

## Internship (or M.Sc. project) on Plastic Marine Litter

In the past few years, public and media attention for the issue of Plastic Marine Litter has been growing. The existence and the growth of extensive plastic gyres in the oceans and the increasing volume of small plastic debris are increasingly being seen as a threat to marine wildlife and potentially also to human health. There is therefore an urgent need to minimize littering and other forms of leakages which ultimately lead to Plastic Marine Litter.

Against this background it is essential

- to gain a better understanding of the sources of plastic waste and the pathways (leaks) leading to Plastic Marine Litter in the North Sea, and
- to identify future research strategies that will yield a deeper insight into how to prevent Plastic Marine Litter by closing leaks of plastics to the environment.

These are the two main objectives of the proposed internship (or M.Sc. project) that is being offered in collaboration with Stichting De Noordzee (North Sea Foundation), the think tank and consultancy IMSA Amsterdam<sup>1</sup>, the Dutch Polymer Institute (DPI) and a few other stakeholders. The project will focus on Plastic Marine Litter in the North Sea.

The first task ( $\frac{1}{3}$  to  $\frac{1}{2}$  of the total project time) is to analyze the data on litter found along the coastlines of North Sea countries (from the OSPAR database<sup>2</sup> and other data sources) in order to form an initial impression of the types of waste and their origins, time delays, and changes in quantities and product types over time, etc. As input for the interpretation of the data, it is also planned to combine statistical information in a material flow analysis on the consumption of the most relevant plastic products (by application and by material, ideally as a function of time). Further information will be gathered by interviewing experts from the research community, government bodies and industry. Ideally, with the available information it will be possible to develop a theoretical model to estimate leakage pathways from the land-based and seaborne sources to the North Sea. While this objective may ultimately not be fully attainable, the key findings and conclusions will in any case provide valuable information about the usefulness and the limits of an analysis using the OSPAR database. Since it is probably not feasible to perform a thorough analysis for the full range of plastic packaging items, the study will focus on 0.5-liter plastic beverage bottles.

This part of the study is not expected to produce a comprehensive impression of the situation. Therefore, the second part of the project ( $\frac{1}{2}$  to  $\frac{2}{3}$  of the time) will involve drawing up a project plan to produce a more accurate and reliable understanding of the pathways leading to Plastic Marine Litter (including transport to the sea from land and by river as well as littering caused by shipping activities). This plan will be based on an inventory of other relevant research activities (e.g. statistical correlations as applied for other types of waste and their ultimate fates), an assessment of their feasibility for research into Plastic Marine Litter and an estimate of the insight that is likely to be gained by using those methods, either directly or in adapted form. The plan will also have to give an estimate of the effort required in person months and the costs of consumables (if any), as well as identifying potential partners (including their role) and, if possible, potential funding sources.

Requirements for this internship (or M.Sc. project) are the ability to process and interpret large datasets of varying scope and a basic knowledge of the Dutch language. This project is offered as an internship, but it may be extended to an M.Sc. thesis and potentially even to a combined M.Sc. thesis and internship.

The formal location of this internship is Utrecht University but separate stays of two or more weeks will be arranged at Stichting De Noordzee (Utrecht), IMSA (Amsterdam) and DPI (Eindhoven). For more information, please contact Martin Patel, [m.k.patel@uu.nl](mailto:m.k.patel@uu.nl).

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<sup>1</sup> IMSA is the author of the recent report "Plastics do not belong in the ocean".

<sup>2</sup> OSPAR stands for the Oslo and Paris Conventions for the Protection of the Marine Environment of the North-East Atlantic.