The Department of Marine Biology

# Annual Newsletter

## Keeping In Touch With Our Marine Biology Community

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Leon H. Charney
School of
Marine
Sciences
UNIVERSITY
OF HAIFA

March 2026

*Prof. Smadar Ben-Tabou de-Leon*
*Head of the Department of Marine Biology*

Dear students, colleagues and alumni,

I wrote this letter shortly after the last hostage, Ran Gvili, was returned, when I felt we were finally moving beyond October 7th. I am now updating it during Iran war 2, but the message remains the same. We will continue working toward a better future and a stronger community as we have already been doing for a while now. This newsletter celebrates the dedication, achievements, and discoveries of the Department of Marine Biology, and our ongoing contribution to the community.

Congratulations to our **18 MSc and six PhD graduates** for their remarkable work and excellence, reflected in their high-impact publications and the prizes they have won, including **Tovah Nehrer** recipient of the Dean's Award for an Excellent MSc thesis, along with many other outstanding students (See full lists in pages 4–5).

Congratulations to Ilana, who has been selected as a 2025 ASLO Sustaining Fellow by the Association for the Sciences of Limnology and Oceanography (ASLO), in recognition of her sustained scientific excellence and her longstanding impact and contributions to ASLO and to the global aquatic science community.

Congratulations to **Tami, Laura, Daniel, Tali, Igal,** and **myself** for **the recent papers** on coral pulsation, comparative metagenomics, modeling and experimenting with bacterial co-cultures, and advances in biomineralization research, published in *PNAS, Microbiome, Nature Microbiology, Advanced Science*, and *Nature Communications*. **Highlights of these papers appear in Pages** 6–10.

This year, you **traveled across continents** to explore marine life in some of the world's most remote regions. In this newsletter, you can read about the **Mass lab's journey** to study coral challenges in French Polynesia, as told by PhD student Pierrick Harnay (page 11); the **Steindler lab's cruise** exploring hidden methane sources in the North Pacific, described by PhD student Jaime Abdiel Lazaro Garcia (Page 12); and **Tal Luzzatto-Knaan's expedition to Antarctica** (Page 14).

A particularly meaningful part of our work is our **outreach and educational engagement** with the broader community. This year, our lab managers created a new course on the Mediterranean Sea for senior citizens. The course was received with great enthusiasm and appreciation from the participants. More details by Tsvia Gildor appear on page 16.

**Our annual retreat, held in June 2025**, demonstrated the scientific and community strength of our department. Excellent oral and poster presentations by students and PIs celebrated a year of great science despite the challenging times. **The awardees for the best talks and posters** introduce themselves and their research toward the end of this newsletter (Pages 17–20).

As I prepare this newsletter and remember the moments we have shared, I am grateful for the privilege of teaching, mentoring, and working by your side throughout the years. I see you bringing the best of yourselves to your science and overcoming difficulties with determination. I am very proud of the excellent science you do, and even more so, of the people you are.

Looking forward to the discoveries, explorations, and paths ahead!

Smadar Ben-Tabou de-Leon
Head of the Marine Biology Department

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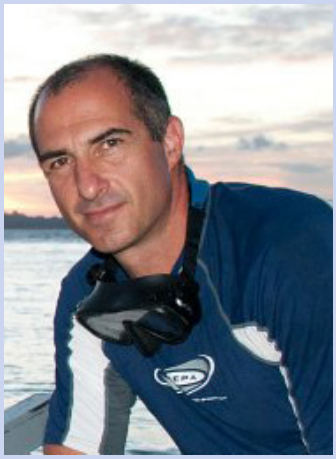


*Dan Tchernov, Head of the Leon H. Charney School of Marine Sciences*

Dear colleagues in the Marine Biology Department,

I would like to extend my warm greetings to all of you. As the Head of the Leon Charney School of Marine Sciences, I am constantly impressed by your dedication, curiosity, and commitment to marine research and education.

Your work is the heart of what we do as a school, and I am grateful for the passion, energy and care you bring to our shared efforts. Together, we continue to shape the future of marine science in meaningful and impactful ways.

Wishing you continued success and looking forward to working together in the year ahead.

