



EUROMARINE OPEN SCIENCE DAY 2025

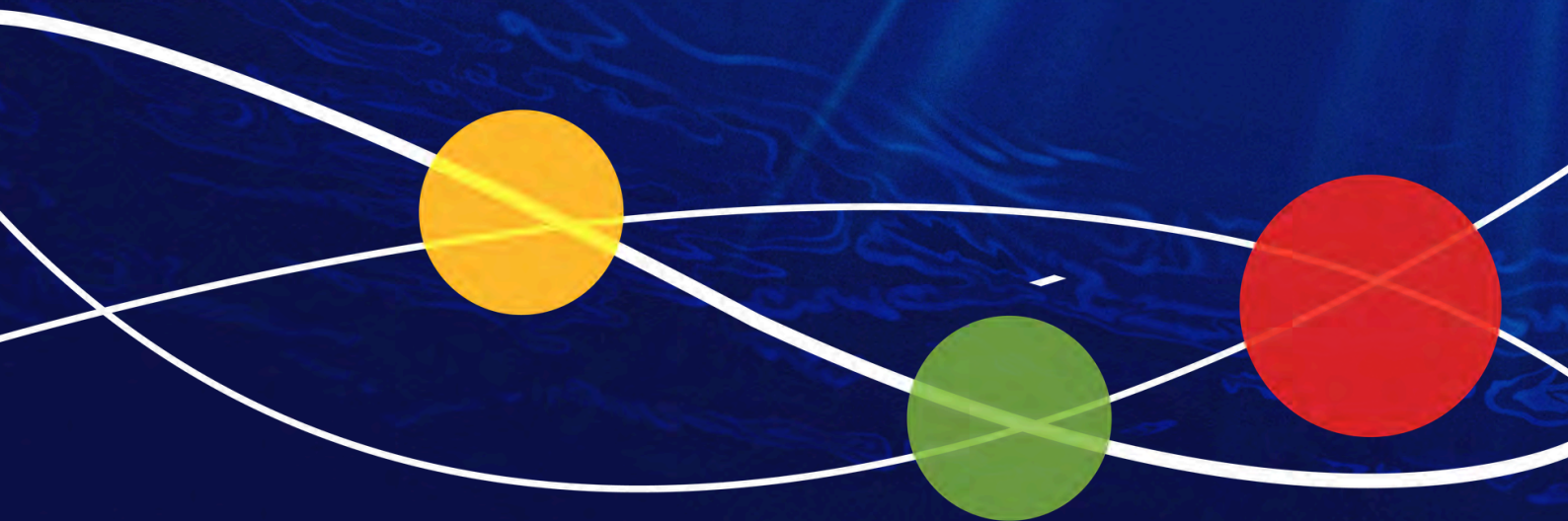


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In its yearly Open Science Day, EuroMarine brings together the marine research community for an open forum to discuss how marine scientists can contribute to addressing the Global Ocean Challenges.

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Preamble



On behalf of the EuroMarine Network, we are delighted to welcome you to the 2025 EuroMarine Open Science Day and General Assembly Meeting in Chioggia, Italy. This event offers a unique platform for researchers and scientists to share their findings, foster meaningful discussions, and explore emerging research topics and priorities in marine science.

This year's agenda reflects the diversity and depth of marine research, from cutting-edge explorations of dark oxygen production in the abyssal seafloor to novel approaches for monitoring coastal litter and investigating the effects of climate change on marine species. The inclusion of interdisciplinary sessions and roundtable discussions encourages critical thinking and collaboration across domains.

We are also excited to highlight how science meets society and private companies through themes such as underwater noise pollution, conservation, and public engagement initiatives. The event will conclude with a special guided visit to the Zoological Museum of Chioggia, followed by a social dinner. We hope this gathering will generate new ideas and collaborations while strengthening our collective efforts to advance marine research and conservation. The Open Science Day and the General Assembly Meeting will also provide a great opportunity to highlight the central role Euromarine can play within our community. Thank you for joining us, and we look forward to engaging with you throughout the event.



