

## **Day 1: Introductory Course on Microplastics**

**May 2<sup>nd</sup> 0900-1500**

**Location: Carriage House and Marine Research Facility, WHOI Quissett Campus**

**Registration at course website: <https://web.whoi.edu/ocean-outlook/>**

**Short course on micro-plastics for Graduate students, PhDs and Post docs. Interested Scientists welcome.**

**Organizers: Marte Haave (Uni Research, Bergen Norway), Scott Gallagher, Mark Hahn (WHOI), Tanja Kögel and Bjørn-Einar Grøsvik (Institute of Marine Research, IMR, Bergen, Norway)**

### **Syllabus:**

Plastic waste is a major global issue. Many plankton and benthic organisms ingest microplastics. But how much is there, and how might it harm the environment? This short course will provide a theoretical and practical introduction to the scientific questions concerning the global increase in environmental plastic, and investigate the role of particle size in microplastic uptake by organisms. The lectures will introduce the global challenges related to plastic pollution as we understand them today, and discuss future research needs and knowledge gaps. Topics covered: Plastic polymer chemistry, environmental sampling and analytical methods, effects of microplastics on marine organisms, needs for risk assessment for environmental and human health. There will be time to communicate with researchers working in each field. The course will also encompass a practical session, with a demonstration of analytical methods in the laboratory as well as critical reading and discussion of published literature.

**Location: Morning lectures will take place in the Carriage House, WHOI Quissett Campus. Lab practicals will take place in Gallagher's Lab, Marine Research Facility (MRF), and MRF Conference Room, Quissett Campus.**

**[Click here for WHOI Campus Maps and Directions](#)**

### **Introduction to Microplastics**

#### **0900- 1030: Lectures (30 minutes each including questions), Carriage House**

1. Global occurrence, sources, distribution and fate of plastic in the environment. (Jessica Donohue, Sea Education Association (SEA, USA))
2. Environmental distribution, sampling and isolation of microplastics in biota and sediment (Marte Haave, Uni Research, Norway)
3. The importance of the smaller size-classes - implications for food safety and risk assessment. (Tanja Kögel)

**1030-1045 Break**

### **1045-1145: Lectures, Carriage House**

1. Methods for identification of plastic polymers - theory and practice  
Raman spectroscopy, Scott Gallager (WHOI, USA), Fourier transform infrared Spectroscopy (FT-IR) & Laser Induced Breakdown Spectroscopy (LIBS), Anna Michel (WHOI, USA)

### **1145-1230 Lunch-break (Buttery on Quissett Campus)**

### **1230 – 1430: Discussion and practical work (group rotation)**

#### **5 students per group**

#### **Group discussion Group 1 and 2 (1 hour, MRF conference room)**

Critical reading: read and discuss curriculum papers

Read and discuss a selection of recent microplastics papers. Tanja Kögel and Bjørn Einar Grøsvik (Institute of Marine Research, Norway).

#### **Group 3, 4 and 5: Practical work (Gallager's Lab)**

##### **Location: MRF 109 (20 min)**

##### **Group 3: Extraction/isolation of particles in biota and sediment (Marte Haave)**

Theory on acid/base digestion, enzymatic degradation/clean up, potential for contamination and need for quality assurance measures and control. A brief practical exercise with density separation.

##### **Location: MRF 111 (20 min)**

##### **Group 4: Visual identification by stereo microscope (Shiye Zhao, Post Doc in Gallager's Lab)**

Chances of under/overestimating numbers when using visual sorting.

##### **Location: MRF 108 (20 min)**

##### **Group 5: Raman Spectroscopy for identification of polymers (Scott Gallager)**

Hands on operation of a 532 nm Raman Spectrometer, hand-held 785 nm spectrometer, and a 532 nm flow-through system for large volumes of water. Also, use of a hand-held IR Reflectance spectrometer.

### **1430-1500 Summary (MRF conference room)**

Knowledge gaps and research needs.

Student driven, researcher-guided discussion.

*Product: Word-Cloud statement, short blog or similar to be posted on a board and/or on the conference web-page*