microbiomes can play in improving aquaculture:

- Minich, et al. 2020. Microbial Ecology of Atlantic Salmon (*Salmo salar*) Hatcheries: Impacts of the Built Environment on Fish Mucosal Microbiota. *Applied and Environmental Microbiology*. Volume 86, Number 12 (e00411-20)
- Minich, et al. 2020. The Southern Bluefin Tuna Mucosal Microbiome Is Influenced by Husbandry Method, Net Pen Location, and Anti-parasite Treatment. *Frontiers in Microbiology*. Vol. 11, 2020, pgs. 2015. DOI: 10.3389/fmicb.2020.02015
- Minich, et al. 2020. Impacts of the Marine Hatchery Built Environment, Water and Feed on Mucosal Microbiome Colonization Across Ontogeny in Yellowtail Kingfish, *Seriola lalandi*. *Frontiers in Marine Science*. Vol. 8, 2021.
<https://doi.org/10.3389/fmars.2021.676731>

Jennifer Smith, Professor, Scripps Oceanography, reports:

The Smith Lab has had a busy and productive year studying California's rocky reefs, Pacific coral reefs and all things related to Seaweed. The Smith team had a productive research trip to both Palmyra Atoll and the Hawaiian Islands where students and staff collected imagery associated with our long-term monitoring programs. Here we assess how coral reef communities are changing over time and in association with local and global stressors including climate change. Here in CA the Smith lab continues to run the Scripps Ocean Acidification Real-time (SOAR) monitoring program off the Scripps Pier to detect long term changes in ocean pH associated with increased levels of greenhouse gasses in our atmosphere.



Dr. Jen Smith inspects a flask containing red algae.

Further members of the Smith Lab continue to work on developing 3D images and videos of the rocky intertidal and are with tribal nations in a project known as Tribal Intertidal Digital Ecological Surveys (TIDES) to bring these novel approaches into the hands of CA's longest ocean stewards.

Finally, the Smith Lab is actively working to perform the necessary research needed to successfully commercialize a type of red seaweed that prevents livestock for producing methane-one of the world's most potent greenhouse gases. In the coming year, members of the Smith Lab hope to develop approaches optimize growth and production of this novel ocean-based climate change solution. Reporting on Smith Lab's algae and methane research has been featured in [UC-wide](#) news and the [Huffington Post](#).

Coastal Ecosystems

Jeff Bowman, Assistant Professor, Scripps Oceanography, reports:

I am training three graduate students (2 Ph.D., 1 M.S.) in areas directly relevant to CMBC. Ph.D. student **Natalia Erazo** presented at the 2021 Aquatic Sciences Meeting and the 2021 World Microbe Forum on mangrove-microbe symbiosis and the role of mangroves in regulating coastal biogeochemistry. We are actively involved in several lines of research relevant to CMBC:

1. Mangrove-microbe symbiosis and the role of mangroves in coastal biogeochemical cycles.
2. the use of eDNA for marine metazoan conservation.
3. the development of a multi-institutional program focused on research at the nexus of environmental science and environmental justice.

Notable funding:

- Office of Naval Research (project title: Planning for a pilot global eDNA marine collection and analysis program (GEMCAP))
- National Science Foundation (project title: *NSF INCLUDES Planning Grant: Planning for an alliance on social justice, science, and the environment*)

Erazo, N.G. and Bowman, J.S., 2021. Sensitivity of the mangrove-estuarine microbial community to aquaculture effluent. *Science*, 24(3), p.102204.

Deep Ocean Stewardship

Lisa Levin, Professor, Scripps Oceanography, reports:

Even though international travel was put on hold this past year, Lisa Levin, the Levin Lab, and the Deep Ocean Stewardship Initiative have remained active in their global research and outreach efforts.

Education programming:

- Oct 2020. Pacific Islands Short Course: Deep-Sea, Humans and Management (DOSI). *Link to YouTube Playlist of recordings [here](#).*
- Nov. and December 2020. Alaska Native Science and Engineering Program (ANSEP) Presentation on Deep Sea Science Career. Univ. Alaska Anchorage, and Univ. Alaska Fairbanks

Selected Workshops and Meetings:

- Oct.-Nov. 2020. Research Cruise - Southern California Borderlands
Link to Press Release [here](#).
- Dec. 3, 2020. UNFCCC Side-meeting on the Ocean-Climate-Policy Nexus
Link to YouTube recording [here](#).
- Dec. 14-17, 2020. IPBES IPCC co-sponsored workshop on biodiversity and climate change
- Dec. 15, 2020. World Conference on Marine Biodiversity Presentation: An In-Depth View of the Deep-Ocean Biodiversity-Climate-Policy Nexus (L. Levin)
- Feb. 2020. Banbury workshop – Comparing environmental consequences of land vs deep seabed mining.
- Feb. 2020. Helped lead IUCN Deoxygenation workshop to develop policy solutions
- April 2021. Webinar: Climate change in the deep ocean.