Dan Tchernov
Head, Leon Charney School of Marine Sciences

# Congratulations to our graduates:

## MSc

Barak **Azrieli**

Amit **Barkai** – *cum laude*

Alon **Blachinsky** – *cum laude*

Jonathan **Blaustein** – *Dean of Graduate Studies Honor*

Elena **Bogdanova**

Shanduo **Chen** – *cum laude*

Khristina **Ermak**

Mapal **Ishay** – *Dean of Graduate Studies Honor*

Racheli **Kalian** – *cum laude*

Mirna **Kaloush** – *cum laude*

Kim **Kovo** – *Dean of Graduate Studies Honor*

Sarah **Lozieh** – *cum laude*

Eitan Shmuel **Newman** – *Dean of Graduate Studies Honor*

**Tovah Nehrer** – *Magna Cum Laude; Dean of Research Prize*

Arin **Qassem** – *Dean of Graduate Studies Honor*

Nadav **Rostowsky** – *cum laude*

Shir **Sassoon** – *Dean of Graduate Studies Honor*

Vibhaw **Shrivastava** – *cum laude*

# PhD

Zoya **Harbuzov**

Tal **Zvi Kedem**

Majed **Layous**

Elad **Nehoray Rachmilovitz**

**Valedictorian:** Debra **Mariko Ramon**

Matan **Yuval**

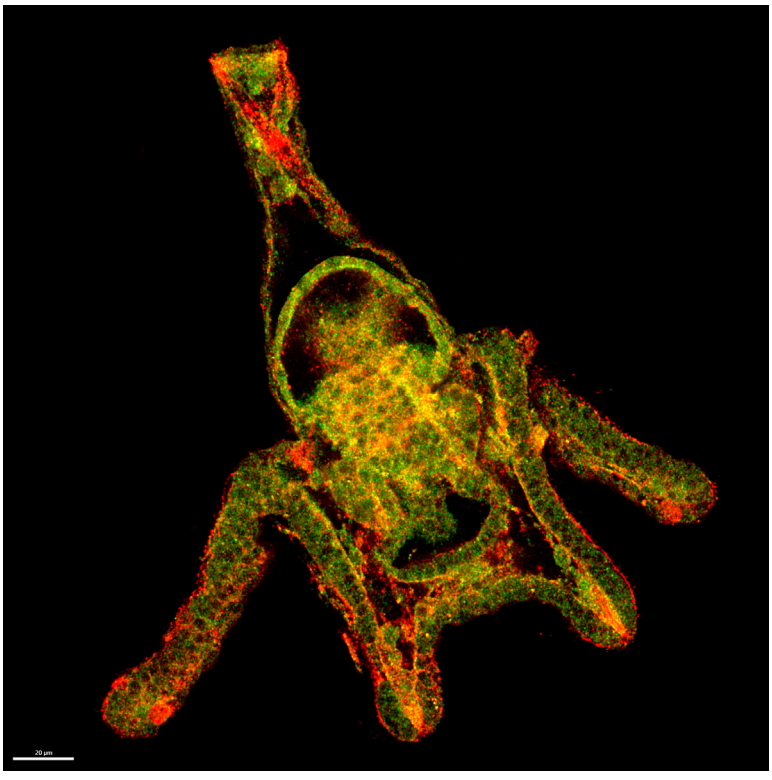
# HIGH IMPACT DISCOVERIES FROM OUR DEPARTMENT

## A mechanosensitive circuit of FAK, ROCK, and ERK controls biomineral growth and morphology in the sea urchin embryo

Majed Layous, Tsvia Gildor, Tovah Nehrer, Areen Qassem, Haguy Wolfenson and Smadar Ben-Tabou de-Leon, PNAS January 2025

https://www.pnas.org/doi/abs/10.1073/pnas.2408628121

This study reveals that sea urchin skeletal growth is guided not only by gene regulatory programs but also by a mechanical feedback from the skeleton itself. As the spicule forms during biomineralization, surrounding skeletogenic cells sense its high rigidity through a conserved mechanosensitive signaling circuit involving FAK, ROCK, and ERK. This mechanical information is then used to regulate skeletal growth and morphology, effectively allowing cells to sense and respond to the physical structure of the biomineral they are building. Strikingly, the same mechanotransduction pathway operates in vertebrate bone formation and pathological calcification, pointing to a deeply conserved strategy by which cells integrate mechanical cues from mineralized tissues to control their growth.



***Focal adhesions are formed around the spicules and are enriched in the spicule tips.*** *Image showing a sea urchin larva 48 hours post-fertilization with immunostaining of active FAK (red) and the focal adhesion protein Vinculin (green), enriched at the spicule tips*

# Insights into Coral Biomineralization: Effects of Ocean Acidification on Early Skeleton Development

Federica Scucchia, Katrein Sauer, Shah Fara, Tali Mass, and Paul Zaslansky, Advanced Science September 2025

https://advanced.onlinelibrary.wiley.com/doi/10.1002/advs.202508585

Coral reefs are built by tiny animals capable of producing massive skeletal structures, yet their ability to do so in acidified oceans is under threat. In the study by Scucchia et al., they investigated how ocean acidification (OA) affects the earliest stages of skeleton formation in a stony coral, focusing on two key growth zones known as rapid accretion deposits (RADs) and thickening deposits (TDs). Using high-resolution imaging and modeling of electron interactions to probe mineral phase composition, they discovered that TDs and RADs form simultaneously (not sequentially, as often assumed). Under OA conditions, they found that skeletons densify with a drop in the amorphous calcium carbonate (ACC) fraction and an increase in crystalline aragonite abundance. Further, they observed that RADs are underdeveloped under acidified conditions, compromising structural integrity and increasing fracture risk. These findings reveal previously unknown shifts in the mineral composition and microstructure of coral skeletons under ocean acidification. Understanding these mechanisms may help us predict which corals can better adapt and inform strategies to protect reef resilience.

