Discover the Depths

CAREER OPPORTUNITIES RELATED TO OCEAN AND AQUATIC SCIENCES

A career resource for students, developed by the National Ocean Sciences Bowl
Why choose a career in ocean and aquatic sciences?

The oceans are critically important to the earth’s ecosystem and to human health. They flow over nearly 75% of our planet and hold 97% of our water. As our earth’s “last frontier,” the study of these vast storehouses of food, water and oxygen is vital and fascinating.

Ocean and aquatic science-related opportunities exist in all sectors, and niche jobs can be found or created in any field or industry, particularly as you advance in your career. You all know about working in universities, but there are many places to pursue ocean and aquatic science beyond academic careers.

Read on to hear stories of people who have expanded the possibilities, created new opportunities, and had a big impact in the blue economy of ocean and aquatic sciences.

Each year, the National Ocean Sciences Bowl (NOSB) sponsors a national competition designed to increase awareness and knowledge about the ocean for high school students and the general public. Over the last several decades, various aspects of oceanography study have grown increasingly important in the workplace — affecting a growing number of career sectors.

In this NOSB booklet, you can learn about job possibilities and how you can prepare yourself now — while in junior high and high school — for entering careers that are ocean-connected. Planning your studies around college-preparatory courses — including math, English, science and foreign languages — is a good first step.

The NOSB is managed by the Consortium for Ocean Leadership. For more information, visit www.nosb.org or contact:
National Ocean Sciences Bowl Program Office
Consortium for Ocean Leadership
1201 New York Avenue, NW, 4th Floor,
Washington, DC 20005
Jobs in ocean science have impact

Ocean and aquatic science contributes to our understanding and appreciation of the world around us. A career in ocean and aquatic science is more than just a job. You can make a difference. Understanding ocean and aquatic science is important for addressing many environmental and societal issues, whether you are working directly in research or applied science or using your knowledge to shape decisions, practices, or public opinion.

Consider these careers:

- **Engineers** create barriers to erosion, technologies to mitigate storm damage and the effects of climate change, and new ways to harness and produce energy.
- **Marine Biologists and Ecologists** discover new species, explore ocean habitats, and provide information to help us plan infrastructure and develop policies for minimal impact on marine organisms and their ecosystems.
- **Paleoclimatologists and Climatologists** tell us what the Earth’s climate looked like in the past and what changes are expected so we can prepare for — and positively impact — the future.
- **Environmental Historians** help us understand a baseline of marine life populations before human impact and give us perspective on how social factors can contribute to environmental issues.
- **Economists** can determine a monetary value for our ocean-derived resources and help us better understand the economic impacts of hurricane damage, biodiversity loss, coastal inundation, and other ocean-related issues and events.
- **Policymakers** need to understand ocean science to develop sound policies that impact our ocean resources.
- **Educators** can increase ocean literacy by implementing early ocean science lessons into the curricula of today’s youth, then teaching the importance of studying our marine surroundings.

How can your career make a difference to the environment, your community, and the world?

What is The Blue Economy?

Gunter Pauli wrote a book called "The Blue Economy." In it, he described a business model that advocates approaching environmental and economic issues in new ways. The Blue Economy uses science and the processes that are in the natural world to create solutions that are environmentally beneficial and have economic and social benefits. The ocean and ocean science figures prominently in the plan.

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What are organizations saying about NOSB alumni and ocean-educated students?

“NOAA’s mission is to understand and predict changes in the Earth’s environment and conserve and manage coastal and marine resources to meet our Nation’s economic, social, and environmental needs. NOAA employs many kinds of scientists, including marine biologists, oceanographers, and climatologists... NOAA personnel need to have a deep scientific understanding that can be applied at the global, regional and local level while effectively working on teams. These are characteristics that NOSB helps develop. Participation in NOSB would be a strength when pursuing a STEM career at NOAA.”

— Louisa Koch, Director of Education, National Oceanic and Atmospheric Administration

“NOSB alumni with STEM degrees are excellent candidates for positions in BOEM’s Environmental Studies Program (ESP) because of their interest in the ocean, team experience, and critical thinking skills. The ESP is a nationwide program that includes nearly 250 scientists across the United States. ESP scientists work in teams to think critically and ask hard questions to ensure appropriate information is gathered to inform decisions on ocean energy and mineral extraction. NOSB alumni epitomize the qualities BOEM looks for in its scientists.”

— Rodney E. Cluck, PhD, Chief, Division of Environmental Sciences, Bureau of Ocean Energy Management
How much do people who work in ocean and aquatic sciences make?

