### MKMRS JUNE 1, 2024

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#### NOISE POLLUTION

University of Haifa researchers collaborated to produce the first evidence of how marine noise pollution can affect dolphins. Al detected changes in dolphin calls, highlighting potential disruptions to marine life. This research was highlighted in **'11 Incredible Scientific Discoveries of 2024'** 





#### SPERM WHALE COMMUNICATION

A student of Project CETI and the University of Haifa, under the supervision of Prof. Dan Tchernov and Dr Shane Gero, passed her *viva voce* in May on eastern Caribbean Sperm Whale communication, prey field, and foraging behaviour! Well done, Mapal Ishay!

#### AAUS COURSE #

Professor Tali Mass and Dr Beverly Goodman-Tchernov finish their 6th course with the assistance of MKMRS staff - this year's course included 4 international students, and 9 all together taking part!



Keep scrolling for a spotlight on new staff who have joined us, research updates and new publications...





# Murmurs from the deep:

## Study highlights the impact of noise pollution

The increase in human maritime activity has brought about a proliferation of vessels whose noise can be detected from considerable distances, up to 20 kilometers away. Previous research hinted at the influence of ship noise on marine animal behavior, particularly among dolphins, but empirical evidence was lacking until now. A recent study conducted at the University of Haifa delved into this issue, employing artificial intelligence for the first time to analyze dolphins' response to ship noise.

Led by Prof. Roee Diamant and Dr. Aviad Scheinin, the research team investigated the nonlinear reactions of bottlenose dolphins to ship noise. Published in the esteemed journal Scientific Reports of the Nature Group, their study sheds light on the impact of maritime traffic on these intelligent marine mammals. By combining acoustic studies of dolphin whistles with AI software, the researchers uncovered unique communication patterns exhibited by dolphins in the presence of ship noise.

The study faced challenges in observing dolphin behavior both with and without ship noise, crucial for understanding their response. To address this, the researchers selected a location near the dolphin reef in Eilat, a habitat frequented by common bottlenose dolphins. Recording devices placed underwater captured sounds from both dolphins and passing ships. Analysis of the recordings revealed significant alterations in dolphin communication when ships were present.

Using a deep-learning algorithm, the researchers achieved a remarkable 90% success rate in classifying dolphin whistles based on the presence of ship noise. This finding suggests a clear behavioral change in dolphins when exposed to maritime traffic. However, the exact nature of the communication patterns altered by ship noise remains elusive, highlighting the complexity of the dolphins' response. Supported by the university's Data Science Center, the study represents a collaborative effort between the Underwater Acoustic and Navigation Laboratory and the Marine Apex Predator Laboratory. Future research aims to unravel the underlying mechanisms behind these effects and their implications for marine ecosystems.

click here to see the articles in JPost and Israel 21c! ISRAEL21c &

THE JERUSALEM POST

NY CONF ISRAEL NEWS HEALTH & WELLNESS

Impact of ship noise on dolphins identified for first time with help of AI - Israeli study



#### WHALE DONE, MAPAL ISHAY! UH and Project CETI student finishes her thesis on navigating the depths of Sperm Whale secrets in the Eastern Caribbean

Mapal Ishay defended her MSc thesis in May, entitled: 'Examination of the prey field, the foraging behavior and the related communication of sperm whales (*Physeter macrocephalus*) in the Eastern Caribbean Sea'.

In marine ecosystems, understanding the foraging behaviour of group-living marine mammals like sperm whales (*Physeter macrocephalus*) is crucial. Coordinated foraging among individuals within social units may enhance prey capture success, yet the mechanisms driving such behaviour remain elusive.

These ocean giants perform extended, deep dives in pursuit of meso- and bathypelagic squid prey, but the extent of their coordination during these endeavours has remained largely unexplored.

Our investigation sought answers to two key questions:



Firstly, we examined the presence of codas, social vocalizations, preceding foraging dives alongside other dive characteristics. Our findings revealed that time of day, surface interval duration, depth of the first capture attempts, and coda presence are all significant in relation to the depth of the onset of echolocation and, thus, to foraging. These insights shed light on the potential role of communication in facilitating coordinated foraging efforts among sperm whales.

Secondly, through faecal analysis utilizing DNA sequencing and compound-specific stable isotope analysis, we unveiled the dietary preferences of Eastern Caribbean sperm whales. Our results identified a diverse array of squid species comprising their diet, with *Ancistroteuthis lesueurii* and *Stigmatoteuthis arcturi* emerging as predominant.

This multi-approach study significantly advances our understanding of sperm whale foraging behaviour and their prey field in the Eastern Caribbean Sea. However, it also raises intriguing questions regarding the mechanisms underlying intra-species foraging specialization and potential inter-species niche partitioning.