Mark John Costello

NORD, Co-chair of EuroMarine



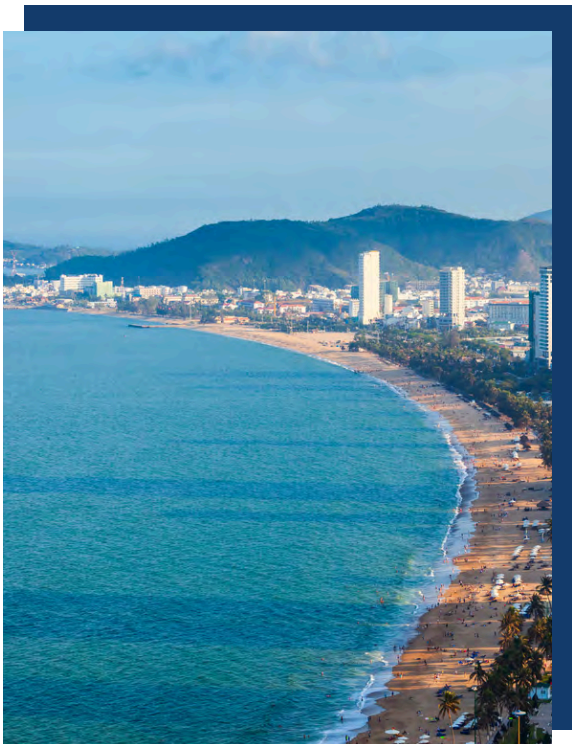
Simonetta Franschetti

UNINA, Co-Chair of EuroMarine

EuroMarine Manifesto

Goal 1: Manage Ocean Complexity

Human population growth and climate change are major drivers acting on all ecosystems, with the Ocean being no exception. To protect our future, we must study how humans affect the ocean and how the ocean impacts us. EuroMarine's manifesto advocates for a profound understanding, protection, and management of the Ocean, securing the health and well-being of future generations.



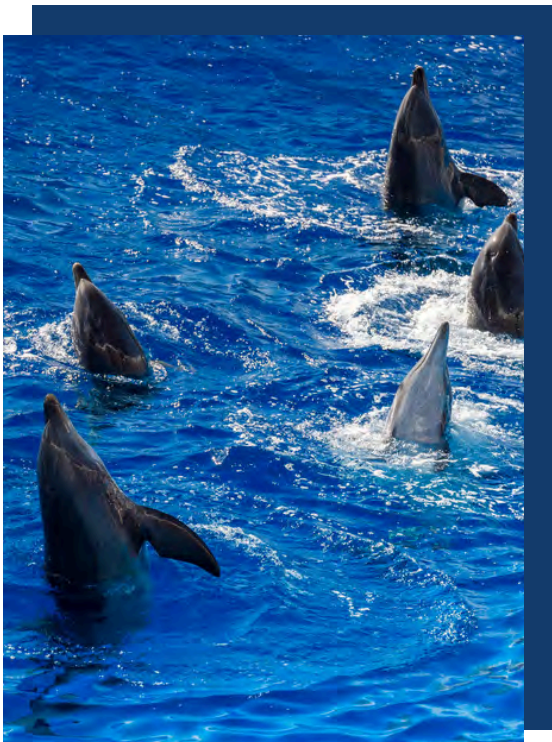
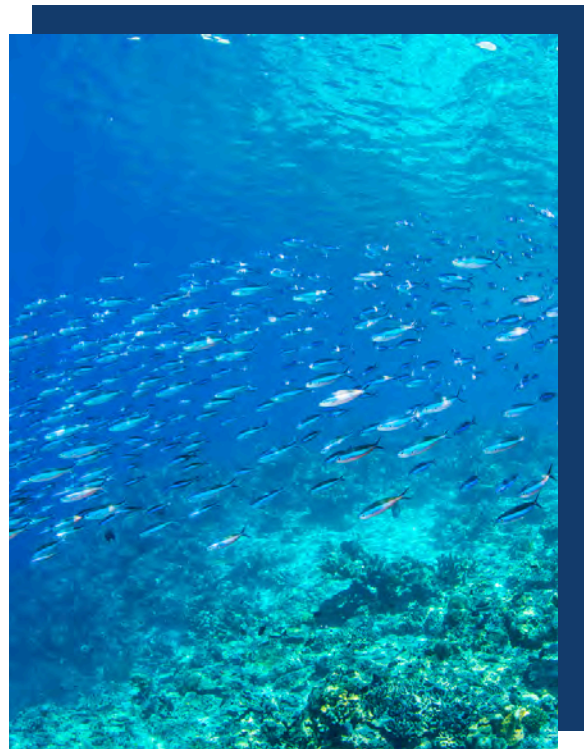
Goal 2: Secure Coastal Areas

