

AUT



**A FUTURE IN
MARINE
SCIENCE**



WHAT IS MARINE SCIENCE?

The world's ocean is the largest and most diverse habitat on Earth and is home to an astonishing variety of life. For us, the Pacific Ocean – Te Moana-nui-a-Kiwa – has a special significance as the route through which Aotearoa New Zealand was discovered. Now, our 15,000 km coastline and expansive four-million-square-kilometre marine exclusive economic zone provides cultural identity, food, medicine and raw materials.

These resources must be safeguarded for future generations, and not overharvested simply to support today's needs. It is increasingly clear we must interact with these systems in a more sustainable manner to balance human interests and marine health.

For this, we need marine scientists who possess a deep understanding of these systems, and can help develop a strong, sustainable future for our oceans and the billions of people who depend on them.

Marine scientists engage with the ocean through biological, chemical, and physical research, and can also engage in commercial fish and shellfish rearing on land (aquaculture) and in the sea (mariculture). They also play a crucial role in conservation efforts, providing critical knowledge to inform decisions and actions relating to the marine environment.

Marine scientists work with people to balance the needs of biodiversity and sustainable use. This can include educating people about the importance and fragility of marine systems and life, exploring the potential value of natural biochemical compounds through bioprospecting, and informing fisheries management.

Marine science skills are highly versatile and can be applied in a wide range of industries, including environmental consulting, planning, policy development and tourism.

If you want to make a meaningful difference by contributing to the protection of our oceans or to commercial endeavours, then marine science may be the career for you.

OUTLOOK AND TRENDS

UN 2021–2030 Decade of Ocean Science

The UN Decade of Ocean Science for Sustainable Development seeks to galvanise global efforts to protect our oceans and enhance sustainability. This platform explores ways to harness our ocean's potential to drive sustainable economic growth, understand our planet's history and biodiversity, provide food security and enhance human wellbeing.

Indigenous science

Tangata whenua (indigenous Māori people of Aotearoa New Zealand) have interacted sustainably with the ocean for centuries. Mātauranga Māori (traditional knowledge) is a crucial component of marine science in Aotearoa, emphasising respect and understanding of interdependence between humans and the marine environment, including cultural, spiritual, historical, biological and physical factors.

Integrating Mātauranga Māori and modern scientific techniques creates new ways to sustainably manage marine resources and protect our ocean for future generations.

Bioprospecting and marine pharmaceutical compounds

Bioprospecting is the exploration and evaluation of biological material for potential commercial use, eg pharmaceuticals, nutraceuticals and biofuel. Researchers and businesses are exploring Aotearoa's biota and its potential to improve human health outcomes, including therapeutic activities of marine sponges.

However, the Waitangi Tribunal flora and fauna claim (WAI 262) has highlighted concerns about use of indigenous organisms and products derived from them, and the need for best practice guidelines with taonga (treasured) species in keeping with tino rangatiratanga (indigenous sovereignty).

Management of coastal resources

As demand for marine resources grows, so does the need for scientists with specialised knowledge and skills to ensure the sustainable use of marine and coastal resources. Experienced specialists are sought after at the Ministry of Primary Industries (MPI), Department of Conservation (DoC), councils, National Institute for Water and Atmospheric Research (NIWA), and other research providers and international agencies.

Marine environmental monitoring

The need for marine environmental monitoring has never been greater. NIWA has commissioned development of an online meta-database, providing a robust monitoring programme to track changes in marine ecosystems over time. People with marine biology and ecology knowledge are needed to build and maintain this inventory.



WORK SETTINGS

Marine professionals can work in offices and laboratories, but they also work in rural areas, coastal waters, offshore, or with land-based ponds and tanks, and may be required to work in all weather conditions.

NIWA, a crown research institute (CRI), is the largest employer of marine scientists.

Further major employers include other CRIs, universities, analytical laboratories, Ministry of Primary Industries, Department of Conservation and the Environmental Risk Management Authority (ERMA). Regional councils, private companies such as aqua-farms, Fish and Game NZ, and tourism and education bodies also employ many marine professionals.

CAREER ROLE EXAMPLES

Marine scientist – Studies and analyses marine ecosystems and organisms, using field and/or computer-based methods to monitor, assess and predict ongoing trends. Works with diverse partners to develop and implement sustainable ocean solutions at local (community and council), national, and/or international levels. May be based in a Crown Research Institute, eg NIWA or government body such as DoC. **

Hydrographic data processor and ocean floor mapper – Explores and maps the ocean's floors using specialised software packages and tools. Processes and analyses multibeam sonar survey data, drawing on analytical and problem-solving skills. Collaborates with multi-disciplinary teams, including geologists, oceanographers and survey technicians, to ensure mapping data accuracy. May require periods of time offshore.

Aquaculture farm manager – Works with aquaculture companies to produce sustainable seafood products. Optimises shellfish and fish cultivation within land-based or off-shore farms, including hatchery production, water-flow and filtration systems, and developing aquafeed. Works alongside multi-disciplinary teams including farm staff, other scientists and government officials.

