

# Scholarship Report – Lena Schaffeld

## Introduction

Plastic pollution is an escalating global concern, particularly in marine environments where it threatens biodiversity and ecosystems. Despite growing awareness, the Mediterranean Sea remains one of the most plastic-polluted saltwater bodies on Earth (Pedrotti et al., 2022), influenced by high population density, tourism, and limited water exchange (Galgani et al., 2014). As a semi-enclosed basin with minimal water exchange and significant maritime traffic, it serves as a hotspot for plastic accumulation, with surface pollution from the Atlantic entering but rarely leaving (Cózar et al., 2015). Recognizing this, *Sail & Explore* organizes annual expeditions to monitor plastic pollution across the Mediterranean. Thanks to Mare Nostrum, I had the opportunity to participate in this year's Ligurian Sea Expedition from Genoa to Piombino (see Figure 1). This initiative addresses critical scientific gaps while promoting citizen science by educating participants on plastic pollution and enabling them to contribute to meaningful research.



Figure 1: sailing route from Genoa to Piombino

## Background and Motivation

My background in marine science, particularly my focus on microplastic pollution, provided a strong foundation for this expedition. While studying in the Azores, Portugal, I observed first-hand the impact of the North Atlantic subtropical gyre on microplastic accumulation. During that time, I collected water samples at a biodiversity hotspot near Faial Island, Azores to assess microplastic exposure on filter-feeders. Spending a summer near the ocean and working on a boat, prepared me for the realities of fieldwork at sea: managing sea sickness, navigating rough conditions, handling wet and cold environments, and close encounters with dolphins and whales. However, I had no prior experience with plastic pollution in the Mediterranean, this project was especially valuable in providing a new perspective and deepening my understanding. Comparing plastic pollution in the Azores with the Mediterranean revealed fascinating differences, such as the unique presence of seagrass (*Posidonia oceanica*) in Mediterranean samples. We also used a finer 50-micron net alongside the standard 300-micron net, which allowed for smaller particles but demanded greater time and care when washing the samples out of the net into a sieve and then into a container (see Figure 2). These were steps we could not easily replicate on a small motorboat, due to lack of filtered water, limited space, and time constraints.



Figure 2: plastic in sample

## Methodology and Experience

This project utilized the manta trawl sampling method (Caldwell et al., 2020), a technique I was familiar with from my master's thesis research in the Azores. This time, however, I had the chance to sample particles smaller than 200 microns—a size range with limited existing data, that is essential for



*Figure 3: rinsing the nets*

understanding microplastic prevalence in our seas and the potential chemical harms for animals and even humans. My previous experience allowed me to take charge and responsibility for organizing and overseeing the sampling process on the sailboat, ensuring the entire team worked together effectively. Over time, we developed a rhythm and became increasingly efficient as a team (see *Figure 3*). This expedition taught me adaptability, flexibility, and the importance of teamwork and clear communication. Coordinating closely with the skipper, I helped plan our daily routes and sampling stations, which required constant consideration of weather and sailing conditions. Conducting research on a sailboat presented unique challenges compared to my previous work on motorboats: we had limited power, fresh water, and operational space, and were highly dependent on favorable weather. We also faced occasional rain, rough seas, and strong winds, which made safety a top priority in our small shared space. Despite these challenges, the sailboat allowed us to cover a wider sampling area, which showcased both the logistical complexities and unique opportunities of conducting science at sea. The experience of working closely with the expedition leader, skipper, and fellow participants created a strong sense of camaraderie. The combination of sailing and science has deeply inspired me to continue exploring this hands-on approach to marine research.

## Citizen Science and Community Engagement

One of the most enriching aspects of this expedition was its focus on citizen science. Working with individuals from various fields and backgrounds enriched the experience, creating a collaborative approach to learning and problem-solving. Engaging with non-biologists allowed me to practice explaining complex topics in an accessible way, which is essential in public outreach and science communication. I also had the opportunity to share my previous experiences in marine science and I found it rewarding to answer questions from the crew about the different fields I have worked in and their relevance to current environmental issues.

## Conclusion and Reflections

Participating in the Sail & Explore expedition was both insightful and inspiring. I gained hands-on experience in microplastic sampling and learned to navigate the complexities of conducting research on a sailboat. I learned a lot about sailing itself: gaining skills in navigation, handling ropes, sailors vocabulary and understanding the importance of teamwork. Despite my initial expectations of difficulty, this experience was highly rewarding, equipping me with practical skills and deepening my commitment to addressing marine plastic pollution. I am grateful for this opportunity, which has motivated me to pursue further research that combines scientific exploration with sailing, to contribute to the conservation of our oceans



*Image 1: Lena at the helm*



*Image 2: the whole crew (left to right: Johanna, Hichem, Mila, Anna, Lena & Preston)*

## References

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