

UC San Diego

SCRIPPS INSTITUTION OF OCEANOGRAPHY

BIOMEDICAL AUTOMATION FACILITY

AT SCRIPPS INSTITUTION OF OCEANOGRAPHY



INNOVATION · SUSTAINABILITY · CURES ●



**JOIN US TODAY IN
THIS EXTRAORDINARY
NEW VENTURE.**

Partner with Scripps Institution of Oceanography in making our groundbreaking Biomedical Automation Facility (BAF) a reality. Once built, the BAF will harness the incomparable data harvesting of Scripps Oceanography to UC San Diego's powerhouse engineering enterprise.

HUMANS HAVE RELIED ON THE BOUNTY OF THE OCEANS AS LONG AS WE'VE BEEN LIVING.



BRADLEY MOORE, PHD

Bradley Moore, distinguished professor of marine chemical biology and pharmaceutical chemistry, is a pathbreaking leader in understanding and applying the chemistry of life. Findings from Professor Moore's lab open up a range of solutions in mitigating pollution, creating sustainable materials and treating disease. Last year, Marizomib, an anti-cancer molecule, entered Phase III clinical trial testing as a treatment for glioblastoma, a brain cancer. Marizomib is especially potent for its ability to permeate the blood-brain barrier. The Moore Lab has unlocked how Marizomib is made by marine bacteria, enabling the discovery of new compounds that may target other cancers or diseases.

Advances in technology now make it possible for us to benefit from marine life and materials without harming fragile aquatic ecosystems, utilizing the unique properties of marine compounds for pharmaceutical applications. These drugs from the sea have already resulted in new therapeutics for treating many human diseases, with marine-associated discoveries leading to six Nobel prizes. The most enduring challenges in infectious disease, chronic disorders and life-threatening cancers may be solved through systematic analysis and replication of ocean-derived compounds.

Scripps Institution of Oceanography has played a pioneering role in creating this exciting new pipeline for drug discovery, partnering with counterparts across UC San Diego specializing in bioengineering, chemistry, data science and medicine. Now, thanks to two significant contributions, Scripps Oceanography is positioned to construct a scientific facility that will

level up our capacity to identify and develop new compounds for clinical testing. Genetic sequencing equipment donated in-kind by Illumina will provide the scientific horsepower for experimentation, while a generous philanthropic commitment kicks off fundraising for a remarkable facility to house this equipment and integrate scientific activities into a seamless, automated workflow.

The proposed Scripps Institution of Oceanography Biomedical Automation Facility (BAF) is modeled on resources regularly developed in private industry, but rarely found in academia. Genetic sequencing equipment will be leveraged by robotic assemblies preparing and conveying samples rapidly, optimizing access of four distinct but complementary functions. Scripps Institution of Oceanography seeks your support in making this powerful concept a reality.

WHY HERE?

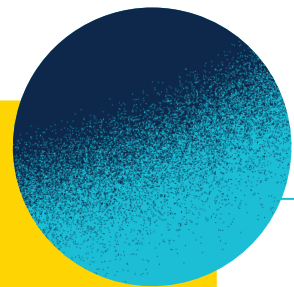
Scripps Institution of Oceanography is internationally renowned as a leader in ocean and planetary exploration for more than a century, with milestone achievements including the establishment of the benchmark Keeling Curve, which measures carbon dioxide concentration in the atmosphere; a sophisticated fleet of research vessels; and the deployment of wireless sensors on a variety of aquatic and terrestrial platforms.

When it comes to applications like pharmaceutical compounds, Scripps Oceanography's impact becomes exponentially greater through close collaboration with partners across UC San Diego. Our campus is also home to a leading School of Medicine, Skaggs School of Pharmaceutical Sciences, Jacobs School of Engineering, School of Biological Sciences, and School of Physical Sciences. The research enterprise is awarded on average more than \$1.5 billion in grants and contracts each year, ranking it among the most productive in the world in terms of annual output.



DEIRDRE LYONS, PHD

In the lab of Deirdre Lyons, assistant professor of marine biology, researchers use high-powered imaging and genetic analysis to ascertain the development of different marine organisms. Research questions span a gamut of species whose evolutionary adaptation to their marine habitats can reveal much about evolutionary biology generally, and can also help us better predict specific ecosystem vulnerabilities as marine environments change.



WHERE BREAKTHROUGHS EMERGE

In the Biomedical Automation Facility, a “Super Core” laboratory will integrate several work cells: a chemical library, a synthetic biology biofoundry, and genome mapping automation for microbiome discovery. Other spaces in the facility will be dedicated to cellular imaging and metabolomics analytical instrumentation. Together, they comprise four connected cores, linked by automation.

- ▶ Cell biology imaging core
- ▶ Molecules and metabolomics core
- ▶ Microbiome core
- ▶ Synthetic biology core

The signature capacity of the facility – automation – compresses the time needed for experimental activities. Equipment incorporates liquid dispensers and handlers and dispatches robotic arms to manipulate multiwell plates and transport them to and from storage and incubators. Data analytics at the BAF will be served by two 10Gbps fiberoptic connections – one to Scripps Oceanography’s centralized data center for processing and backing-up data and one to the campus’ San Diego Supercomputer Center (SDSC), which services the interdisciplinary Center for Microbiome Innovation.




Research support spaces will provide space for the researchers developing laboratory experiments and machine learning technology to generate the ideas at the core of successful exploration.



JACK GILBERT, PHD

Jointly appointed to Scripps Institution of Oceanography and UC San Diego School of Medicine’s Department of Pediatrics, Jack Gilbert is a widely recognized leader in studies of interconnected microbial communities, commonly known as the microbiome. With counterparts in computer science and bioengineering, Dr. Gilbert explores medical and environmental microbiology, microbial ecology, and biotechnology development. Recent work focusing on constitutive changes in microbial communities in the Chicago Area Waterways System point to more focused interventions to tend the health of marine ecosystems and the organisms in contact with them – including human populations.



Together, technology and scientists will take our discovery to new levels of application and impact, a reach only made possible by resourceful partners like you. Thank you for supporting Scripps Institution of Oceanography in this exhilarating initiative.

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Director of Development

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