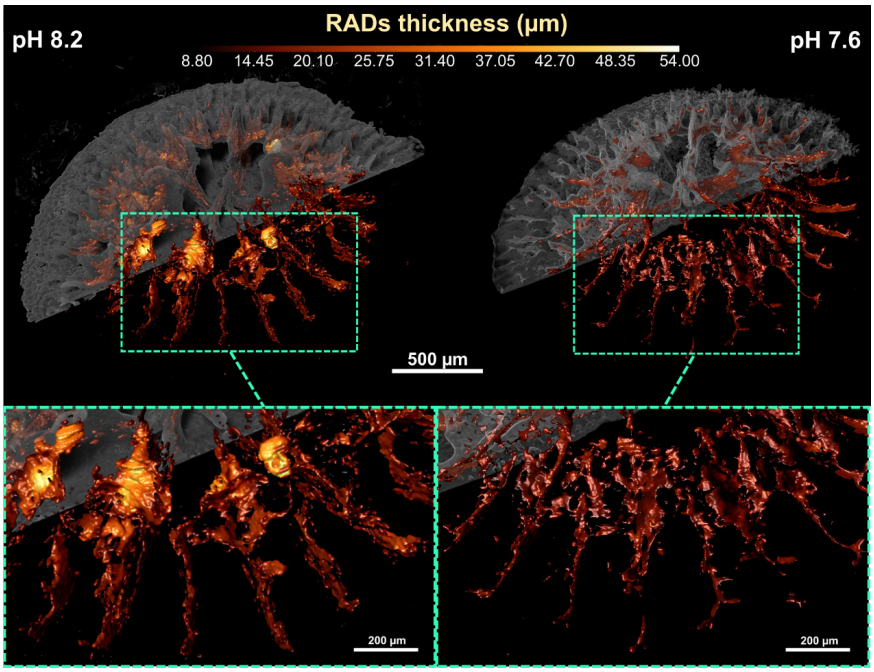


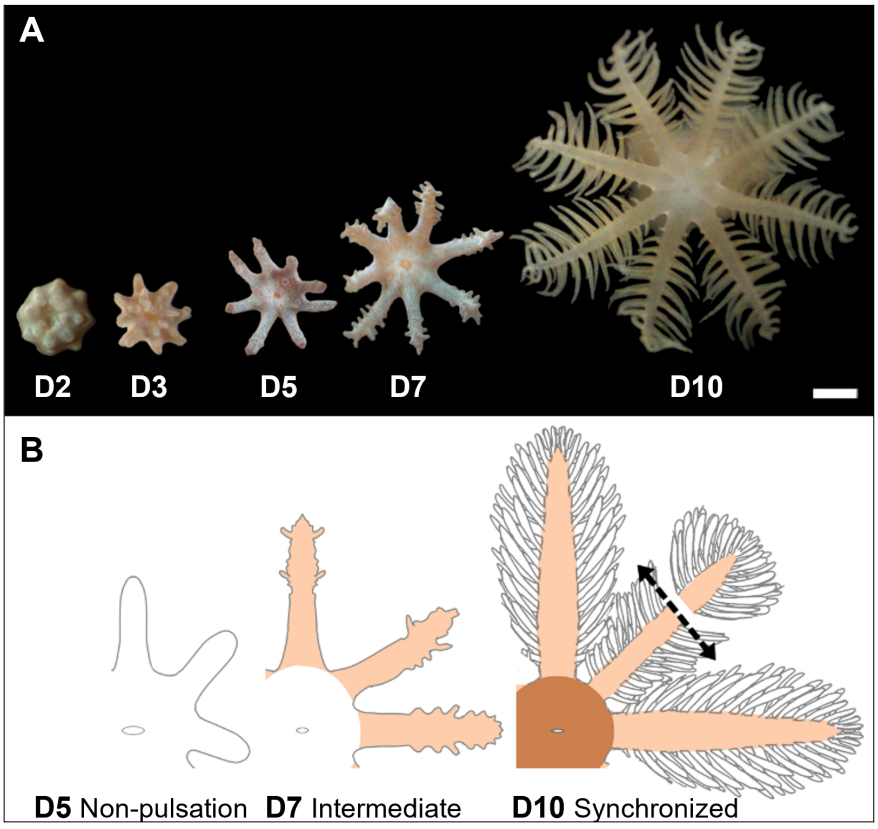

*Image showing 3D tomographic reconstructions of coral primary polyp skeletons, highlighting pH-dependent differences in the distribution of rapid accretion deposits (RADs; red/yellow) and thickening deposits (TDs; semi-transparent gray) under normal (pH 8.2) and ocean acidification (pH 7.6) conditions.*

# Diffuse pacemaker mechanism with distinctive organization drives pulsation in the octocoral Xenia umbellata

Elinor Nadir, Yehuda Benayahu, Maya Ofek-Lalzar, Tslil Gabrieli, Tamar Lotan, PNAS 2025

https://doi.org/10.1073/pnas.2500611122

Rhythmic movements in animals are typically controlled by localized pacemakers or central pattern generators. In cnidarians, however, the organization of such circuits remains poorly understood. Here, we investigate the neural basis of tentacle pulsation in the octocoral *Xenia umbellata*. Combining regeneration assays, transcriptomics, and pharmacological perturbations, we show that pulsation relies on a conserved molecular toolkit, including cholinergic signaling and anoctamin channels. Yet, unlike bilaterian systems, rhythmic control in *X. umbellata* is fully decentralized: individual tentacles and even dissected fragments retain autonomous pulsation without a defined pacemaker center. Synchronization emerges only later through neural and muscular coupling. These findings reveal an alternative strategy for rhythmic control in non-bilaterian animals and expand current models of pacemaker evolution.