Jan 29, 2021. Podcast Deoxygenation and the Oceans in the UN with Dr. Lisa Levin. Changing Waters. *Link to Podcast recording [here](#).*

Laffoley, Dan, John M Baxter, Diva J Amon, Joachim Claudet, Jason M Hall-Spencer, Kirsten Grorud-Colvert, Lisa A Levin, P Chris Reid, Alex D Rogers, Michelle L Taylor, Lucy C Woodall, Natalie F Andersen. 2021. Evolving the narrative for protecting a rapidly changing ocean, post-COVID-19. *Aquatic conservation: marine and freshwater ecosystems* 31: 1512-1534

Sampao, E. Catarina Santos, Inês C. Rosa, Verónica Ferreira, Hans-Otto Pörtner, Carlos M. Duarte, Lisa A. Levin, Rui Rosaet. al. Experimental impacts of hypoxic events surpass those for future ocean warming and acidification Impacts of hypoxic events surpass those of future ocean warming and acidification". *Nature Ecol. Evolution*. January 2021 DOI: 10.1038/s41559-020-01370-3

Howell et al. 2021. A decade to study deep-sea life. *Nature Ecol. Evolution*. 5 (3), 265-267

CR Smith, V Tunnicliffe, A Colaço, JC Drazen, S Gollner, LA Levin, et al. Deep-sea misconceptions cause underestimation of seabed-mining impacts. *Trends in Ecology & Evolution* 35 (10), 853-857



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SPEAKERS

- Introduction, Michelle Guraieb, DOSI Climate Change WG
- How is the deep ocean changing? Laurent Bopp, IPSL/ENS, France
- Consequences for life in the deep, Shira Shirayama, Kyoto University, Japan
- Implications for society, Ana Colaço, University of the Azores, Portugal
- Climate solutions & governance, Cymie Payne, Rutgers University, USA
- Discussion, moderated by Lisa Levin & Moriaki Yasuhara

Marine Geology

Richard Norris, Professor, Scripps Oceanography, *reports:*

Dr. Dick Norris, working with MAS MBC student **Patti Clark** and postdoc **Matt Costa**, has been estimating the carbon sequestration value of UC San Diego's Kendall Frost Mission Bay Marsh. Earlier this year, Norris and his colleagues extracted sediment cores from the marsh that the team used to gauge how much carbon can be stored at Kendall-Frost. "Our preliminary assessment," says Norris, "is that the carbon buried in the marsh is worth hundreds of thousands of dollars to the City, a value that could increase into the millions of dollars if we restore marsh along the northern shore of Mission Bay." Other

ways the marsh offers economic value is through water purification since the marsh acts as a natural filter, hosting the early development life stages for commercially valuable fish and the economic value of ecotourism related to bird watching and other marsh activities. Marsh accessed through elevated boardwalks would also connect the community to the Mission Bay and increase the value of real estate in the area.

A new grant from the Honda Foundation to the San Diego Audubon Society and UCSD will help foster connections between indigenous Kumeyaay Nation with their cultural traditions. The Kumeyaay historically accessed resources in the desert, mountains, and coastline at various times of the year.



Students take measurements at Kendall-Frost Marsh.

Arts & Social Sciences

Mark Jacobsen, Professor, Economics, *reports:*

Mark supported MAS and Ph.D. students working on a range of interesting questions around coastal preservation, seafood sustainability, blue carbon, and climate change. He works directly with the US EPA on applications of research findings related to vehicle emissions and other topics.

Lisa Cartwright, Professor, Visual Arts, Communication and Science Studies, *reports:*

Supported by the Getty Foundation for the region-wide Getty Pacific Standard Time "Art + Science" initiative, UC San Diego's Arts and Humanities Institute and the Birch Aquarium at Scripps are leading collaborations among Scripps scientists and a network of UC scholars and artists and community

members with the goal of producing works of art and design that interpret the history and current practice of oceanography and Indigenous marine knowledge in the region and in the locales where Scripps has conducted research.