The rise in global mean sea level will directly impact coastal areas, which accommodate over 40% of the world's population. At EuroMarine, we advocate for new monitoring, conservation and restoration measures of marine urban spaces to expand the "Blue" component of present day "Grey" cities, to benefit local populations and global Ocean health. Now is the time to create innovative solutions for resilient and sustainable marine urban spaces.



Goal 3: Target Ocean and Human Health

Oceans can affect human health positively through the provision of essential goods and services, such as protein, pharmaceuticals, biofuels and more, but also negatively through the exposure to toxins and pollutants. At EuroMarine, we believe that there is a need to understand the functioning and connectivity of local marine ecosystems better in order to preserve and enhance associated Ocean services.



Goal 4: Protect Ocean Commons

As the distribution of "Ocean commons" changes, responsible Ocean governance becomes vital to address emerging challenges. Robust science-based thinking, advanced observations, and integrated frameworks will inform decision-making to ensure responsible and sustainability-enhancing Ocean governance. At EuroMarine we believe that to protect the "Ocean Commons", we need better knowledge and new ideas to navigate global challenges.

Open Science Day 2025

EuroMarine is a member-based, interdisciplinary, collaborative network of European marine organisations and research institutes. EuroMarine creates, facilitates and funds, training, networking and research opportunities to address emerging issues in marine sciences. The EuroMarine network advocates for evidence-based approaches to European marine policy and governance.

The EuroMarine Open Science Day serves as a dynamic prelude to the General Assembly, bringing together researchers to share scientific advancements and emerging priorities in marine research. Insights and discussions from the Open Science Day provide valuable context and inspiration for the General Assembly, where EuroMarine members will reflect on the network's achievements, address strategic goals, and define future priorities. This seamless transition from scientific exchange to collective decision-making reinforces EuroMarine's commitment to fostering an engaged, informed, and forward-thinking marine research community.



Agenda



25 February 2025 - Open Science Day

- 08:30 **Arrival & Registration of participants**
- 09:00 **Welcome by University of Padova**
- 09:15 **Welcome and Introduction by EuroMarine Scientific Coordinators**
Mark John Costello (EuroMarine Co-Chair, NORD) & Simonetta Franschetti (EuroMarine Co-Chair, UNINA)

Session 1

- 9:30 **Evidence of dark oxygen production at the abyssal seafloor**
A. Sweetman, Scottish Association for Marine Science (SAMS)
- 10:30 **Coffee Break**
- 10:50 **Zombie ideas in marine science**
Mark John Costello, NORD
- 11:00 **Comparative analysis of eDNA methods and primers to investigate micronekton diversity in oligotrophic mesopelagic regions (online)**
Pavanee Annasawmy, Univ Brest
- 11:10 **Lessons from a molecular dissection of life history variation in Atlantic salmon**
Jukka-Pekka Verta, NORD
- 11:20 **Round Table**
- 11:35 **Thermal priming protects Manila clams against deadly marine heatwaves**
Luca Peruzza, UNIPD
- 11:45 **Native against allochthonous: multi-disciplinary approach for heatwave response analysis**
Filippo Drigo, UNIPD
- 11:55 **Carbon-nitrogen isotopic signal and metal content of two benthic organisms at a naturally CO₂-driven acidification vent in the Galapagos islands**
Rafael Bermudez, Charles Darwin Research Station
- 12:05 **Sparkling waters: how acidified habitats influence marine organisms**
Marco Munari, UNIPD
- 12:15 **Round Table**