*Oral disc regeneration and pulsation recovery. (A) Amputated polyps from 2 days post-amputation (dpa) (D2) to fully regenerated, pulsating polyps at 10 dpa (D10). (B) Model of pacemaker organization. A diffuse pacemaker network (light orange) enables independent tentacle pulsation during regeneration, whereas a later-forming synchronization region (dark orange) coordinates all eight tentacles. Diffuse tentacle pacemakers allow dissected fragments to retain pulsation. The quarter polyp includes the mouth and three tentacles.*

# Historical depletion and future drought driven risks to Gulf of Mexico fisheries production

Igal Berenshtein, Benjamin Kirtman, Kim de Mutsert and David D. Chagaris, Nature Communications 2026

https://www.nature.com/articles/s41467-026-69116-6

This new study examines how large-scale terrestrial drought can trigger long-lasting declines in marine fisheries. Focusing on the Gulf of Mexico, the research shows that a severe drought in the late 1980s reduced Mississippi River flow and nutrient supply to coastal waters, leading to a collapse of roughly 40% in total fisheries production. Using long-term data and ecosystem modeling, the study further projects that future climate-driven droughts could cause even more severe and recurrent declines in fish biomass and catches during the 21st century. The findings highlight drought as a major, yet often overlooked, threat to marine food webs and fisheries sustainability under climate change.

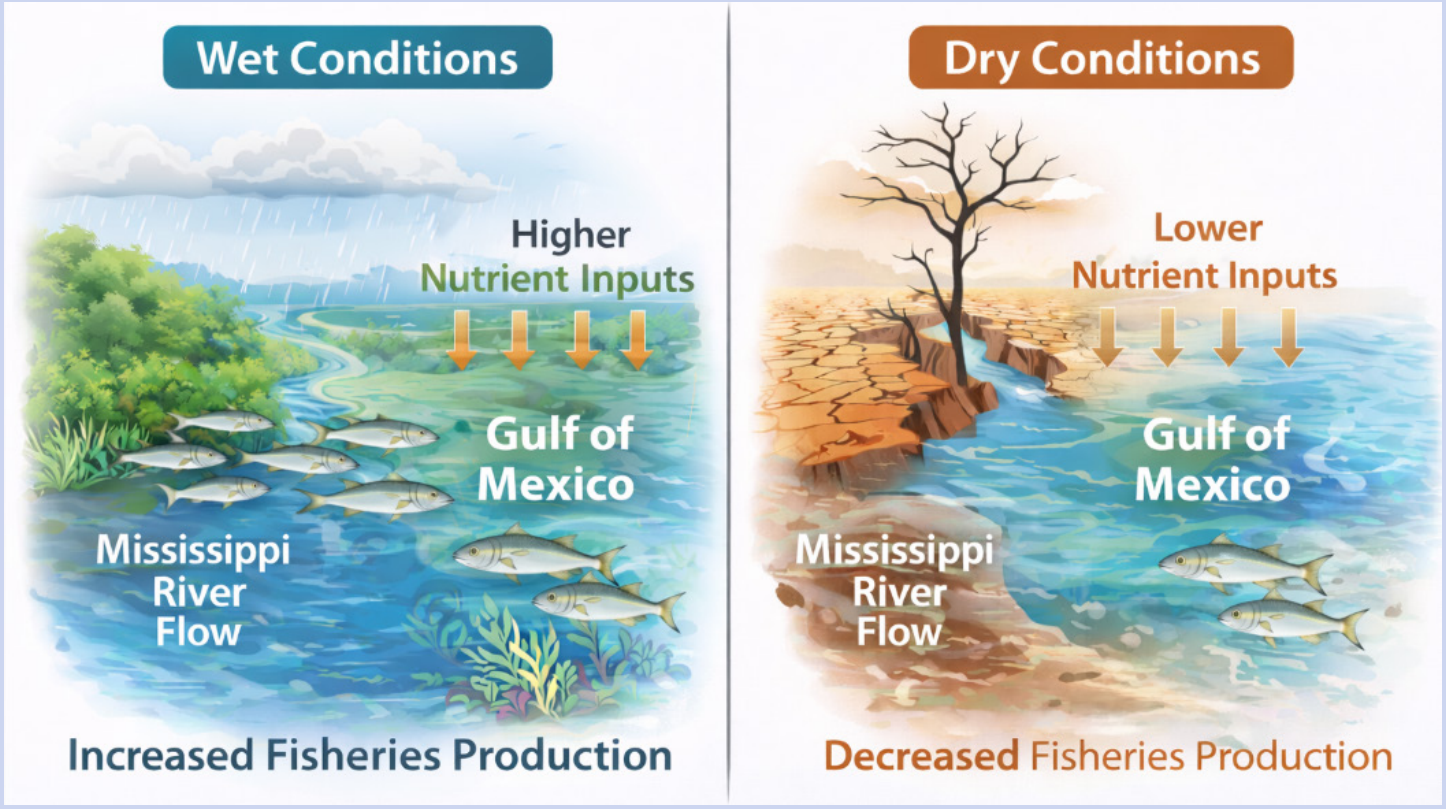
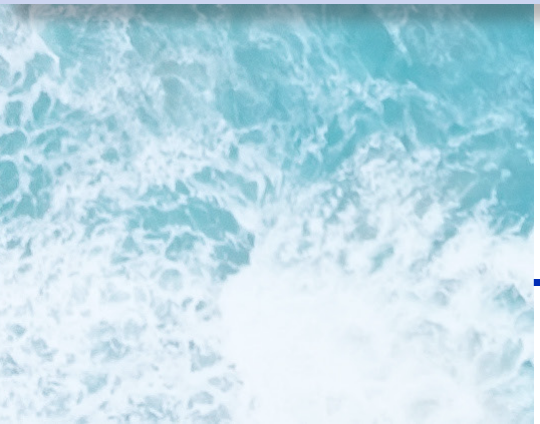