Projects, including mixed media works, films, and interactive installations in sound and image, will be featured on display and in workshops and events for public engagement at the Birch and in Geisel Library and other campus sites through 2024, the culminating year of the Pacific Standard Time Art + Science initiative. Lisa Cartwright of Visual Arts and **Nan Renner** of the Birch are leading this project, which features collaborations with the labs of **Jules Jaffe**, **Stuart Sandin**, **Jennifer Smith**, **Emily Chin**, and many others.

Follow the project at:

<https://www.graphicocean.org/>



Image of Pinar Yoldas' Hollow Ocean installation at the Venice Biennale Architettura 2021. Pinar is a UC San Diego Visual Arts Professor and has explored humanity's relationship between plastics and the ocean for over a decade.

Ayelet Gneezy, Professor, Rady School of Management, reports:

Dr. Gneezy co-led the *Scripps-Rady Ocean Plastic Pollution Challenge* (January - June 2021), connecting UC San Diego's Rady School of Management to Scripps and CMBC through her role as Director for the Center for Social Innovation and Impact. Dr. Gneezy has spent much of this year applying her research and expertise to informing COVID-19 related research and vaccination campaigns.

Ayelet also served on the following notable panels and organizations:

- Panelist, COVID-19 and Your City Webinar, Speaker (April 6, 2020)
- Ratings Expert Group Member, Charity Navigator Nonprofit
- Director, US-Israel Center on Entrepreneurship and Economic Sustainability, Rady School of Management

Fridman, A., Gershon, R., & Gneezy, A. (2021). COVID-19 and vaccine hesitancy: A longitudinal study. *Plos One*, 16(4), e0250123

Saccardo, S., Samek, A., Lee, C., & Gneezy, A. (2021). Nudging Generosity in Consumer Elective Pricing. *Organizational Behavioral and Human Decision Processes*, 163, 91-104

Gneezy, A., Imas, A., & Jaroszewicz, A. (2020). The Impact of Agency on Time and Risk Preferences. *Nature Communications*.

Biden Is Missing Out on Something, and It's Called a Deadline, *NYT* July 4, 2021.

Winning Team in First Ocean Plastic Pollution Challenge Proposes Barring Single-Use Plastics At Large Events, *La Jolla Light*, June 11, 2021.

Seth Masket: The Great Vaccine Divide Puts Republican Leaders in A Moral Quandary, *Denver Post*, June 25, 2021.

Rob Wilder, *Scripps Oceanography Director's Council, Emeritus*, **reports:**

Dr. Wilder continues to innovate at the intersection of marine conservation and finance. In 2020 he created the world's first Index (OCEAN) for marine conservation in 2020, which is live on Wall Street in the U.S., in Europe and Asia. This builds off his success with his Clean Energy Index (ECO). Rob is laser focused on bringing the value of robust marine biodiversity to the attention of global markets and has enjoyed numerous speaking engagements as well.

Visiting Scholars

By hosting Visiting Scholars, CMBC fosters deep connections with researchers, practitioners, and organizations who share our mission and bring value to our research, education, and outreach efforts.

Katie Cramer, *Assistant Research Professor at Arizona State University and Ocean Fellow at Conservation International*, **reports:**

Katie began has engaged in the following collaborative activities within CMBC:

- Acting as a mentor to undergraduate students participating in CMBC's Research Experience for Undergraduates (REU) during the 2020 summer session. Led by **Stuart Sandin** and **Jane Teranes**, this REU program investigated ecological patterns and human and environmental drivers of spatial variation and temporal change in coral reef ecosystems in the Indo-Pacific region from analysis of underwater reef imagery collected by Sandin's group.
- Continued collaboration with CMBC's **Dick Norris** on a project studying long-term change in Caribbean coral reef ecosystems to inform conservation. This work tracks changes in reef ecosystems and environments from the prehistoric period to present from analysis of fossils of corals, fish, and urchins preserved in coral reef sediment cores. These data formed the basis of a Master's Thesis for Professor Norris' student **Wendy Murakoa**, whom Cramer co-advised.
- Publication of two manuscripts: [The transformation of Caribbean coral communities since humans](#) in the journal *Ecology and Evolution* and [Reef conservation off the hook: Can market interventions make coral reef fisheries more sustainable?](#) in the journal *Frontiers in Marine Science*.
- Completion of book chapter "The present and future status of ecosystem services from coral reefs" to be published in *Imperiled: The Encyclopedia of Conservation* later this year.
- Invited to join the Annual Meeting Panel of the [Conservation Paleobiology Network](#) and participated in the planning and development of the first annual meeting of this new NSF-funded group (to be held in 2022).
- Submission of proposal for working group "'Integrating paleo and historical data into coral reef management and policy" to Conservation Paleobiology Network. This working group will bring together coral reef managers, conservation practitioners, historical ecologists, and paleoecologists to develop frameworks for incorporating historical baselines and long timeseries of ecological change on Caribbean reefs into pressing watershed and fisheries management issues within this region. In collaboration with CMBC alum **Loren McClenachan**.
- As a member of the [Reef Futures](#) project, compiled a global dataset of coral reef benthic community composition and developed statistical models to determine the social and environmental drivers of reef fish and coral communities at global, national, and local scales.
- Appointed as a Commissioner to the [Encinitas Environmental Commission](#).