Session 2

- 14:00 **De-embankment: the most successful way to restore estuarine wetlands**
Johan van de Koppel (Royal Netherlands Institute for Sea Research)
- 15:00 **Coffee Break**
- 15:20 **Functional characterization of the second feedback loop in the circadian clock of the Antarctic krill *Euphausia superba***
Chiara Stefanelli, UNIPD
- 15:30 **Drone-based coastal litter monitoring: techniques, framework, and standardization**
Umberto Andriolo, INESC Coimbra
- 15:40 **Ocean Literacy in managing Marine Protected Areas: Bridging natural and cultural heritage**
Silvia Gomez, UAB
- 15:50 **Round Table**
- 16:10 **Exploring impacts of offshore wind electromagnetic fields on elasmobranchs – EMFish**
Lotte Pohl, VLIZ
- 16:20 **Art meets science to revive coral reef through acoustic enrichment**
A.Beggiato, UNIPD
- 16:30 **Underwater Noise Pollution: An Emergent Challenge for Preserving the Marine Environment**
Giacomo Sabbadin, UNIPD
- 16:40 **Round Table**

Reports

- 17:00 **Emerging Questions, Challenges and Opportunities in Prioritizing Research for Arctic Marine Ecosystems: A Multiscale Perspective**
Melina Kourantidou, Univ. Brest
- 17:05 **Advancing the operationalization of relational values for equitable marine conservation**
Natali Lazzari, University of Santiago de Compostela
- 17:10 **PulseOcean: Taking an interdisciplinary pulse on ocean under global change**
Irene Olivé, SZN



Andrew K Sweetman

SAMS

Andrew K. Sweetman is the leader of the Seafloor Ecology and Biogeochemistry research group at the Scottish Association for Marine Science (SAMS), UK. He holds a PhD in deep-sea ecology from the Max Planck Institute for Marine Microbiology (Germany). Andrew is an expert on seafloor biodiversity and ecology and has a strong focus on the impact of anthropogenic stressors on shallow and deep-sea benthic ecosystems. Over the last 12 years, he has generated > 10 million GBP of research funding and led/ co-led a total of 27 research projects.

Johan van de Koppel

NIOZ

Johan van de Koppel's primary research interests center on the processes that generate spatial complexity in ecosystems, particularly in the form of spatial patterns, aggregations, and fronts in marine intertidal ecosystems. He investigates the principles underlying these processes and how pattern-forming mechanisms influence ecosystem functioning. His work focuses on self-organized spatial complexity, including patterns and other spatial structures that emerge from interactions between organisms or between organisms and their physical environment. Examples of systems exhibiting such patterns include mussel beds, arid bushlands, and salt marshes.



Book of Abstracts

Session 1

Zombie ideas in marine science

Mark John Costello, NORD

Sometimes things we read and/or learned in university later have permeated the literature to such an extent that despite a lack of analysis or evidence, people believe they are true. Here, I propose some of these "zombie ideas" that despite being disproven or lacking evidence, continue to be perpetuated as if they were a fact. They include that most diversity is in the deep-sea, most species are microscopic, that there are millions of marine species, that species richness peaks at the equator, that the Shannon index is a good measure of diversity, and that species have gone extinct due to climate change. Maybe you can propose additional zombie ideas.

Comparative analysis of eDNA methods and primers to investigate micronekton diversity in oligotrophic mesopelagic regions

Pavanee Annasawmy, Univ Brest

Despite being the most abundant vertebrates in the world's ocean, micronekton (mesopelagic fishes, crustaceans, and squids) remain poorly studied due to limitations in traditional sampling methods (active acoustics and trawling), and the lack of standardization in emerging environmental DNA (eDNA) techniques. This Euromarine OYSTER ECR cooperation project, compared eDNA sampling methods and primers to establish a consensus within the research community, aiming to advance biodiversity studies and detection of micronekton. We showed that active eDNA sampling methods, such as filtering seawater from Niskin bottles or net cod-ends, are more effective than passive methods such as the Metaprobe. Presently reported eDNA extraction protocols from the Metaprobe are misleading. The 12S MiFish primer proved to be the most suitable for detecting mesopelagic fish, whereas the COI primer was less effective in detecting micronekton taxa. Overall, eDNA shows greater potential for assessing micronekton diversity than traditional trawling methods. However, further consensus on methodological approaches and precise reporting are needed for global comparisons.