*Illustration: Wet conditions increase Mississippi River flow and nutrient delivery to the Gulf of Mexico, boosting marine productivity and fisheries (right panel). Drought reduces river flow and nutrient inputs, leading to lower fish biomass and decreased fisheries production (left panel).*



nature microbiology

Article

https://doi.org/10.1038/s41564-025-02196-0

# Models and co-culture experiments assess four mechanisms of phytoplankton–bacteria interactions

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Osnat Weissberg[1], Dikla Aharonovich[1], Zhen Wu[2,3], Michael J. Follows[2] & Daniel Sher[1]

Ferreira *et al. Microbiome* (2025) 13:4
https://doi.org/10.1186/s40168-024-01963-1

Microbiome

RESEARCH

Open Access

# Comparative genomics analyses of Actinobacteriota identify Golgi phosphoprotein 3 (GPP34) as a widespread ancient protein family associated with sponge symbiosis

Cláudia Ferreira[1], Ilia Burgsdorf[1], Tzipora Perez[1], Gustavo Ramírez[1,2], Maya Lalzar[3], Dorothée Huchon[4,5] and Laura Steindler[1*]

# FROM THE FIELD: MARINE RESEARCH EXPEDITIONS

## Investigating the Adaptation of Pocilloporidae Corals to Environmental Changes

### Pierrick Harnay, Mass lab

My name is Pierrick Harnay, and I am a PhD student in the Mass lab (University of Haifa) and Hollie Putnam lab (University of Rhode Island). My doctoral research focuses on the **adaptive challenges faced by Pocilloporidae corals in changing environments**, with a particular emphasis on French Polynesia and the island of Mo'orea. This work is part of the BSF Climate Solutions program.

Mo'orea is a remote island in the South Pacific, located next to Tahiti, where coral reefs have undergone major ecological fluctuations driven by cyclones, coral bleaching, and outbreaks of crown-of-thorns starfish. These disturbances have reshaped reef communities in the lagoon and on the reef, with species of the genus Pocillopora now dominating coral abundance.

My research focuses on the development and resilience of Pocilloporidae corals on Mo'orea. A central component of this work has been documenting the spawning behavior of *Pocillopora* species, an aspect that remains largely unexplored in French Polynesia. Through early-morning field observations in the lagoon, timed to the full and new moons, I spent over 500 hours in the water and documented the first recorded spawning events for *Pocillopora verrucosa, P. meandrina, P. tuahiniensis, and P. grandis*.

In parallel, I surveyed Pocillopora populations across the Mo'orea lagoon to examine changes in abundance and recovery following bleaching events. I combine field surveys with genetic sampling and advanced 3D scanning to link skeletal structure to species identity and developmental stage. I also investigate how environmental conditions such as water flow, light, predation, and salinity influence skeletal morphology and plasticity.

The broader goal of this research is to test strategies that enhance growth and resilience in juvenile and adult corals under climate change stressors. During the 2024 spawning season (November–December), both Tali and Hollie joined me in Mo'orea to conduct larval experiments. Each morning before dawn, we waited for corals to spawn and collected gametes to study larval development and thermotolerance. Together, these efforts will help us uncover how reef-building corals persist and adapt in a rapidly changing ocean.

## Science at Sea: Exploring Hidden Sources of Methane in the North Pacific

### Jaime Abdiel Lazaro Garcia, Steindler lab

My name is Jaime Abdiel Lazaro Garcia and I am a PhD student at the Lab of Laura Stendler. Last September–October, I participated in a research cruise aboard the research vessel *Kilo Moana* in the North Pacific Ocean near Hawaii- an experience that became a cornerstone of my PhD research. This expedition was conducted as part of a collaboration between my supervisor, Laura Steindler, and the laboratories of Prof. Dan Repeta (WHOI, USA), and Dr. Oscar Sosa (University of Puget Sound, Tacoma). Funded by the NSF-BSF, the project brought together an international team of scientists and students united by a common goal: understanding how methane is produced in the open ocean.

Methane is a powerful greenhouse gas, yet surface ocean waters are often rich in methane despite being fully oxygenated, a long-standing puzzle known as the "marine methane paradox." During the cruise, our objective was to investigate the role of marine microorganisms and their metabolic pathways in methane production under nutrient-limited conditions.


Together with the other teams, we conducted a series of experiments and sampling campaigns that integrated oceanography, microbiology, and biogeochemistry. Our results are both surprising and exciting, revealing previously underappreciated microbial strategies that may help explain why methane accumulates in oxygen-rich marine waters.