Lyall Bellquist, Marine Fisheries Scientist, The Nature Conservancy - California, reports:

Lyall remains an active contributor and collaborator with CMBC, working on numerous research projects, publications, and supporting educational efforts at the Center.

Selected Workshops and Meetings:

- Bellquist, L., V. Saccomanno, B. Semmens, M. Gleason, and J. Wilson. 2021. The rise in climate change-induced Federal Fishery Disasters in the United States. Ann. Mtg. The Nature Conservancy virtual Global Science Gathering.
- Two multi-institutional webinars focusing on impacts of marine heatwaves on west coast fisheries from Mexico to Alaska. Sept, 2020 and Feb, 2021.
- Strengthening collaborative science between TNC, SIO, and NOAA Southwest Fisheries Science Center; informing federal fisheries management about nationwide climate linkages with federally declared fishery disasters; advancing science to achieve more proactive and climate ready fisheries management.

Partnerships and Funding:

- Finalized SIO-TNC 2020-2025 Cooperative Agreement
- National Science Foundation Convergence Accelerator proposal: FishSense - 3D Imaging for Fish Detection, Measurement, and Assessment

Education:

- Funded two MS and two MAS student for important fisheries research questions
- Funded a joint TNC-SIO postdoctoral position focusing on climate ready fisheries and bycatch vulnerability in the Pacific
- Course 'Key Contributor' to SIO 286: Marine Science, Economics, and Policy: Marine Protected Areas
- Committee Member – **Lindsay Bonito**, M.S. Marine Biology, graduated 2020. National and regional syntheses of Exempted Fishing Permit use and impact in the United States. Scripps Institution of Oceanography.
- Committee Chair – **Clara Fejer**, CMBC MAS Program, graduated 2020. Review of fisheries stock enhancement and the California Ocean Resources Enhancement and Hatchery Program, including documentary film. Scripps Institution of Oceanography.
- Committee Member – **Liz Hunter**, CMBC MAS Program, graduated 2020. California artificial reefs review and future directions. Scripps Institution of Oceanography.

Bellquist, L., Saccomanno, V., Semmens, B.X., Gleason, M.G., and Wilson, J. 2021. The rise in climate change-induced Federal Fishery Disasters in the United States. PeerJ. 9:e11186

Nosal, A., D. Cartamil, A. Ammann, L. Bellquist, N. Ben-Aderet, K. Blincow, E. Burns, E. Chapman, R. Freedman, P. Klimley, R. Logan, C. Lowe, B. Semmens, C. White, and P. Hastings. 2021. Triennial migration and philopatry in the critically endangered soupfin shark (*Galeorhinus galeus*). Journal of Applied Ecology.

Wegner, N.C., Portner, E.J., Nguyen, A., Bellquist, L., Nosal, A.P., Pribyl, A.L., Stierhoff, K.L., Fischer, P., Franke, K., Vetter, R.D., Hastings, P.A., Semmens, B.X., and Hyde, J.R. In Review. Post-release survival and prolonged sublethal effects of capture and barotrauma on deep-dwelling rockfishes (genus *Sebastes*): Implications for fish management and conservation.