Compensation is a big reason why we work. It is particularly exciting that ocean and aquatic science-related fields are excellent opportunities for well-paying jobs.

Of course, when choosing a career or specific job, salary is not the only factor to consider. Health and financial benefits, quality of life issues, experience motivations, intellectual growth, travel opportunities, and physical motivations also should be part of your decision-making process.

Although we have already seen that career possibilities in ocean and aquatic science are many; it would be impossible to list all the possible jobs, employers, locations, and levels of experience each career choice requires. The information here is meant to be a general guide that can get you started as you explore your options and your future.

Visit nosb.org/careers for more information about career choices and median annual salaries for specific ocean and aquatic science-related careers.

Median annual earnings for ocean and aquatic science-related occupations, compared to all U.S. employment

What are employers looking for?

According to the National Sciences Foundation, the number of science, technology, engineering and mathematics occupations are projected to grow more than 30% faster than the overall U.S. workforce over the next five years. This is a substantial reason to pursue these fields.

Many companies and organizations have need for people with knowledge and skills in ocean and aquatic science. Leaders from some of these companies talk about those needs here.


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<tr>
<th>Occupation</th>
<th>Projected Employment Growth</th>
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<tr>
<td>All U.S. job market</td>
<td>0%</td>
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<tr>
<td>All Science and Engineering</td>
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<td>Bio/agri/environmental life scientists</td>
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<td>Engineers</td>
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Because the ocean and ocean life are so fundamental to our climate and weather systems, Eastman is supporting Woods Hole Oceanographic Institute (WHOI) in developing innovative ways to observe and measure ocean processes.

“The integration of ocean science into curriculum empowers the next generation of thinkers, makers and scientists to be the catalysts for change that our global community needs. Using advanced math, chemistry, physics, biology, robotics, and computer coding as an underpinning, understanding ocean science develops real world problem-solving and critical thinking skills and provides students with a strong foundation for their future careers. Change begins with education and what better way to engage in a global need than to inspire the best and brightest young minds around the endless possibilities of applying educational skills to impact the issues of our changing world.”

— David A. Golden
Eastman, Senior Vice President, Chief Legal & Sustainability Officer and Corporate Secretary
“Rockwell quote Nem iumqui serspero exceari onseque cone ipiet qui atemo blacepe lestota tincianis mos ium cupitate pore, natur as adictum fuga. Ut liquunte vit eossunti ratur, officaeptati aut vellorest pa doluptataes exceprehento con corion re num. natur as adictum fuga. Ut liquunte Blacepe lestota tincianis mos ium cupitate pore, natur as 54 words.”

— Name of corporate leader
Title and company

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Title and company

“Rockwell quote Nem iumqui serspero exceari onseque cone ipiet qui atemo blacepe lestota tincianis mos ium cupitate pore, natur as adictum fuga. Ut liquunte vit eossunti ratur, officaeptati aut vellorest pa doluptataes exceprehento con corion re num. natur as adictum fuga. Ut 44 words.”

— Name of corporate leader
Title and company

Exploring careers in ocean and aquatic sciences
There is no single path that is the right way to reach your career. The more people you ask about what led them to their current jobs, the more you’ll see the path is often meandering and guided by serendipity. But that does not mean you cannot plan your path. Stay open to opportunities along the way. You never know what experiences will help lead you to your dream job!

Here are some stories of the career pathways of six professionals with careers in ocean and aquatic sciences.

**Growing up, I never planned to study ocean science; in fact, I had very little exposure to the ocean as a kid.**

I always liked science and nature, so I took a Marine Biology class before starting high school. I used what I learned from that class to earn a spot on my school’s NOSB team, which later went to nationals twice.

I majored in Chemistry in college at UCSD. Because of my history with NOSB, I decided to study abroad in Australia in a Marine Biology program. During that time, I learned I could study both chemistry and the ocean.

After working for a professor at the Scripps Institution of Oceanography, I decided to apply to graduate school. At USC, I used ocean sediments to study how the Amazon River affects carbon production in the ocean.

I got my Ph.D. to be a scientist, and found an opportunity to teach and travel with SeaMester. While teaching Oceanography, I incorporated sites from our itinerary into lectures, helping my students understand why the science mattered to them.

The desire to have a bigger impact led me to the AAAS Science and Technology Policy Fellowship. I am now at Lawrence Berkeley National Lab, working as a Communications Specialist at the Molecular Foundry, a nanoscale science research center.