Beyond the scientific discoveries, the human experience aboard Kilo Moana was equally meaningful. I worked alongside students and researchers from around the world, spanning different cultures, academic backgrounds, and career stages. Living and working together at sea fostered intense collaboration, long discussions on deck, and a shared sense of curiosity that transcended borders and disciplines.

This cruise was not only a defining moment in my PhD journey, but also a reminder of how international collaboration and hands-on research are essential for advancing our understanding of the ocean and its role in Earth's climate system.

# Antarctica- A kingdom of uncertainty

Tal Luzzatto-Knaan

"I don't need to see more; I need to see deep" was my feeling the first time I set foot in Antarctica.

Last winter, I had the privilege of returning to Antarctica. This time, for research. Joining the Czech Antarctic Research Program (CARP), for a three-month research expedition to the J.G. Mendel Station on James Ross Island, Antarctica. We were 14 team members, in the middle of nowhere at the end of the world, at the Weddell Sea, where heroic stories took place such as Shackleton's expedition on the *Endurance*. As a marine biologist, the purpose of my research was to collect and characterize the macroalgae on our study site, that had never been explored before. I was also collecting microorganisms as part of my exploration of natural products from extreme environments.

It is almost impossible to describe the beauty of Antarctica, its magic, its uniqueness. But also, its danger, fragility and unexpectedness. Uncertainty is the only certain thing. Plans are constantly changing, like the wind, which determines everything.

I never thought I would be backpacking in Antarctica, yet walking for 15-20 km per day, over mountains, frozen lakes and snowfields was the routine (when weather allowed). We were camping in the storm, measuring glaciers, riding All-terrain vehicles (ATV) and zodiacs to more distant sites. Often, we were locked in a station for days due to extreme storms and under strict water-discipline, because the river froze and we couldn't pump water. To add to that, being an Israeli, during war, so far away while reality is ongoing, was quite challenging at times.

These experiences augment the feeling of respect for nature and for people, modesty and humility, and emphasize what is truly important and what is needed for survival. It made me appreciate silence, the diversity of white colors and textures and the resilience of organisms. This was an amazing experience, scientifically, professionally, socially, and personally, and I cannot wait for the next one!

If you ask me what the most important things to take to Antarctica, it would be: patience, a flexible mindset, and good shoes.

For more:

https://www.israelhayom.co.il/magazine/shishabat/article/17614608
https://www.sci.muni.cz/en/current-news/the-mendel-team-returns-from-antarctica


MARINE
RESEARCH
STATION

# There Is No Age Limit for Learning

Tsvia Gildor

The University of Haifa recently opened new courses for senior citizens and invited us, the lab managers of the Marine Biology Department, to create a course about the Mediterranean Sea. We began by brainstorming together, defining what such a course could include, and then built it piece by piece, drawing on the knowledge and passions we each bring to our work.

The course opened with an introduction to the Mediterranean Sea by Eli Shemesh, followed by Barak Zilberman's lecture on the evolution of marine life, from single-celled organisms to complex multicellular forms. From there, each of us taught our favorite topic: Omri Nahor spoke about algae and primary productivity; Tslil Gavrieli explored marine interactions such as parasitism and predator–prey dynamics in cnidarians; Racheli Bober discussed corals and symbiosis; and Neta Saar Minhar focused on octopuses and marine pollution. Thanks to Ziv Shamir, who taught me about sharks, I was also able to confidently cover that fascinating subject.

Naturally, I chose to give a lesson on sea urchins. While it might seem that I simply gathered materials from the lab, the process actually pushed me to deepen my understanding, from sea urchin ecology to aspects of their physiology, including the remarkable mechanism of tube feet. I also revisited cyclins from my PhD work, sharing how they were first discovered in sea urchins, an insight that later contributed to a Nobel Prize awarded to two Technion researchers.

Our senior students were curious, engaged, and a true pleasure to teach. They showed a strong interest in the human history of the sea as well, and thanks to Prof. Debbie Cvikel, who joined us to speak about shipwrecks, we were able to add that important dimension to the course.

Making science accessible is one of our most meaningful missions. I hope this course is only the beginning of many future opportunities to share our love of the sea with the community.


*Senior students and lab managers visiting our beloved whale skeleton*

# 11th Annual get together of the Marine Biology Department

On Thursday, 25/6/2025, we held our **11th annual Marine Biology get-together at the Haifa University campus**. Around 90 participants, including MSc and PhD students, postdocs, PIs, lab managers, research associates, and representatives from six sponsoring companies came together to celebrate our scientific achievements and progress. The retreat featured inspiring oral and poster presentations demonstrating the department's multidisciplinary research, which deepens our understanding of marine life and supports ocean conservation efforts. Getter Group and Rhenium shared exciting advances in microscopy and molecular biology, respectively.

🙏 Many thanks to everyone who made this event a success: Tami, Laura, Daniel, Tal, Tali, Nadine, Anat and Daniela, that helped organizing the event

🎓 Our PI's and students for their excellent presentations

🎨 Chiara Conti for the beautiful retreat logo

🎉 Prashant Tewari, Miri Morgulis, Alhan Abu Hamoud, Alhassan Mukaila & Aman Prakash for organizing a fun social activity

📸 Dar Golomb for capturing great moments

🤝 Our sponsors for their generous support: Rhenium, Aquazone, Getter Group, Tivan Biotech, Biological Industries/Sartorius, and Bioanalytics.