Lessons from a molecular dissection of life history variation in Atlantic salmon

Jukka-Pekka Verta, NORD

The characteristics of an individual at birth and during growth, adulthood, and reproduction describe its life history. The molecular mechanisms that mediate intraspecific life history variation have remained largely unknown, yet the discovery of such mechanisms would provide keys for understanding how life histories evolve and may adapt to future environmental changes. We dissected the molecular mechanisms of maturity age variation in Atlantic salmon (*Salmo salar*), where a single major gene, *vgll3*, controls for 40% of the variation. Our results reveal that *vgll3* does so by controlling the activity of thousands of other genes that each determine different aspects of pubertal onset. The discovered interconnectivity mediated by *vgll3* puts us closer to understand how complex life histories are shaped by natural selection. These results extend to predicting how changes in the environment may influence salmon life histories and what genes may play additional roles therein.

Thermal Priming Protects Manila Clams Against Deadly Marine Heatwaves

Luca Peruzza, UNIPD

This study investigated heat-priming as a potential strategy to mitigate the effects of marine heatwaves (MHWs) on Manila clams (*Ruditapes philippinarum*) in bivalve aquaculture. Clams were subjected to heat-priming at 30°C for 7 days, followed by a simulated heatwave two weeks later. The experiment used a 2x2 factorial design: Primed (P) or Na⁺-ve (N), and Heat-wave challenged (H) or Control (C). Results showed higher survival rates and improved burrowing behavior in primed clams exposed to heatwaves (PH) compared to na⁺-ve clams (NH). Transcriptomic analysis revealed upregulation of heat-shock proteins and metabolic pathways in PH clams. Beneficial bacterial taxa were more abundant in PH clams, while detrimental families were more prevalent in NH clams. Long-term protective effects were observed in primed clams not exposed to heatwaves (PC), including higher antioxidant activity and upregulated metabolic pathways. These findings suggest heat-priming as a promising strategy for increasing clam resilience to MHWs in aquaculture.

Native against allochthonous: multi-disciplinary approach for heatwave response analysis.

Filippo Drigo, UNIPD

To investigate heat-stress responses of two habitat-forming plant species in the Venice Lagoon, *Sporobolus maritimus* (native) and *S. anglicus* (allochthonous), we exposed individuals to an artificial heatwave under laboratory-controlled conditions. Morpho-physiological responses were monitored before, during and after the heatwave. Additionally, we generated a de-novo transcriptome to identify differentially expressed genes across species and conditions. Shoot mortality was observed in the native species, with individuals failing to recover completely after the heatwave. Functional parameters, such as Fv^{max}/Fm^{max}, remained significantly lower at the end of the recovery phase compared to both baseline and heatwave levels. Conversely, *S. anglicus* exhibited a high tolerance to heatwave-stress, showing no shoot mortality and complete recovery by the end of the recovery period. Although transcriptomic data are still pending, these preliminary results suggest that the native species is more negatively affected by heatwave conditions, while the allochthonous species is more resilient and capable of full recovery.

Carbon-nitrogen isotopic signal and metal content of two benthic organisms at a naturally CO₂-driven acidification vent in the Galapagos islands

Rafael Bermudez, Charles Darwin Research Station

Marine systems with natural carbon dioxide (CO₂) sources have been used as analogous of ocean acidification (OA) to understand its effects on organisms and marine ecosystems functioning (Hall-Spencer et al., 2008; Boyd et al., 2014). These areas, commonly known as CO₂ seeps, are characterized by a CO₂ input from volcanic activity that can affect marine shallow areas by acidifying the surrounding waters (Hall-Spencer et al., 2008). Due to its volcanic origin, CO₂ vent systems can be found all over the world from mid-oceanic ridges to oceanic island and intra-plate magmatism (Tarasov et al., 2005). Seeps are suitable environments to examine how OA will translate into ecological changes as they allow researchers to look into the effects of long-term in situ exposure of several organisms to elevated pCO₂ levels at naturally varying environments, as well as it allows natural levels of interactions between species and their habitat (Hall-Spencer et al., 2008; Wernberg et al., 2012; Teixida et al., 2018). Here, we report the carbon chemistry of a shallow CO₂ seep located next to Roca Redonda island at the Galapagos archipelago, as well as investigate the $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ makeup and metal levels in two species of benthic organisms, the sea snail *Hexaplex princeps* and the sea urchin *Eucidaris galapaguensis*, at an acidified volcanic seep and at a control site.