As scientists, our ongoing exploration of these magnificent creatures and their role in marine ecosystems promises to unravel further complexities, contributing to the conservation and management of these vital ocean habitats.



#### OUR NEWEST TEAM MEMBER: FARES FARES! WELCOME

We are thrilled to announce the latest addition to our team, Fares Fares, who joins us as our AI, Big data, Robotics & Sensors sector leader. Fares brings with him a wealth of knowledge and experience in the intersection of computer science, artificial intelligence (AI), and robotics, making him an invaluable asset to our organization.

Fares holds a Bachelor of Science degree in Computer Science from the University of Haifa, where he



specialized in computer vision & robotics. He continued his academic journey at the same institution, earning his Master of Science in Computer Science, focusing on AI & Computer Vision. His dedication to learning and pushing the boundaries of technology is evident in his academic achievements. His research interests have led him to explore the realms of smart aquaculture, where he applies cutting-edge AI technologies to promote sustainable environmental solutions. By optimizing aquaculture practices through AI, Fares aims to contribute to better resource management, health monitoring, and ecological sustainability.



In his young career, he has already contributed significantly to the advancement of his field. He has authored notable publications, including "ORBSLAM3-Enhanced Autonomous Toy Drones: Pioneering Indoor Exploration" and "Newton-PnP: Real-time Visual Navigation for Autonomous Toy-Drones." These works demonstrate his prowess in developing innovative solutions to complex problems, particularly in autonomous navigation in GPS-denied environments.

We are excited to welcome Fares to our team and look forward to the valuable insights and contributions he will bring to our projects. His expertise in AI, robotics, and sensors will propel us toward new heights of innovation and excellence. Join us in extending a warm welcome to Fares Fares as he embarks on this exciting journey with us! **Connect with Fares on LinkedIn: www.linkedin.com/in/fares-fares** 

## NAVIGATING A ROCKY TIME

As we reflect on the past months, our team has faced significant challenges due to the current war, which necessitated partial closure of our primary diving areas in both the northern and southern sectors. Notably, several of our members were called to reserve duty, which complicated our planned monitoring season. However, our resolve remains unwavering, and we are committed to adapting and finding new avenues to pursue our research objectives.

Despite the closures, this period has spurred innovation and collaboration within our team. Moreover, we remain hopeful about the possibility of resuming our diving activities in the near future, especially at the sites in front of Sdot Yam. These locations are integral to our studies, and we are ready to recommence our fieldwork as soon as conditions permit. Our preparatory work during this downtime ensures that we can swiftly and effectively return to these critical sites.

This challenging time has also reinforced the strength of our research community. The support and solidarity from our partners, collaborators, and supporters have been inspiring. Together, we are demonstrating resilience and creativity in the face of adversity.

#### MKMRS INITIATES A NEW SURVEY OF BATOIDS

Our spring monitoring of the Gador region, adjacent to the Gador reserve, began late due to the wave sea and low visibility conditions prevalent at the beginning of the season. Anat Tsemel and Dr. Eli Shemesh cover a 900 m by 6 m area around and across a rocky ridge at a 4 to 8 m depth range in this underwater visual census. This week, we had a perfectly glossy sea of 24 degrees C(75.2F), and we spotted 10 batoids belonging to 3 species: Dasiyatis pastinaca (7), D. chrysonota (2) and the endangered Aetomylaeus bovinus (the Bull Ray photographed in the page background and right inset). Most were females and some were advanced gravid females. The purpose of this survey is to provide the NPA the scientific basis for extending the current reserve (which extends only to 300 m offshore) to protect this habitat as well.





## Publications since February 2024

- Thompson, K.F., Gordon, J., Webber, T., Zuriel, Y., Kobo, K., Tchernov, D., Airoldi, S., Violi, B., Verga, A., Gannier, A., Fontanesi, E., Ascheri, D., Scheinin, A.P. (2024). Threatened cetaceans off the coast of Israel and long-range movement of a sperm whale. Aquatic Conserv: Mar Freshw Ecosyst. 2024;34:e4155. https://doi.org/10.1002/aqc.4155
- Goodbody-Gringley, G., Martinez, S., Bellworthy, J., Chequer, A., Nativ, H. and Mass, T., 2024. Irradiance driven trophic plasticity in the coral Madracis pharensis from the Eastern Mediterranean. Scientific Reports, 14(1), p.3646. https://doi.org/10.1038/s41598-024-54217-3

On the way: Characterising a potential nearshore nursery ground for the blackchin guitarfish (Glaucostegus cemiculus) in Ma'agan Michael, Israel Barak Azrieli , **Eynav Cohen \* , Leigh Livne \*** , Debra Ramon , **Ziv Zemah-Shamir** , Adi Barash , **Anat Tsemel , Eyal Bigal , Eli Shemesh , Dan Tchernov and Aviad** Scheinin