At the end of the meeting, prizes were awarded to the three best talks and posters:

🏆 **Best talk**:

- First prize: **Aman Prakash**
- Second Prize: **Lina Ratinskaia**
- Third Prize: **Efrat Beck**

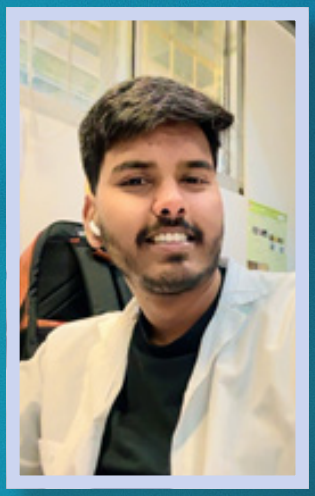
🏆 **Best Poster**:

- First prize: **Prashant Tewari**
- Second prize: **Noga Barak**
- Third Prize: **Chiara Conti**

Congratulations to all! 👏👏👏

[Link to photos]

Looking forward to next year!

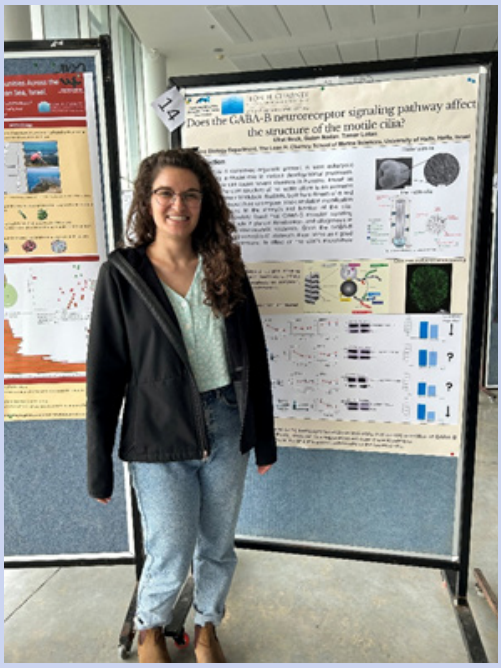


## First place for best talk: Aman Prakash

I am 2nd year master's student in the Regulation and Evolution of Development Lab under the supervision of Prof. Smadar Ben-Tabou de Leon. My research focuses on the Developmental, Behavioral and Molecular response of the sea urchin larva to food availability. These larvae have a remarkable ability to adjust their feeding structure based on the availability of food. They develop longer feeding structures when food is scarce and shorter ones when food level is high. While this developmental plasticity is known, I am particularly interested in exploring whether the larva also show behavioural responses to food availability, similar to their responses to other environmental stimuli. This aspect has not been studied at the larval stage and our lab is the first to address this question. My studies will demonstrate whether food availability is affecting the behaviour of the sea urchin larva and whether the larva can control its food intake. I hope to decipher the role of Dopamine in regulating food intake and embryo morphology in response to food availability. This would illuminate the ability of a marine embryos to adapt to varying food conditions and the molecular pathways involved.

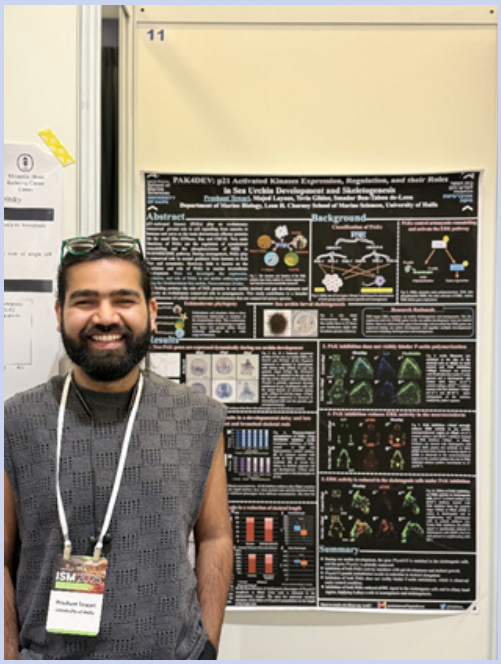
## Second place for best talk: Lina Ratinskaia

I am Lina Ratinskaia and I am a Master's student under the supervision of Dr. Maxim Rubin-Blum and Dr. Tal Luzzatto Knaan. My research focuses on microbial secondary metabolites in extreme deep-sea environments of the Eastern Mediterranean. The research site of my study is a unique deep-sea habitat located off the coast of Israel. It is characterized by natural brine seeps enriched with methane, hydrogen sulfide, and ammonium. Existing in complete darkness with the complete absence of sunlight, these chemical-rich environments create some of the most extreme conditions on Earth! Yet they host diverse microbial communities. In my research, I investigate the chemical natural products of microbial secondary metabolism by studying their biosynthetic gene clusters (BGCs) encoded in the genomes of microorganisms from the sediment. I employ an integrative approach that combines metagenomics, transcriptomics, and metabolomics to investigate the functional and chemical potential of these organisms. I have identified numerous BGCs, many of which show low similarity to known clusters, suggesting the potential for novel metabolites. A few that match existing annotations allow us to begin predicting their ecological roles by tracking expression across sediment depth. Metatranscriptomic data confirms that several BGCs are actively expressed in situ, showing their relevance and biosynthetic potential. This work expands our understanding of life in extreme environments and contributes to the discovery of new natural products.