Sparkling waters: how acidified habitats influence marine organisms

Marco Munari, UNIPD

Ocean acidification (OA), caused by the uptake of anthropogenic carbon dioxide by oceans, lowers pH levels and drives profound ecological changes. Beyond direct physiological effects, habitat characteristics in acidified environments play a critical role in shaping organisms' responses. While laboratory experiments provide controlled insights, natural CO₂ vents offer unparalleled opportunities to study OA's long-term impacts under complex, real-world conditions. In the CO₂ vent systems of Ischia Island, sea urchins (*Arbacia lixula*) and limpets (*Patella caerulea*) revealed diverse adaptive responses. *A. lixula* displayed changes in metabolic rates and behaviors influenced by both OA and habitat-driven factors. *P. caerulea* exhibited shell erosion yet increased size, linked to resource availability, alongside seasonal metabolic shifts. These findings emphasize OA's multifaceted impacts, illustrating how the interplay of environmental conditions and biological mechanisms shapes the resilience of marine organisms in acidified habitats.

Session 2

Functional characterization of the second feedback loop in the circadian clock of the Antarctic krill *Euphausia superba*

Chiara Stefanelli, UNIPD

The Antarctic krill is a key species in the Southern Ocean ecosystem and possess an ancestral clock, whose main components have been previously characterized. However, the second feedback loop, modulating clock gene expression through two transcription factors VRI and PDP1, has not yet been described. We bioinformatically identified and cloned three putative pdp1 sequences, which were then analysed for tissue-specific expression and functional activity via luciferase assays, including in combination with two vrille isoforms. Among the pdp1 isoforms, Espdp1_3 displayed the highest expression levels in circadian relevant tissues compared to the other isoforms. Additionally, EsPDP1_3 and EsVRI_2, exhibited the expected positive and negative regulation of the V/P-box in vitro. Finally, Espdp1_3 and Esvrille showed rhythmic expression patterns under light-dark cycles. This study expands our knowledge about the molecular architecture of the Antarctic krill circadian clock by defining the components involved in modulating clock gene expression, establishing a second feedback loop.

Drone-Based Coastal Litter Monitoring: Techniques, Framework, and Standardization

Umberto Andriolo, INESC Coimbra

The abundance of litter in marine environments is a global concern. A new monitoring strategy, based on drones, has recently been adopted to overcome the spatial and temporal limitations of traditional visual census methods. This work presents the technical framework for conducting drone-based litter surveys on coasts. It outlines the rationale for selecting appropriate drone flight altitudes, and reviews various techniques for detecting items in aerial images. Additionally, it shows recent developments and potential assessments, including detailed mapping of litter, characterization of items size, and estimation of the weight and volume of litter bulk. Finally, the work discusses recent efforts to standardize data collection and reporting through the creation of the first global guidelines. This study provides a comprehensive overview of the new drone-based litter monitoring strategy, which can contribute to advancing the understanding of litter dynamics along coasts.

Ocean Literacy in managing Marine Protected Areas: Bridging natural and cultural heritage

Silvia Gomez, UAB

The study explores the factors driving the integration of ocean literacy into the management of Marine Protected Areas (MPA), highlighting its role as a powerful tool to transform the human ocean relationship to improve conservation efforts. A survey was completed by 197 visitors in Cap de Creus (Northeastern Catalonia, Spain). The findings show that visitors who were more willing to pay for conservation valued cultural and natural heritage more highly, and held more positive opinions about protection, regardless of their knowledge and despite their lower income and educational level. These results show us that knowledge does not necessarily indicate greater environmental awareness. The need to consider the marine environment as a cultural-natural embedded heritage is highlighted to foster a cultural connection, inspire commitment to its protection and promote conservation that ensures human well-being and health. Finally, some recommendations are offered to improve the integration of Ocean Literacy in MPA policies.