Back in high school, all I knew was that I liked science. In practice I took opportunities that sounded interesting – like learning SCUBA, joining a NASA education project, or leaving everything to go teach on a boat. These random turns in the trajectory of my career path have helped me reach where I am today.

“**My adaptability and being a quick study, both honed as an oceanographer and sea-farer, were essential to my success. I still don’t know exactly what I’ll be when I grow up, but I’m having a good time figuring it out.”**

**Laurie Chong**
Communication Specialist, Molecular Foundry

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What is the pathway to reach your goal?
“I became a scuba diver when I was 13-years-old while growing up in Washington, DC. For me, diving was like becoming an astronaut and exploring alien planets. Only I got to do it here on Earth, and there is nothing I’d rather do than enjoy our underwater worlds.”

Sam Teicher
Founder, Coral Vita  reef restoration

My name is Sam Teicher, and I’m one of the founders of Coral Vita, a company that grows corals to restore dying reefs.

I got my B.A. in Political Science from Yale College. Originally, my focus was on national security and international development. But as I learned more about climate change I decided to dedicate myself to environmental sustainability. I interned for Environment America’s campaign to limit toxic air pollution and was admitted to the Yale School of Forestry & Environmental Studies master’s program.

Prior to starting my degree, I took a gap year to help the launch the environmental branch for my friend’s non-profit ELI Africa in Mauritius. One project I helped create was a UN-funded coral farm, working in tandem with the Mauritius Oceanography Institute, students, local communities, and business leaders to restore the lagoon of Trou aux Biches.

Back at grad school, I focused my masters on Business & the Environment to fill a gap in my education/professional experience, while also revisiting my passion for policy by taking Yale’s yearlong Studies in Grand Strategy course.

After working on climate change adaptation policy at the White House Council on Environmental Quality as well as the Global Island Partnership, I realized policymakers and NGOs alone can’t move rapidly or effectively enough to counter global reef degradation. So, I started Coral Vita as a company with my friend to scale up reef restoration globally. We use innovative methods developed by the Mote Marine Lab and Gates Coral Lab to accelerate coral growth up to 50x while strengthening their resiliency to climate change. We believe we can help preserve coral reefs for future generations.

“My academic and professional careers provided me with skills in research, writing, data analysis, and task management that are critical for my work; they also nurtured my love and passion for the ocean with fieldwork, exploration, and discovery.”

Leonard Pace
Program Manager, Schmidt Ocean Institute

Raised in Brooklyn, New York my love for ocean sciences resulted from trips to the New York Aquarium and volunteering at the Brooklyn Zoo where I worked with aquatic exhibits.

That interest resulted in a Bachelors degree in Marine and Environmental Sciences and a Master degree in Fisheries Biology.

By that point in my academic career, beyond the classroom, I’d conducted research on invasive species at the Great Lakes Science Center, at sea aboard the Sea Education Association’s R/V Westward, by air with the

Continues on page 12
The pathway to your goal continued

Leonard Pace, continued from page 11

Environmental Protection Agency’s Helicopter Monitoring Program in Antarctica, and on sharks in South Africa.

My academic career provided me with a wonderful breadth of experiences that helped me realize that I wanted to work in science program management to support programs similar to the ones I’d experienced.

My path continued with a John A. Knauss Marine Policy Fellowship where I supported the U.S. Coral Reef Task Force, co-chaired by the National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service.

That exposure to marine policy at the highest level was intriguing and I continued my exploration of ocean policy and management through several contracts and term positions in and around Washington, DC.

I am currently a Program Manager for Schmidt Ocean Institute where I regularly review proposals seeking to conduct cutting-edge marine research and technology demonstration around the world.

I feel fortunate to be among those that steer the course of technological and scientific development for ocean sciences.

I received a B.A. in Art Practice from the University of California, Berkeley and an M.F.A. in Painting from the University of California, Los Angeles.

Many of my paintings center on invertebrates, especially deep sea invertebrates. Although my degrees are in art, I chose to attend research universities as opposed to art schools, so that I could pursue a range of disciplines alongside my art. Through college and grad school, I took courses in literature, philosophy, history, and science—primarily physics, neuroscience, psychology, and chemistry.

While I always had a strong interest in invertebrates, I had intentionally wanted to separate my aesthetic interest in invertebrates from the field of science. However, as I became interested in more unusual, deep sea invertebrates during graduate school, I realized that the biology of the creatures was, in many ways, the most compelling aspect of the work. I began visiting marine laboratories to observe specimens and speaking with the scientists who study them to learn more about the way they function in the ocean’s depths.

