H2020-MSCA-ITN
Bringing marine ecology into 21st century

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MIXITIN

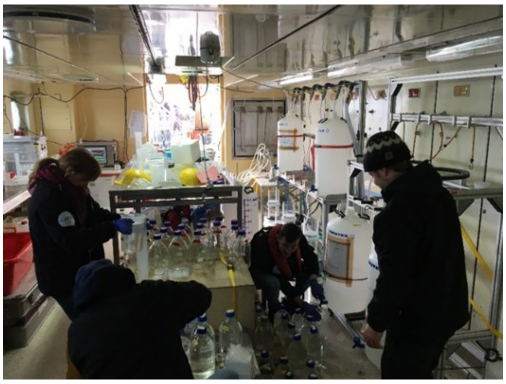
Training next generation marine ecologists in the mixotroph paradigm

Summer 2019 Newsletter: Project updates

June 8th was World Oceans Day 2019, raising awareness of the important role of the oceans for our planet. Members of MixITiN are enhancing our understanding of the oceans all year by studying the vital role that mixoplankton play in the oceans.

In this Newsletter we feature just a few aspects of MixITiN work conducted by some of our ESRs.

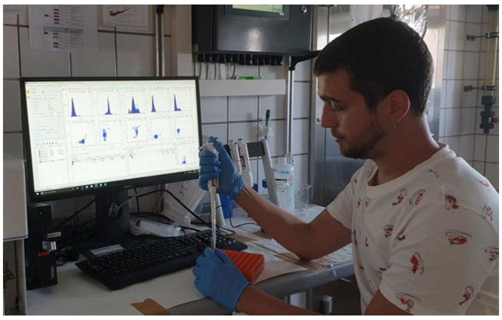
ESR1 Konstantinos Anestis

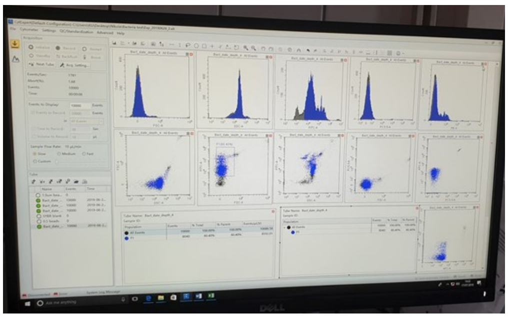


In June, I travelled to the Norwegian fjords as part of an expedition to better understand plankton biodiversity in the changing arctic ocean. For my project, I participated in sampling for RNA and DNA, as well as performing on-board experiments in order to study the effect of stressors on grazing by protozooplankton (which would include mixoplankton activity). The conditions we tested included various light intensities, temperature and nutrient concentrations. Even though the workload was high, just looking at the surrounding nature was more that in enough in order to forget everything and go forward. I can now say that I have been at the northernmost extreme of Europe!

Check the website to find out more about me and my project www.mixotroph.org/mixitin-esrs/

ESR2 Nikola Medić





Mixoplankton are major contributors to harmful algal blooms (HABs), threatening ecosystems, animal and human health. They cause massive fish-kills, damage fisheries and aquaculture, and impact recreational uses of water for tourism and allied economic losses. I am studying the ichthyotoxic (fish toxic) haptophyte *Prymnesium parvum,* a constitutive mixotroph which under certain environmental conditions produces and release ichthyotoxic compounds called prymnesins. At the University of Copenhagen, Marine Biology Section, we are exploring the effect of different irradiance levels and prey concentrations on the physiology of *P. parvum* including toxin production and excretion. The current focus is on mixotrophy and allelochemical interactions (chemical communications) between *P. parvum*, bacteria and other members of the plankton to better understand how climate change may affect blooms of this globally important species.

Website: www.mixotroph.org Email: mixotroph@swansea.ac.uk Follow us on Twitter @mixotrophs Like us on Facebook

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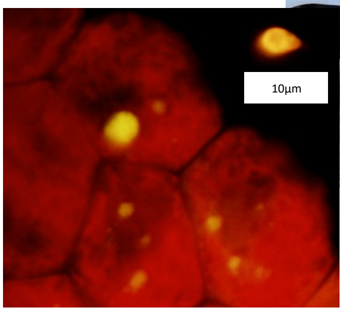
Read more about the challenges facing science operating in the world of mixotrophic plankton: check our recent free-access paper "**Mixotrophic protists and a new paradigm for marine ecology: where does plankton research go now?**" (https://doi.org/10.1093/plankt/fbz026)

Also, check our previous Newsletters at www.mixotroph.org/category/mixitin-newsletters/ !

ESR3 Guilherme Ferreira

I have just finished my secondment in Denmark where I had the opportunity to work with fluorescent plankton, including mixotrophs under a climate change scenario. Besides the natural beauty that mixoplankton already possesses, the addition of fluorescent prey causes quite the impact! It became even better when one such technique allowed me to be the first person in the world to identify a dinoflagellate species (found on Barcelona's coastal area) as a mixoplankton species! I'm super excited to test this new guy with different prey items and/or different climate change-related factors for my project. Who knows what are the surprises that are yet to come? Stay tuned!



Fluorescent cells (yellow) in a welled plate

ESR4 Joost Mansour

Working in the Mediterranean, I have been studying the nutrition of Acantharia (Radiolaria), which are large single celled mixoplankton containing many 10's of photosynthetic symbionts. Following ^{13}C incorporation I have observed that the uptake of carbon into the Acantharia is higher when they are supplied with ammonium (NH_4^+) rather than with nitrate. Although toxic in high quantities, NH_4^+ usage is more energy efficient. Studies of cnidarian symbionts and hosts show that often photosymbionts contain high levels of NH_4^+assimilation enzymes. If this is the same with Acantharia, then the symbionts would be well equipped to consume the NH_4^+ released as waste products by the Acantharia host cell. What is not clear is how important may nitrate be as a N-source for the symbionts when the Acantharia are starved of prey and thus releasing little NH_4^+. This is important because nitrate is a common N-source in eutrophication events.

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