



**OCEAN
UNIVERSITY**

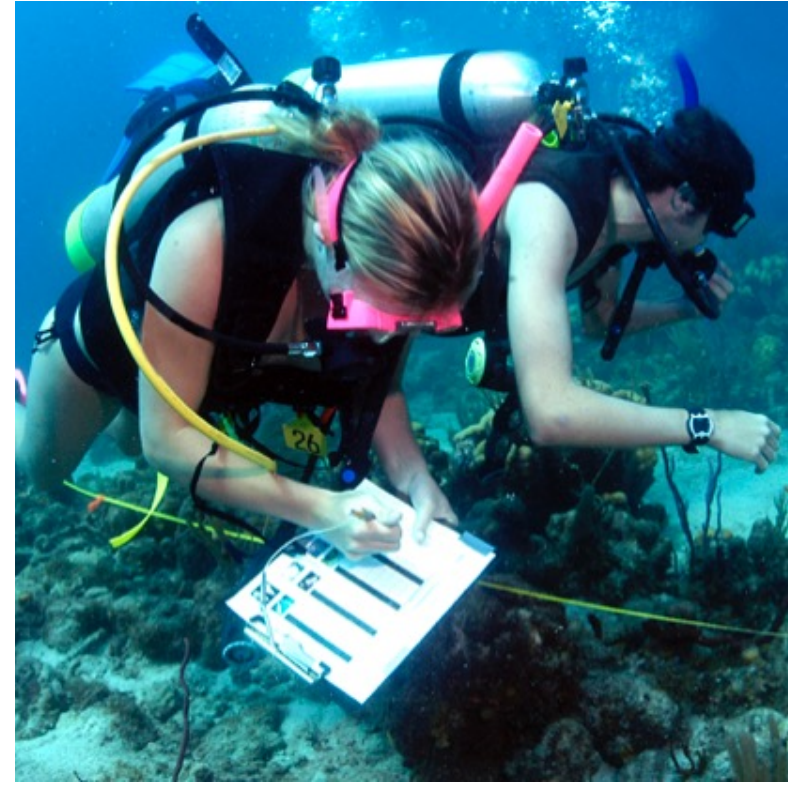
A Model Internship Program to
Increase Diversity in Ocean
Science

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An Ocean Under Threat

The ocean is our greatest resource. Whether you live near the coast or far from its shores, the ocean contributes to the health and well-being of every one of us. Unfortunately, our impact on the health and well-being of the ocean is of a far more destructive nature. As a result, the ocean is under tremendous threat. It has never been hotter or more acidic. It's losing oxygen at an alarming rate. And pollution, especially plastic waste, negatively affects almost every aspect of marine life.



A Need to Advance Marine Science

In order to provide an effective response to these threats, we must focus on developing the next generation of marine scientists. One key to this development is the opportunity for students to pursue marine science earlier in their academic life. Another is to ensure equal participation in these opportunities among historically underrepresented groups. Only when marine science becomes more diverse and inclusive will we then be able to unlock the intellectual and creative talent needed to advance scientific innovation.



Ocean University

The idea for an "ocean university" grew out of an independent research project that Noa Gottlieb started during her first year in high school and continued as part of her internship at Harvard University. At the time, it was clear that more needed to be done to foster diversity and inclusiveness in marine science. She proposed studying the different ways to increase the participation of underrepresented students in marine science programs and struck upon the idea of a university-based model internship program for high school students worldwide.

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Abstract

A diverse scientific community is a condition precedent for the ultimate success of each UN Decade of Ocean Science challenge. The global nature of these challenges requires the intellectual and experiential input of a diverse scientific community. But with its primary focus on post-secondary school education and training, the current paradigm is ill-suited to increasing diversity in ocean science. Resources should be devoted to increasing opportunities for high school students, especially those from underrepresented backgrounds and communities. However, the very reason these communities are underrepresented is that they often lack the resources necessary to support programs outside the typical science curricula. And while universities have the intellectual and financial ability to sponsor such programs, there remains a substantial disconnect between what universities currently offer and what high school students need.