Fox5 News, "[Young great white shark sightings off San Diego coast spike](#)," July 15-16, 2020

"Let's Talk Hook-Up" fishing radio show, San Diego, July 12, 2020

Sara McDonald, Senior Fisheries Scientist with the Monterey Bay Aquarium Seafood Watch Program, **reports:**

Between July 2020 and June 2021, Sara worked with several MAS MBC students who were interested in learning more about seafood sustainability and conducting independent research (including Capstone projects) on the topic. Specific work includes:

- Met with several students to discuss potential independent study and capstone research projects related to bycatch, marine mammal-fisheries interactions, IUU fishing, sustainable fishing practices, and human rights in seafood.
- Conducted a guest lecture on IUU fishing, traceability, smuggling, and forced labor for the Fall Quarter's Ocean Law and Policy course
- Participated as a panelist in Salty Cinema Live: Fishing for the Future event.
- Served as a member of the MAS-MBC Admissions Committee to review, rank and discuss applications for the 2021 cohort
- Served as Independent Study advisor for three MAS-MBC students who worked on special projects pertaining to the Seafood Watch Standard for Fisheries and the Seafood Slavery Risk Tool (**Allegra La Ferr**, bait use, **Chloe Gouache**, Seafood Slavery Risk Tool, and **Gene DePuy**, characterizing controversial Seafood Watch reports)
- Served as Capstone Committee Chair for MAS-MBC student **Kellan Warner**, *"An Analysis of Global Fisheries and Factors Limiting Sustainable Practices for U.S. Seafood Imports"*
- Served as Capstone Committee member for MAS-MBC student Chloe Gouache, *"Proposed Guidelines on Pre-Arrival Risk Assessments of Foreign Vessels: Using Lessons Learned to Strengthen Implementation of the UN FAO Agreement on Port State Measures"*

Oriana Poindexter, Collaborating Scientist, NOAA Southwest Fisheries Science Center, **reports:**

Oriana received a NOAA Saltonstall-Kennedy Award program funded work from Sept 2020 - Aug 2021 that culminated in the Fishful Future.com project & associated products. Fishful Future aggregates resources to familiarize the general public with edible and non-edible uses for seafood by-products. She also published an online blog series (6 articles to date) for an NMSF-funded abalone project and has ongoing funding from NMSF to produce a book covering all seven of California's abalone species. Oriana released 'Cyanotyping with Oriana Poindexter,' a video created in collaboration with fellow MAS MBC alumna, **Lindsay Bauman**.

Education

CMBC's educational impact is an amalgam of efforts: from programmatic level coordination, facilitation, and collaboration, to the teaching and mentorship of individual faculty and researchers across our distributed membership at UC San Diego and partners.

CMBC Student Representatives

Kayla Blincow, our outgoing CMBC Student Representative, helped keep students engaged with CMBC. She led a survey of CMBC Students, created a Slack Channel, hosted a Zoom networking event for students in November 2020. In Spring 2021 we onboarded two new CMBC student representatives, **Kara Wiggins** and **Fernanda Urrutia Osorio**, who have hit the ground running developing new ideas for communications and events to engage and support students and the public alike.

Ph.D. Specialization Program in Interdisciplinary Environmental Research (PIER)

The PIER program completed the formal addition of two UC San Diego departments, Visual Arts and Ethnic Studies, with associated degree codes for Ph.D. participants from those areas. This brings us to 11 participating departments across campus.

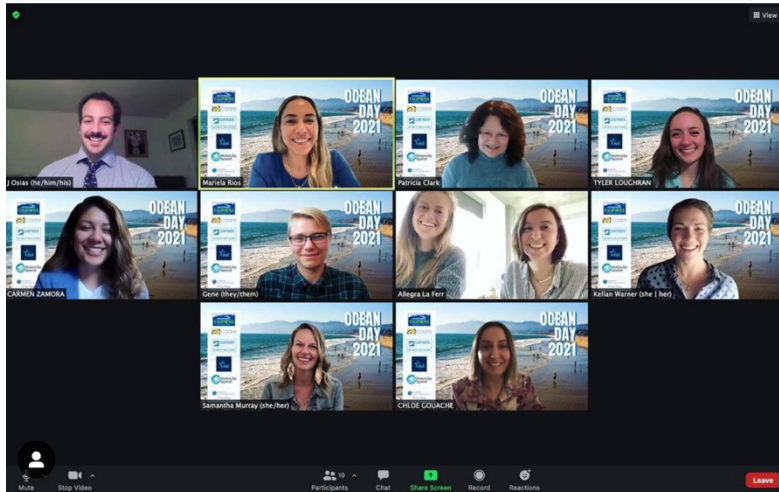
Peer-learning and mentorship continued with strong leadership by the '20-'21 student co-coordinators, **Danielle McHaskell**, **Julia Chavarry**, and **Jordan DiNardo**. They hosted several well attended and engaging meetings and panels over Zoom, continuing to explore what interdisciplinarity means to them and their research. **Erica Ferrer** has passed the baton to **Natalia Erzao** who is now serving as our student representative, supporting incoming co-coordinators and communications.