In the summer of 2012, I joined a research expedition from Scripps Institution of Oceanography to explore the depths of the continental margin along the San Diego Coast and finally had the chance to observe many of my artistic subjects—living!—as they were collected from the sediment and water column. Being able to see the animals while they were alive rather than observing preserved specimens was a transformative experience for me, as I was able to draw them while they moved and see all of their natural pigmentation.

The expedition even introduced me to a brand new medium: deep sea sediment. Every day, after the researchers finished sieving the mud brought up from the ocean floor, I used the remaining sediment to paint a new mural on the wall of the ship.

“Although my degrees are in art, I chose to attend research universities as opposed to art schools, so that I could pursue a range of disciplines.”

Lily Simonson
Artist, Los Angeles, California

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"As much as I’ve loved wildlife conservation and the ocean, I’ve also loved writing, reading, and making a global impact on policy — and now I have a job that allows me to combine all three!"

I fell in love with marine ecosystems as a kid growing up by the Chesapeake Bay in Baltimore, and I fell in love with advocacy and politics as a college kid in Washington, D.C.

It all started with environmental science summer camps in middle school and Environmental Science classes in high school. I went on to major in Biology and become an Environmental Biology Scholar at Howard University.

I took classes in college that started to change the way I thought about making a difference in biodiversity conservation: maybe it wasn’t all about being in the field – maybe I could work in an office and still make a serious impact!

Designing laws and regulations that protected wild places and marine ecosystems seemed just as important as diving to identify and collect data about those same places.

When I returned from a research experience in West Africa, I received my master’s degree in Wildlife & Fisheries Sciences from Texas A&M University. Still nurturing a desire to write and work in politics and advocacy, I moved back to Washington, D.C. a year later.

By this point, I had found my fit, and I knew how much I wanted to work at the intersection of ocean science and policy. I went back to graduate school to finish my Ph.D. at Duke University, where I gained two new interests: renewable energy and environmental entrepreneurship.

At Duke, I founded Kedge Conservation, a social enterprise that helps rural and nomadic communities in coastal Africa develop community micro-businesses and also became the Lead Editor for Energy Policy in the Duke SciPol program.
University ocean and aquatic science programs

Many universities have ocean and aquatic science departments, schools, or institutes with programs for undergraduate and graduate students. A few are highlighted here. The college name is hyper linked to the program website.

Undergraduate and Graduate

George Mason University Department of Atmospheric, Oceanic, and Earth Sciences

cos.gmu.edu/aoes/

Massachusetts Institute of Technology, Department of Civil and Environmental Engineering
cee.mit.edu

Department of Earth, Atmospheric, and Planetary Science
eapsweb.mit.edu

North Carolina State University Department of Marine, Earth, and Atmospheric Sciences
meas.sciences.ncsu.edu

Old Dominion University Department of Ocean, Earth, and Atmospheric Sciences
odu.edu/oeas/

Oregon State University College of Earth, Ocean, and Atmospheric Sciences
ceoas.oregonstate.edu

Rutgers, The State University of New Jersey Institute of Marine and Coastal Sciences
marine.rutgers.edu/main/

Savannah State University Marine Sciences Program
savannahstate.edu/cost/mar-env-science/marine-science/index.shtml

Stanford University Hopkins Marine Station
hopkinsmarinestation.stanford.edu

Stony Brook University School of Marine and Atmospheric Sciences
somas.stonybrook.edu

Texas A&M University College of Geosciences
geosciences.tamu.edu

Galveston Marine Sciences Department
tamug.edu/mars/index.html

Now that you have an idea of the directions a career in ocean and aquatic sciences can take you, make it happen! Take advantage of the following opportunities for more ideas, inspiration and experiences to lead you toward your career:

- **Think carefully** about the education you will need (types of schools and degrees), from community college, technical school, and undergraduate degree or graduate degrees. **The programs listed on these pages can help you get started.**

- **Be creative...** how can you work in ocean sciences in Nebraska?

- **Show initiative!** Search for (and grab!) opportunities and experiences, such as scholarships, internships, fellowships, summer field work and volunteer positions.

- **Ask questions!** Talk to people working in the career you want. Tell people about your interests—sharing information often leads to information.

- **Participate in and learn from** your local NOSB bowl! (If you don’t have an NOSB team at your school, start one! Visit nosb.org today.)