To facilitate the development of the necessary programs, we propose partnering with universities across the globe to create a model program we call "Ocean University" that is designed to facilitate the implementation of ocean science internships for high school students. The model internship program includes: (1) a standardized ocean science curriculum with academic and career-oriented elements; (2) guidelines for student mentoring during and post-internship; (3) ongoing academic opportunities to ensure continued support and development; and (4) post-internship community education and outreach.

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2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development



Relevant U.N. Ocean Decade Challenges

Challenge 9:

Ensure comprehensive capacity development and equitable access to data, information, knowledge, and technology across all aspects of ocean science and for all stakeholders.



Challenge 10:

Ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood, and identify and overcome barriers to behavior change required for a step change in humanity's relationship with the ocean.

How We Addressed These Challenges

The goal of ensuring equitable access to information and knowledge for all stakeholders can only be achieved by providing communities that have been historically underrepresented in the ocean sciences with increased opportunities to participate. Equitable access is at the crux of our proposal. Our model program is explicitly designed to facilitate the dissemination of information and knowledge among all stakeholders and across all socio-economic, ethnic, religious, gender, and national categories. As more students from underrepresented backgrounds and communities participate in our model internship program, they, in turn, will act as a source of information for the wider community. This influx of knowledge and information will enable these communities to adjust their behavior to contribute to that sustainability. Finally, achieving true diversity in the ocean science community is a necessary precursor to effectuating change in humanity's relationship with the ocean.



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Vision and Transformative Impact

In the wake of the death of African-American George Floyd and the ensuing conversation on racial and social injustice, the international scientific community has been unequivocal in pledging its support to increase diversity, equity, and inclusion in the sciences. While recognition of the biases inherent in our educational and professional institutions is a necessary first step toward rectifying past and continuing injustices, many of these institutions have struggled to find practical solutions to eliminate existing inequalities in the sciences. Without a realizable plan to turn these institutional pledges into actionable steps, transformative change will indeed remain elusive. Significantly increasing the number of ocean scientists would have the transformative effect these institutions seek while positively impacting every U.N. Decade of Ocean challenge.

We believe that the most efficient way to accomplish this is to expand the pool of potential ocean scientists by reaching into communities that have been previously excluded from the ocean sustainability conversation. With over 25,000 universities and research institutions as potential partners and millions of high school students worldwide, our model internship program has the potential to massively transform the future of ocean sustainability on a truly global scale.



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Existing Infrastructure, Technology, and Partnerships

What makes our model program eminently realizable is that the universities and research institutions that would serve as the program's backbone have been consistent and vocal proponents of increasing diversity in the ocean sciences. Moreover, these same universities and research institutions already have extensive experience administering academic programs and internships. Many currently offer ocean science summer programs for high school students. Although typically tuition-based, it is proof positive that they have the necessary infrastructure to support educating high school students in the ocean sciences. In addition, the National Science Foundation sponsors the research experience for undergraduates program involving hundreds of universities, further evidencing that the infrastructure to support our model program is already well established. We are partnering with various universities to study the composition of existing internship programs to determine what elements would contribute to a successful ocean science internship for underrepresented students.



Sectors Engaged Outside of Traditional Ocean Sciences

The complex nature of the challenges facing the ocean and the interdisciplinary nature of potential solutions require collaboration with scientists and stakeholders outside traditional ocean science. Therefore, our model program's curriculum will include coursework in economics, political science, literature, art, history, engineering, and computer science. The often localized nature of these challenges requires that marine scientists also consider the collectively learned experiences of indigenous populations. Accordingly, we will partner with organizations that can help us incorporate elements of traditional ocean knowledge so that program participants benefit from exposure to oral traditions and experiential learning.