Exploring impacts of offshore wind electromagnetic fields on elasmobranchs - EMFish

Lotte Pohl, VLIZ

The EMFish project aims to investigate the potential impact of electromagnetic fields from offshore wind farm power cables on electro- and magnetosensitive elasmobranchs. Magnetic field (MF) levels were measured in the Belgian North Sea, home to nine offshore wind farms and several elasmobranch species. Novel acoustic tags with built-in magnetometers were used in three ways: towed above a submarine cable (to capture spatial MF variations), deployed inside a wind farm (to capture temporal variations), and deployed in a starry smoothhound shark (*Mustelus asterias*, to track the shark's MF exposure). Results show that MF levels fall within the sensitivity range for elasmobranchs and vary spatially and temporally, decreasing the likelihood of habituation. The results do not rule out the possibility that human-induced electromagnetic fields may influence the behaviour of elasmobranchs, emphasizing the importance of understanding these interactions to ensure that sensitive marine animals are not harmed through offshore wind developments.

Art meets science to revive coral reef through acoustic enrichment

A.Beggiato, UNIPD

Innovative approaches are essential to counteract global coral reef degradation. Fish communities play a critical role in reef recovery by performing key ecological functions, yet traditional restoration methods rarely address sensory cues that influence fish behavior.

This study aims to restore damaged reefs' auditory landscapes through acoustic enrichment. Experimental sites were established using 3D sound sculptures crafted from ceramic and calcium carbonate. These sculptures, embedded with underwater loudspeakers, broadcast recorded sounds of healthy reefs around the island of Feridhoo, Maldives. Preliminary findings suggest that healthy reef sound playback may promote fish community development in degraded habitats. The study's outcomes might establish replicable protocols for enhancing coral reef restoration across diverse locations, offering promising insights into the potential of acoustic enrichment in ecological recovery efforts.

Underwater Noise Pollution: An Emergent Challenge for Preserving the Marine Environment

Giacomo Sabbadin, UNIPD

In the frame of the European Project DeuteroNoise, we aimed to study the effects of anthropogenic underwater noise on the colonial ascidian *Botryllus schlosseri*. Indeed, the marine invertebrate ability to cope with noise is mostly unknown although noise is mentioned as a pollutant of concern in the European Marine Strategy Framework Directive. We exposed colonies collected in the Venetian Lagoon to a continuous noise (for 30 minutes; peak bands 63-125 Hz) mimicking the low frequency maritime traffic noise, and tested different dB levels. To verify the effects induced by the treatment, we used both behavioral and physiological tests evaluating the animal ability to detect mechanical stimuli, the heartbeat frequency, and the filtration rate, also over time. Results show that noise has negative effects at both behavioral and physiological levels, inducing stress-related answers. Therefore, the study evidences the necessity to monitor this pollutant for reaching the Good Environmental Status of European basins.

Practical Info



Physical attendance

The event will take place in the Aula Magna in Palazzo Grassi. The exact address is Palazzo Grassi Riva Canal Vena, 1281, Fondamenta Canal Vena, 1282, 30015 Chioggia VE, Italy.

Reaching Chioggia from the airport

Venice Marco Polo Airport (VCE): This is the nearest major airport to Chioggia. From Venice Airport, you can take a direct bus to Chioggia's city center.

- Direct Bus: Arriva Veneto operates buses directly from Marco Polo Airport to Chioggia. Check the schedule here: [Arriva Veneto Timetables](#).
- Alternative Route via Venice: Alternatively, you can take a bus to Venice's Piazzale Roma and transfer to a bus for Chioggia from there.
- Taxi: Taxis from Marco Polo Airport to Chioggia cost approximately €120 (as of last year).

Treviso Airport (TSF): This airport is served by low-cost airlines but is a bit further from Chioggia. If you fly into Treviso, you'll need to:

- Take a bus to Venice Piazzale Roma.
- Then, transfer to a bus for Chioggia from Piazzale Roma (see Arriva Veneto link above).



Hotels

[Domus Clugiae](#), which is located in Calle Luccarini, Chioggia, which is 7 minutes walking from Palazzo Grassi

[Hotel Clodia](#) which is located in Calle Forno Filippini, 876, Chioggia, which is 5 minutes walking from Palazzo Grassi.

Online attendance

For the online participation please follow the link below:

<https://us06web.zoom.us/meeting/register/32DFUZCbSgqwp-TZYyCI9w>



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