Masters of Advanced Studies in Marine Biodiversity and Conservation (MAS MBC)

Samantha Murray, Executive Director of the MAS MBC Program, *reports:*

The 2020-2021 Academic Year:

In response to a clear incoming student preference for in-person content, we made a one-time, complex COVID adaptation this year, in favor of holding the Summer Course at the end of the '20-'21 MAS MBC Program, instead of the beginning. We are incredibly proud of our team and our students for the extraordinary collaborative effort it took to create, implement, and attend such an innovative and adaptive program that truly was unlike any other. Although it was a challenging year for all, 21 enrolled MAS MBC students engaged in rigorous, hands-on coursework throughout the last 10 months on Scripps' campus.



MAS MBC '21 cohort participated in course, professional development and networking opportunities, both in person and remote. Screen capture from the virtual 2021 California Ocean Day event to engage with the California Legislature on ocean and coastal issues.

In lieu of a virtual 2020 Summer Course, MAS MBC leadership created and executed a 13-week virtual Summer Lecture Series last year that engaged students, facilitated connection with faculty and external practitioners, and introduced core marine conservation disciplines. Following that series, in addition to attending an in-person day of Orientation last September, students attended some of the only in-person classes taught on all of Scripps and UC San Diego campuses. Core classes in Ocean Law and Policy, Survey Design and Analysis, and the specialized MBC Forum course were taught in person in Fall and Winter quarters, largely in

outdoor teaching tents on upper campus. Seven of our students took the Scientific Diving course in person this year and several students volunteered in labs with Scripps faculty and supported **Phil Zerofski** in collecting research specimens.

On June 9th, 2021, we held an in-person Capstone symposium for our 18 graduates, who gave dynamic, interdisciplinary, and accessible presentations on such topics as:

- Ecologies of Sound and Sea: An Auditory Journey Through Acoustic Ecology
- Creating OpporTUNAty for Community Engagement in Marine Spatial Planning: Developing an Ocean Use Survey Strategy for the Maldives
- Secrets of the Mud: Blue Carbon Assessment for the Kendall-Frost Marsh Reserve, Mission Bay, San Diego, California
- Risk Due to Climate Change: Lessons in Vulnerability Adaptation in Coastal Communities in Trinidad and Tobago
- Examining the Effects of the European Union's Carding Scheme on the Republic of Panama's Seafood Trade
- Go Mad for Gonads: Does Exposure to Levonorgestrel Affect the Reproductive System of the California Warty Sea Cucumber (*Apostichopus parvimensis*)?
- Chasing Catch: Climate-Driven Distribution and Abundance of Pacific Bluefin Tuna and Japanese Anchovy
- Searching for Sharks in the Shallows: An Examination of Coastal Shark Distribution Patterns in the Florida Keys Archipelago
- And many more!

The interactive event was [webcast live on YouTube](#) with 497 unique viewers and 907 total views.

The 2021-2022 Academic Year:

This year we received 112 applications, a 78% increase over 2017 and the most applications we've had since the MAS MBC Program's inception. This included 30 applications from underrepresented minority (URM) applicants, which is 4.3 times as many URM applications as we received just five years ago. Our entire application pool was strong, and we are proud to have enrolled a bright and talented 2021-2022 cohort that includes 45% URM students. Leadership in the MAS MBC Program are committed to significantly enhancing representation in instructors and guest practitioners, as well as creating coursework and curating experiences that are inclusive and supportive for each and every MAS MBC student on the Scripps campus.

The 2021 MBC Summer Course:

The MBC Summer Course is off to a strong and inspiring start. We launched on July 2, after three days of in-person Orientation supported by MAS MBC alumni from the '19 and '20 cohorts. The ten-week course is housed on the UC San Diego campus, in the Revelle South outdoor teaching tent. The in-person program is supporting 35 students this year, which includes the outgoing '21 MAS MBC grads (who will graduate in September of this year), the incoming MAS MBC '22 cohort, and 3 PIER PhD students. "It is a talented group of curious students with distinct and valuable backgrounds and lived experiences. We're excited about this extraordinary opportunity to bring together such an impactful group of people," said Murray.



MAS MBC '22 Summer Orientation at the Revelle Plaza outdoor teaching tent.