## Third place for best talk: Efrat Beck

I am a master's student under the supervision of Professor Tamar Lotan. My research explores how the ectopic activation of the γ-aminobutyric acid, GABA-B receptor, influences the development of motile cilia in the planula of the sea anemone, ***Nematostella vectensis (N. vetensis)***. The motile cilia play a crucial role in the movement of aquatic organisms. These delicate organelles are built from microtubules composed of α- and β-tubulin dimers, which undergo various post-translational modifications (PTMs) such as acetylation, glycylation, polyglutamylation, and tyrosination. These modifications regulate the cilia's length, flexibility, stability, and beating motion. In our lab, we discovered that activating the GABA-B receptor impairs the mobility of N. ***vectensis*** planulae. GABA, the main inhibitory neurotransmitter in animals, acts through GABA-A and GABA-B receptors and plays an important role in nervous system development and function. My research aims to uncover whether GABA-B receptor activation alters tubulin PTMs. Transcriptomic analyses have revealed changes in the expression of enzymes responsible for adding or removing these modifications, suggesting possible shifts in specific PTMs. Western blot experiments further confirmed alterations in PTM patterns in both whole planulae and isolated cilia samples. Our next step involves proteomic approaches to better understand the molecular pathways affected by GABA-B receptor activation. This work will bridge neurobiology and cell biology, revealing how neurotransmitter signaling can reshape the machinery that drives movement in early life.




## First place for best poster: Prashant Tewari

I am a PhD researcher in the Regulation of Evolution and Development (RED) Laboratory, led by Prof. Smadar Ben-Tabou de Leon, where my journey began as a Master's student. I am deeply fascinated by how a single cell, the fertilized egg, transforms into a complex multicellular organism and the regulatory mechanisms that guide these developmental transitions. My current work focuses on uncovering the cellular and molecular basis of skeletogenesis in sea urchin embryos. I am particularly interested in the actomyosin regulation of the trafficking of vesicles bearing mineral ions into the biomineralization site. By integrating live-cell imaging, quantitative image analysis, and pharmacological perturbations, my research seeks to reveal how cytoskeletal and signaling pathways coordinate mineral deposition during embryonic development. Ultimately, this work aims to uncover how cytoskeletal dynamics translate cellular regulation into the precise growth and form of embryonic mineralized skeletons.

## Second place for best poster: Noga Barak

I am a PhD student in the labs of Professor Tamar Lotan and Professor Daniel Sher. My research focuses on the massive blooms of the jellyfish *Rhopilema nomadica*, which have a major impact on Mediterranean marine ecosystems. While these blooms are major events, the microbial processes shaping their dynamics have remained largely unexplored. A central finding of my work is that during bloom progression in the Eastern Mediterranean, jellyfish-associated microbiome diversity declines sharply, accompanied by the dominance of bacteria from the genus *Endozoicomonas*. This genus has gained increasing attention for its important role in coral holobionts and other marine symbioses. To better understand its ecological versatility, I sequenced 12 novel *Endozoicomonas* genomes isolated from *R. nomadica* at different bloom stages. By comparing jellyfish-associated (EJ) and coral-associated (EC) strains, we uncovered clear EJ-specific genomic specialization, including a unique Wsp chemosensory system linked to host attachment and pathways for metabolizing host-derived compounds such as myo-inositol and steroids. Remarkably, genomic variability among the EJ strains is concentrated in prophage-rich regions that also encode diverse DNA defense systems, suggesting strong viral pressures within the bloom environment. Overall, this research links large-scale microbial community shifts during jellyfish blooms to specific genomic traits that enable *Endozoicomonas* to thrive within their hosts.

## Third place for best poster: Chiara Conti

I am concluding my PhD at the marine microbiology lab, under the supervision of Laura Steindler, whom I joined for my master's. My research has been focusing on the sponge holobiont, term which indicates the animal together with the associated microbiome as a functional unit. I studied host-microbe interactions under different aspects: from the mechanisms of recognition between the host cells and symbiotic cyanobacteria, to the tripartite interaction between sponge, bacteria and phages, to the elemental cycling connecting the holobiont to its surrounding environment. This last aspect is of extreme interest and importance, since it is linking the holobiont with a powerful greenhouse gas: methane. In fact,-*omics* analyses suggested that the microbiome may hold the potential for a methane release pathway. In particular, in phosphate-depleted conditions, these microbes are capable of using a methylated compound, methylphosphonate (MPn), as a P source, releasing methane as a byproduct of the reaction. My task was to experimentally prove the occurrence of such pathway. Using $^{13}$C-marked MPn as a substrate for incubations of sponge pieces, I observed a buildup of $^{13}$C-marked methane over time, thus confirming the presence of this pathway and opening a new avenue of research linking symbiosis to greenhouse gases in a warming world.


Updates and news on the Marine Biology Department can be found here:

https://marsci.haifa.ac.il/en/news-archive/

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