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For International Collaboration and Capacity-Building

We understand that what works in Peoria, Illinois, may not necessarily be effective in Pretoria, South Africa. Therefore, our model program will be designed to be flexible enough to adapt to different educational systems and cultural norms. This will be achieved by working directly with local stakeholders – indigenous populations, universities, research institutions, individual ocean scientists, high school administrators, and high school students themselves - who understand and can help navigate the contours of their educational and cultural environment. We will also partner with like-minded organizations in other countries to seek their guidance and leverage their local knowledge and expertise.

For Developing Global Capacity and the Next Generation of Ocean Scientists

Our model internship program is, both by definition and intent, designed to facilitate the development of global capacity and encourage the development of the next generation of ocean scientists. Our model internship program will be “open access” so that any university or research institution in any country will have the ability to adopt and implement the program. And while the model program will have certain basic core components and recommended elements, it will not be a “one size fits all” solution and will be fully adaptable to different educational systems and cultural norms.



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Noa Gottlieb, Ocean Connect, Inc.

Noa Gottlieb is the Founder and Chief Executive Officer of Ocean Connect, Inc., a 501(c)(3) public charity whose mission is to provide students from underrepresented communities with the resources they need to help solve the problems that threaten the health of the ocean. Ms. Gottlieb is currently a student at Miss Porter's School in Farmington, Connecticut. From 2020 to 2021, she was a member of the initial cohort of the US Youth Advisory Council for the United Nations Oceans Decade, a diverse group collaborating to further the UN Ocean Decade goals in a way that best served the members in each of their communities with a commitment to inclusion, outreach, and engagement. Ms. Gottlieb was also a co-lead delegate representing the Connecticut chapter of the Ocean Climate Action Platform in lobbying the U.S. Congress to pass the Ocean Based Climate Solutions Act. During the summer between her first and second years of high school, she interned at the Girguis Lab for Ecophysiology, Biogeochemistry, and Engineering at Harvard University. In 2022, she was accepted into the University of California San Diego Research Scholar Marine Science Program, taking advanced courses in marine biology, oceanography, and science writing. She also recently obtained her NAUI Scuba Diver/Open Water Diver Certification.

Ayana Melvan, Mystic Aquarium

Ayana Melvan is the Senior Director of Strategic Partnerships for Mission Programs at the Mystic Aquarium, Mystic, Connecticut. Ms. Melvan has long advocated for youth of color and lower income, promoting opportunities for them to grow and thrive. Ms. Melvan is an Ambassador for the After School Alliance, a 501(c)(3) charitable organization whose mission is to ensure that all youth have access to affordable, quality afterschool programs by engaging public will to increase public and private investment in afterschool program initiatives at the national, state, and local levels. Prior to her present position at Mystic Aquarium, Ms. Melvan was Senior Program Officer, Youth Development and Lead for the Rhode Island Afterschool Network United Way of Rhode Island and, before that, a Fellow at the Riley Institute at Furman University. Ms. Melvan was recently named to the Rhode Island Environmental Education Association board. Ms. Melvan received her Bachelor of Arts in Communications and Film Studies from the University of Massachusetts, Amherst.

Nicole Yen, UC San Diego

Nicole Yen is a Pre-College Instructor at the University of California San Diego Extended Studies/Scripps Institution of Oceanography. Prior to her teaching position at UC San Diego, Ms. Yen was a Graduate Researcher at the University of California San Diego's Scripps Institution of Oceanography. Ms. Yen's research focuses on using phylogenetic tools to investigate the evolution and biogeography of dorvilleid polychaetes found in Eastern Pacific hydrothermal vents, seeps, and whale-falls. Other research projects she has been involved with include working with bottlenose dolphins, sea turtles, chimpanzees, gorillas, giant pandas, and burrowing owls through institutions such as the San Diego Zoo, Lincoln Park Zoo, and Scripps Institution of Oceanography. Ms. Yen received her Bachelor of Science degree in Ecology, Evolution, Systematics, and Population Biology from the University of California, San Diego during which time she studied Marine Biology and Terrestrial Ecology at the University of Queensland (Australia). Ms. Yen received a Master's degree in Marine Biology from the University of California, San Diego, and a Master of Arts Degree in Education from the University of Southern California.

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