Where do you go to get to where you want to be?
University of Alaska-Fairbanks School of Fisheries and Ocean Sciences
sfos.uaf.edu/

University of California Santa Barbara
undergrad.biology.ucsb.edu

University of Connecticut at Avery Point
Marine Sciences Program
marinesciences.uconn.edu

University of Delaware College of Earth, Ocean, and Environment
ceoe.udel.edu/academics/for-current-undergraduates/marine-sciences-summer-program

University of Maine School of Marine Sciences
umaine.edu/dms/

University of Miami Rosenstiel School of Marine & Atmospheric Science
rsmas.miami.edu

University of Michigan School of Natural Resources and Environment
seas.umich.edu

University of New England Department of Marine Sciences
une.edu/cas/marine/

University of New Hampshire Marine Program
marine.unh.edu

University of North Carolina at Chapel Hill
Marine Sciences Program
marine.unc.edu

University of North Carolina at Wilmington
Center for Marine Science
uncw.edu/cms/

University of San Diego Department of Environmental and Ocean Sciences
sandiego.edu/cas/environmental-ocean-sciences/

University of Southern Mississippi
Department of Marine Science
usm.edu/marine/

University of Washington College of the Environment
coenv.washington.edu/

Youngstown State University Department of Geological and Environmental Sciences
catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-geological-environmental-sciences/

Graduate only

East Carolina University Institute for Coastal Science and Policy
ecu.edu/icsp/

Massachusetts Institute of Technology/Woods Hole Joint Program in Oceanography, Applied Ocean Science & Engineering
mit.whoi.edu/home/

Texas A&M University – Corpus Christi
Coastal and Marine System Science Program
sci.tamucc.edu/PENS/CMSS/index.html

University of Colorado-Boulder,
Cooperative Institute for Research in Environmental Sciences
cires.colorado.edu

University of South Florida College of Marine Science
marine.usf.edu

University of Wisconsin-Milwaukee School of Freshwater Sciences
uwrm.edu/freshwater/

Virginia Institute of Marine Science/College of William and Mary
www.vims.edu
Other resources

Ocean and aquatic science related career information
Sea Grant: marinecareers.net
Science Careers: sciencemag.org/careers
The Oceanography Society: tos.org/career-profiles
COSEE Ocean Careers: oceancareers.com/2.0/index.php
Womenoceanographers.org: womenoceanographers.org
American Geosciences Institute: agiweb.org/workforce
NOAA Ocean Careers: oceanexplorer.noaa.gov/edu/oceanage/welcome.html
Teledyne Technologies Careers: teledynecareers.com
Department of Labor: bls.gov/ooh/ www.bls.gov/green/greencareers.htm
National Ocean Sciences Bowl's Career Resources:
   nosb.org/opportunities/career-resources

Federal Jobs
Applying for federal jobs can be different than applying for jobs in the private sector. Information on federal jobs can be found at the following sites.
Office of Personnel and Management: opm.gov
USA Jobs: usajobs.gov

Internship Opportunities
Consortium for Ocean Leadership Policy Internship:
   oceanleadership.org/opportunity-ocean-leadership-policy-internship
Federal Career Intern Program:
   treasury.gov/careers/Pages/federal-career-intern-program.aspx
Monterey Bay Aquarium Research Institute Internships:
   mbari.org/education/internship/genintern.htm
Naval Postgraduate School Internships and Fellowships:
   my.nps.edu/web/research/internships-fellowships
NOAA student opportunities:
   education.noaa.gov/Special_Topics/Student_Opportunities.php#page=page-1
National Science Foundation Internships:
   nsf.gov/careers/careertypes/pathways.jsp
Sea Grant Guide to Internship Opportunities:
   marinecareers.net/internships-and-fellowships
University of New Hampshire School of Marine Science and Ocean Engineering:
   marine.unh.edu/resources/all/internships
Woods Hole Oceanographic Institution Undergraduate Programs:
   whoi.edu/main/undergraduate-programs

How do you start a NOSB team?

The National Ocean Sciences Bowl (NOSB) is a timed competition for teams of high school students involving critical thought questions and rapid memory recall responses. Topics cover biology, physics, geology, and chemistry of the oceans, as well as related geography, technology, history, policy, and current events.

To learn more, visit nosb.org/compete.
The National Ocean Sciences Bowl (NOSB) is managed by the Consortium for Ocean Leadership. For more information about the NOSB, visit www.nosb.org or contact: National Ocean Sciences Bowl Program Office, Consortium for Ocean Leadership, 1201 New York Avenue, NW, 4th Floor, Washington, DC 20005. The NOSB is made possible by the generous support of a number of sponsors. For a complete list, visit our website: www.nosb.org/supporting-nosb/sponsors-2.

This career booklet was made possible by support from the Eastman Foundation.

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