Międzynarodowa Środowiskowa Szkoła Doktorska
przy Centrum Studiów Polarnych
w Uniwersytecie Śląskim w Katowicach

ul. Będzińska 60
41-200 Sosnowiec
tel. +48 32 368 93 80
polarknow@us.edu.pl
www.mssd.us.edu.pl

**Title of PhD project: Effect of the microplastic pollution on structure and functioning of pelagic microbial food webs**

**The leading unit:** Institute of Oceanology Polish Academy of Science/National Marine Fisheries Research Institute

**Requirements:**

1. Master degree in oceanography, ecology or similar;
2. Knowledge in the ecology of marine protists;
3. Experience with field work and manipulation experiments on protists;
4. Experience with measuring grazing rate by protists;
5. Experience with measuring effect of pollutants on protists;
6. Experience with studying protists by microscopy;
7. Knowledge of molecular techniques, microscopy and statistics;
8. General skills: analytical thinking, independent and teamwork, organisation skills, creativity;
9. Good written and spoken English.

**Tasks description:**

The successful candidate will conduct manipulation experiments with aquatic microorganisms collected at from the Baltic Sea, and will analyse the samples using microscopic and molecular methods applied in microbial ecology (sequencing, CARD-FISH). The planned activities will include preparation and conducting the manipulation experiments, laboratory analysis, statistical analysis, interpretation of data, writing scientific articles and presenting the results at conferences. The successful candidate will participate in 5 experiments:

1. Experiment 1 will test the response of communities of bacteria and of bacterivorous protists to the most common types of polymers: PE and PS.

2. Experiment 2 will test whether the effect of microplastics (MPs) depends on their concentrations.

3. Experiment 3 will test the cascading effects of MPs on the higher trophic level.

4. Experiment 4 will test the response of bacterial communities to leakage from MPs particles, and whether it cascades to bacterivorous protists.

5. Experiment 5 will test whether the passage of MPs through food vacuoles of protists increases their quality as a carbon source for bacteria.

**Abstract:**

Międzynarodowa Środowiskowa Szkoła Doktorska
przy Centrum Studiów Polarnych
w Uniwersytecie Śląskim w Katowicach

ul. Będzińska 60
41-200 Sosnowiec
tel. +48 32 368 93 80
polarknow@us.edu.pl
www.mssd.us.edu.pl

The project aims to understand the impact of microplastics (MPs) pollution on the structure and functioning of the pelagic microbial food webs. We will investigate how the presence of bacteria-sized MPs (about 2 µm) affects the activity, growth rates, and community composition of bacteria and bacterivorous protists. Plastics pollution is considered a major threat to biodiversity and human survival. Its potentially detrimental impact on microorganisms and microbial food webs may jeopardize the functioning of an entire ecosystem. On the other hand, the positive effect of plastic on bacterial activity was also observed. The ecosystem-level consequences of the MP pollution on microbial trophic interactions remain poorly studied and understood. In presented project, we will verify four hypotheses concerning the effect of MPs on bacteria and bacterivorous protists: (i) MPs constitute worse quality food for bacterivorous protists than bacteria, negatively affecting their growth rates and resulting in changes in the community composition; (ii) The changes caused by the negative effect of MPs on bacterivorous protists community cascade to higher trophic levels; (iii) leakage from MPs provide a carbon source for bacteria; (iv) Passage of MPs through food vacuoles of bacterivorous protists increases their quality as a carbon source for bacteria. These hypotheses will be verified in a series of whole-microbial community manipulation experiments combined with the addition of MPs of different polymer types.

**Other information:**

The work will be carried out under supervision of dr hab. Katarzyna Piwosz, kpiwosz@mir.gdynia.pl, National Marine Fisheries Research Institute and dr hab. Józef Wiktor, wiktor@iopan.gda.pl, Institute of Oceanology Polish Academy of Sciences