14 LIFE BELOW WATER

CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT



Dr. Tal Luzzatto Knaan (Credit: School of Marine Sciences Facebook)

RESEARCH

AI Unlocks New Insights into Whale Communication

A new study by researchers at the Leon H. Charney School of Marine Sciences has developed the first automated system capable of reliably identifying and classifying the communication patterns of sperm whales, even in noisy underwater environments. Led by Prof. Roee Diamant and conducted as part of the international CETI project, led by Prof. Dani Tchernov, the research enables large-scale analysis of whale vocalizations and reveals coordinated, dialogue-like communication between pairs of whales. The findings were published in *Scientific Reports*.

AI-Powered Robot Swarms for Faster Oil Spill Detection

A University of Haifa study by graduate student Hadas Cohen and Dr. Oren Gal of the Leon H. Charney School of Marine Sciences introduces an AI-powered robotic swarm system for rapidly detecting and tracking oil spills at sea. The system uses coordinated autonomous marine vehicles and a novel AI model to predict the movement of oil slicks under changing ocean conditions, enabling faster and more effective environmental response.

AI Optimizing Microalgae Growth

A University of Haifa study at the Morris Kahn Marine Research Station applies AI to optimize microalgae cultivation in climate-tech applications. The model, trained on three years of operational data from BarAlgae, predicts algae growth and evaluates different harvesting strategies to maximize long-term yield. It integrates operational, environmental, and visual biological data to improve prediction accuracy and cultivation efficiency.

PUBLIC ENGAGEMENT

Real-Time Sea Monitoring from Research Buoy

Real-time ocean data from the Morris Kahn Marine Research Station & Blue Technologies Hub research buoy, located off Sdot Yam, is now publicly available through a new graphical interface on the station's website. The buoy provides continuous measurements of wave conditions, wind, and sea surface temperature, updated every 20 minutes, serving researchers and marine users alike. The data are also integrated into the Israeli GoSurf platform and offers forecasts for surfers and other sea users.

Byzantine Chisel Discovery

A collaboration between the University of Haifa and Rafael Advanced Defense Systems enabled the world's first digital reconstruction of a 1,500-year-old Byzantine chisel recovered from a shipwreck off Israel's Dor coast. Led by Prof. Debbie Cvikel with students from the University's maritime archaeology programs, the project offers new insights into Byzantine maritime life while demonstrating how advanced technologies can drive archaeological discovery and interdisciplinary innovation.

Taking Aim at Illegal Blast Fishing

Prof. Roee Diamant of the Leon H. Charney School of Marine Sciences at the University of Haifa is helping authorities combat illegal blast fishing, a destructive practice that threatens marine ecosystems across Asia, Latin America, and Africa. He developed an acoustic system that successfully detected underwater explosions in real time during recent field trials on the Philippine island of Palawan, conducted in collaboration with the local coast guard. Following the successful pilot, the technology is expected to be deployed in additional regions worldwide.

LEARNING AND STUDENTS

ARIEL Makes a Splash at RoboSub

The University of Haifa's ARIEL team made its official debut at the prestigious international RoboSub competition, becoming the first Israeli team to compete in the event in a decade. Led by Prof. Itzik Klein of the Hatter Department of Marine Technologies, the eight-member graduate student team designed and built an autonomous underwater vehicle that placed an impressive 20th among 59 teams from around the world. The achievement showcases the students' expertise in robotics, navigation, computer vision, and autonomous systems, and further strengthens the University of Haifa's position as a leader in marine robotics research and innovation.

Blue Tech Meets Industry

M.Sc. students in Blue Biotechnology and Sustainable Aquaculture program completed an industry internship course in partnership with the AquaculTech Innovation Community. Through placements at leading companies, they gained hands-on experience in aquaculture technologies and marine innovation, highlighting the value of academia-industry collaboration in preparing the next generation of Blue Tech leaders.

OPERATIONS

Meet Our Marine Research Technologies

The Department of Marine Technologies showcases advanced instruments and Autonomous Systems that support cutting-edge marine research. From underwater robotics and sensing technologies to ocean monitoring platforms, these tools enable students and researchers to explore, understand, and protect the marine environment while advancing innovation in ocean science.

Advanced Marine Research Services

The Leon H. Charney School of Marine Sciences offers advanced marine research services using state-of-the-art technologies and facilities. Available to researchers, students, and industry partners, these services support innovative research and professional solutions across a wide range of marine science applications.

State-of-the-Art Marine Technology Facilities

The Department of Marine Technologies is home to advanced research facilities that supports cutting-edge innovation in ocean science and engineering. Its state-of-the-art laboratories, testing facilities, and marine technologies provide students and researchers with hands-on experience while enabling pioneering research in autonomous systems, underwater sensing, and marine monitoring.