MAS MBC leadership has built a truly holistic and interdisciplinary 2021 Summer Course that combines marine science, communication, ecology, economics, governance, community work, social justice, ethics, and emotional well-being, all thoughtfully stitched together throughout the quarter. More than 85 guest lecturers, practitioners and experts will be joining the program to teach students this summer, including MAS MBC founder **Dr. Jeremy Jackson**, economist **Dr. Rashid Sumaila**, Kumayaay College instructor **Dr. Stan Rodriguez**, CBS News reporter **Neda Iranpour**, Mote Marine Lab scientist **Jasmin Graham**, Obama appointee **Pedro Silva**, Executive Director of Sacred Places Institute for Indigenous People, **Angela Mooney D'Arcy**, and many more.

In addition to doing modified outdoor labs in the tent, MBC students are participating in field trips to Torrey Pines State Reserve and the Kendall Frost Reserve at Mission Bay, as well as three days of cruises onboard R/V *Robert Gordon Sproul*, and two separate field weeks to the Wrigley Institute at Catalina Island and the Kenneth Norris Rancho Marino Reserve.

The 2021 Summer Course would not have been possible without our intrepid and indispensable course assistants, **Kat Montgomery (MAS MBC '19)** and **Carly Shabo (MAS MBC '19)**.

CMBC would also like to congratulate Samantha Murray on her March 2021 re-appointment by Governor Newsom to the California Fish and Game Commission, where she serves as Vice President. Samantha was sworn in by San Diego Mayor Todd Gloria. This position requires Senate confirmation, and her term is six years.

Student Highlights

Students are an integral and engaged part of our research and learning community.

MAS MBC

Elyse Goin ('21) was an NSF-funded Youth Environmental Action in Higher Education (YEAH) Fellow in Fall 2020, where she mentored a group of undergraduate students to propose solutions and ideas in response to the UN's Sustainable Development Goal 11: Sustainable Cities and Communities

Alejandro Cano-Lasso Carretero ('21) was awarded a 2021 UC San Diego Interdisciplinary Research Award by the UCSD Graduate Division for his Capstone Project, *Role of the Jaws in Whale Hearing*.

Tyler Loughran ('21) earned a 2022 Knauss Fellowship

Kaycey Bui ('22) is going to the UNFCCC COP 26 in November 2021

M.S. and Ph.D.

Sarah McTague (M.S. student, Sandin Lab) gave her first scientific talk for the ESRI (Environmental Systems Research Institute) Ocean, Weather and Climate GIS Forum. In a virtual format, she presented on her use of GIS in studying the spatial interactions of coral colonies at Palmyra Atoll.

Erica M. Ferrer (Ph.D. candidate, Aburto Lab)

Erica remains busy with presentations, publications, and fellowships, all while qualifying for her Ph.D. and participating in the PIER program.

She presented a virtual webinar on *Theory and empirics suggest that an end to overfishing will help small-scale fisheries thrive in a warmer world* for the March 2021 OurFish symposium (Delivering on Climate & Biodiversity Targets Through Better Fisheries Management). Erica also participated in outreach events through: San Diego's Stay Cool organization, as well as the UC San Diego's GPSA Climate Action and Policy committee (CAP).

Erica was also awarded CMBC's inaugural Ferguson Family Prize in summer 2020, putting \$10,000 towards her dissertation research project entitled *How does "ocean weather" affect recruitment among commercially important bivalves in the Gulf of California?*

Ferrer, E. M., Aburto-Oropeza, O., Jimenez-Esquivel, V., Cota-Nieto, J., Mascareñas-Osario, I. and López-Sagástegui, C. (2021). Mexican small-scale fisheries reveal new insights into low-carbon seafood and "climate-friendly" fisheries management. *Fisheries*. doi: 10.1002/fsh.10597

Ferrer, E. M., Cavole, L. M., Clausnitzer, S., Dias, D. F., Osborne, T. C., Sugla, R. and Harrison, E. (2021). Entering negotiations: Early-career perspectives on the UN Conference of Parties (COP) and the unfolding climate crisis. *Frontiers in Marine Science*. doi: 10.3389/fmars.2021.632874

Danielle McHaskell (Ph.D. student, Smith Lab)

Danielle studies invasive seaweeds in the local temperate ecosystems. Danielle is involved in a number of fellowship and community projects in addition to her research. This past year she was a co-coordinator for the PIER program's Interdisciplinary Environmental Research Forum. Applying this focus on working across fields of study, she is a collaborator with the UC San Diego Visual Arts and the Birch Aquarium's *Graphic Ocean* project.

Danielle has been active giving presentations and conducting outreach. She was [interviewed](#) by OceanX on the role of horseshoe crabs in COVID-19 Vaccine Research. Danielle was also a panelist for the [Black in Marine Science panel](#) hosted by #BlackinMarineScience with The National Aquarium in Baltimore.