Fisheries analyst – Helps develop, deliver and manage New Zealand’s fisheries. Provides advice to government ministers, managers, project partners and practitioners on fisheries management issues and government objectives. Manages multiple projects and priorities. Requires excellent analytical and problem-solving skills, and the ability to clearly communicate complex information to a variety of audiences. **

NGO consultant – Provides guidance or technical assistance to international non-governmental organisations active in the Pacific, such as Conservation International or Nature Conservancy. Works collaboratively with diverse organisations and stakeholders to achieve conservation and sustainability goals, providing expertise in areas such as project management, fundraising and community engagement. **

**May require postgraduate study and/or several years’ prior work experience.

SKILLS AND KNOWLEDGE

Technical skills

- Detailed knowledge of marine science, ecosystems, biology and chemistry
- Well-developed research skills
- Strong statistical and computer skills
- Excellent writing skills, for compiling reports and for publications
- Boat handling and navigation
- Diving certification
- Awareness of health and safety practices

General skill requirements

- Ability to work in a team
- Excellent communication skills, particularly in explaining complex ideas to clients or co-workers who may not understand technical terms
- Strong project management skills
- Hands-on practical aptitude
- Competent time management and organisation, especially the ability to prioritise
- Creative problem solving abilities
- Understands and values strong partnership in Te Tiriti o Waitangi

PERSONAL QUALITIES

- Lateral thinker
- Passionate about marine environments
- Logical, methodical and precise
- Flexible and quick to adapt to new projects or changing requirements
- Objective, enquiring and open to new ideas

SALARY GUIDE

	Salary
Marine Technician	
Entry level	\$50,000–\$55,000
5 years+ experience	\$72,000–\$85,000
Marine Biologist	\$64,000–\$71,000
Senior Marine Biologist (8 years+)	\$109,000–\$123,000+
Hydrographic Surveyor	
Entry level	\$62,000–\$65,000
Senior (8 years+)	\$107,000+
Fisheries Analyst	
Entry level	\$60,000–\$80,000
Senior level (with postgraduate study)	\$80,000–\$120,000

Sources: Payscale, SalaryExpert, CareersNZ, Glassdoor, SEEK, Economic Research Institute (ERI).

Salary range is indicative of the New Zealand job market at the time of publication (2023) and should only be used as a guideline.

THE AUT APPROACH

The Marine Science major in the AUT Bachelor of Science is globally focused and taught by lecturers from all over the world who have a variety of research backgrounds with expertise in temperate and tropical ocean settings.

Final-year students can enrol in a research project, which may involve a placement with an employer organisation. Previous projects include researching survival aspects of surf clams and seaweed for private industry, population dynamics of commercial fish species of interest to the MPI and investigating the ecology of deep-sea species.

Marine research groups at AUT focus on diverse areas such as physical oceanography, mangrove ecology, biodiversity, aquatic biogeochemistry, fisheries science, seaweed applications and cephalopod ecology. We have strong ties to industry partners in aquaculture, sustainable harvest, fisheries research, and the Australian Blue Economy Cooperative Research Centre.

FURTHER STUDY OPTIONS

Postgraduate study is required for many roles in marine science. Postgraduate programmes include the Graduate Certificate and Graduate Diploma in Science, Master of Science and Doctor of Philosophy in Marine Science.



JAEVER SANTOS

EMu Database Support Officer at Australian Museum in Sydney

Master of Science (Research) with Honours (First Class) in Marine Science

"I started in 2020 at Australian Museum as a digitising technical officer for the malacology (mollusc) collections. This involved creating and updating digital records for our specimens. It was a huge job requiring skills in taxonomy, hazardous chemical handling and accurate data entry.

After 18 months I moved to this collections database support officer role. About half my time is spent operating the helpdesk for our collection management system and training users. The other half involves processing data produced by digitisation projects and putting it into the database. I also look at data policy – that we're capturing the right information in the right way to effectively share it with other institutions, scientists and the public.

I love working in a museum environment. I'm privileged to work in meaningful ways with so many taonga, from natural science collections and cultural collections to archival collections. I collaborate with many internal and external stakeholders.

This requires good communication skills, for example explaining technical concepts in training, problem solving with vendors, and workshopping data standards.

Cultural sensitivity is another important skill, particularly in the museum environment. It's important to remember scientific, cultural, and archival collections all coexist and connect. I'm grateful cultural sensitivity is familiar to most of us Kiwis.

I feel everyone goes through a 'marine biologist phase', I just never outgrew mine. My passion is marine invertebrates, especially squid. My master's research focused on taxonomy – classification and naming of species and life on earth."

EMPLOYER COMMENT

"A collections database support officer needs experience with collection management systems (database) as a user and preferably as an administrator. Strong technical skills in database management and the ability to analyse and solve problems are vital because they interact with and interrogate large datasets and manipulate this data.

Jae brings a combination of strong technical skills and interpersonal skills. His science background is an asset because he understands scientific data and how it should be captured within the database. He also understands user issues.

Volunteering (digital and onsite) and internships are a great way to first experience this sector. Graduates need to understand learning is lifelong and they have to constantly develop their skills to keep current."

Sunita Mahat
EMu Database Support Coordinator at Australian Museum

USEFUL WEBSITES

Department of Conservation

doc.govt.nz

Science New Zealand

sciencenewzealand.org

National Institute of Water and Atmospheric Research – Taihoro Nukurangi

niwa.co.nz/our-science/coasts-and-oceans

Aquaculture New Zealand

aquaculture.org.nz

FURTHER INFORMATION

For the most up-to-date information on the study of marine science and the Bachelor of Science, visit aut.ac.nz/marine-science

For other Future Career Sheets visit:

aut.ac.nz/careersheets

EMPLOYABILITY & CAREERS

For employability and career support, AUT students can book an appointment through <https://elab.aut.ac.nz/>

 @AUTEmployabilityandCareers

FUTURE STUDENTS

Contact the Future Student Advisory team for more information: aut.ac.nz/enquire

futurestudents@aut.ac.nz

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CURRENT AUT STUDENTS

Contact the Student Hub Advisors team for more information: 0800 AUT UNI (0800 288 864)

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