Alumni Highlights

MAS MBC

Rachelle Fisher (MAS MBC '08) celebrated 10 years as leading Principal at Strategic Earth Consulting where she and her team design, implement, and facilitate integrated communications and community engagement strategies for natural resource decision-making and management.

Matt Mulrennan (MAS MBC '10) is now CEO of EnVest - the world's leading environmental investing event, which has helped raise \$130M+ into early stage environmental companies through its investor members.

Dominique Cano-Stocco (MAS MBC '11) is now the Executive Director, External & Government Affairs for Verizon. Dominique also joined the Board of Wildcoast and is working on a BlueVerizon initiative to help educate Verizon about how ocean conservation serves their climate protection mission.

Tom Holm (MAS MBC '15) published his first book entitled *Shrouded Heritage: Island of the Blue Dolphins*, documenting the journey he and his daughter completed to finding descendants of the famed 'Lone Woman of San Nicolas Island.' As a result of Tom and his collaborators' work, over 1,000 ancestral remains associated with The Lone Woman have been repatriated to their island home. Tom is also the Executive Director and Lead Scientific Investigator of the Kumeyaay Heritage Preservation Council and a professor at San Diego State University.

Ben Fiscella Meissner (MAS MBC '17) and **Paula Ezcurra (MAS CSP '17)** won an award at the [2021 World Wildlife Day Film Showcase](#) for their short film on mangroves in the Yucatan.

Emi Koch (MAS MBC '19) won the [2021 UC San Diego International Alumni Award](#).

James Bruce (MAS MBC '19) had his MAS MBC capstone paper cited in a 2021 UN FAO publication on transshipment and fisheries, titled "Transshipment: a closer look – An in-depth study in support of the development of international guidelines."

Tekateteke Metai (MAS MBC '18) accepted a new position in July 2020 at the Ministry of Fisheries (MFMRD) in Kiribati as the Principal Mineral Offshore.

Gaby Lamanna ('20) created a film named "[Drifters of the Sea](#)" for the FjordPhyto project and her MAS Capstone. The film was accepted to the USAPECS Polar Film Festival 2020. FjordPhyto was founded and is run by **Allison Cusick (MAS MBC '17, Ph.D. candidate)**.

M.S. and Ph.D.

Ayana Elizabeth Johnson (Ph.D. '11) published an anthology of essays by women climate leaders that she co-edited: *ALL WE CAN SAVE: Truth, Courage, and Solutions for the Climate Crisis*. In addition to publishing this book and a number of articles in a variety of magazines and blogs, Ayana is co-host of the new podcast *How to Save a Planet* with journalist Alex Blumberg.

Tara Whitty (Ph.D. '14) runs a freelance consultancy: Keiruna Inc. (keiruna.com) and is co-host of her minimally-speaking autistic brother Danny's [The Ocean and Us Podcast](#), which shares the wonder of the ocean, the importance of inclusion in enjoying and saving it, and Danny's journey to learning more about the sea.

Emily Kelly (Ph.D. '15) is the Lead for UpLink Ocean at the World Economic Forum.

Amanda Netburn (MAS MBC '10, Ph.D. '16) is an Ocean Policy Analyst at the White House Office of Science and Technology Policy.

Bridget Roth Tran (Ph.D. '16) will join the Federal Reserve Bank of San Francisco in September of this year.

Noah Ben-Aderet (Ph.D. '17) is now the Sustainable Fisheries and Aquaculture Program Manager for the California Ocean Protection Council.

Alfredo Giron (Ph.D. '19) is a André Hoffman Fellow at Stanford Center for Ocean Solutions and World Economic Forum and was October 2020 "Person of the Month" for the UN Decade of Ocean Science for Sustainable Development (2021-2030)

Kaitlyn Lowder (Ph.D. '19) is a Senior Program Associate for the The Ocean Foundation. She supports their International Ocean Acidification Initiative.

Rishi Sugla (Ph.D. '21) is the founding Director of the Kuril Islands Research and Conservation Initiative (KIRCI), a project that grew out of his work as expedition member, impact producer, and science communicator on the award winning film project "[From Kurils with Love](#)." Rishi is also a Knauss Fellowship Finalist for 2022-2023 fellowship period.

Wes Howden (Ph.D. '21) was a member of the PIER program and student in the Economics department. He will start a 2-3 year postdoctoral fellowship at the University of Arizona this Fall. The service component of this postdoc is to advise on the development of economics programming in a new interdisciplinary center on environmental research, the Arizona Institutes for Resilience.