

H2020-MSCA-ITN  
Bringing marine ecology  
into 21<sup>st</sup> century



Training next generation  
marine ecologists in the  
mixotroph paradigm

## Newsletter Spring 2019: Meet the supervisors

**Aditee MITRA** Project Coordinator, Swansea University (UK). I am a marine systems dynamics ecologist, studying mixoplankton and zooplankton. I bring my experiences in research, academia, governance and public & media engagement to MixITiN. My scientific contribution is modelling eSNCMs and predator-prey dynamics.



**Kevin FLYNN** Deputy Project Coordinator, Swansea University (UK). I am a plankton physiologist who originally worked in the laboratory, and increasingly uses models. In MixITiN I work on the models for the CM, GNCM and pSNCM types of mixoplankton.

**Albert CALBET** Consejo Superior de Investigaciones Científicas (CSIC-ICM, Spain). I research mainly marine protists and mesozooplankton. In MixITiN I work on assessing the role of mixoplankton as grazers in planktonic food webs, and to determine how this role is modified by different physico-chemical variables.



**Nathalie GYPENS** Université Libre de Bruxelles (Belgium). I am an ecological and biogeochemical modeler. Within MixITiN I study the role of mixotrophy in eutrophied ecosystems and the way mixotrophy will change climate-active gas emissions (in particular CO<sub>2</sub>, CH<sub>4</sub> and DMS).

**Per J HANSEN** Københavns Universitet (Denmark). My interest is in the physiology and ecology of planktonic organisms and the structure and function of microbial communities in marine environments. In MixITiN I study the functional biology and physiology of different kinds of mixoplankton.



**Fabrice NOT** Station de Biologique de Roscoff, Sorbonne Université (France). In MixITiN I focus on deciphering the physiological characteristics of photosymbiotic mixoplankton using molecular and microscopy tools.

**Paraskevi (Vivi) PITTA** Hellenic Centre for Marine Research (Crete, Greece). My interest is in the microbial food web structure and function of oligotrophic environments. In MixITiN, I study ciliate mixotrophy in the ultra-oligotrophic Eastern Mediterranean.



**Enric SAIZ** Consejo Superior de Investigaciones Científicas (CSIC-ICM, Spain). My main interest is the ecology of zooplankton, in particular the behaviour, ecophysiology and trophic dynamics of copepods. In MixITiN I study the interactions between copepods and mixoplankton.

**Willem STOLTE** Deltares (Netherlands). I am a marine plankton ecologist, working to better understand the functioning of marine ecosystems to optimize management advice. In MixITiN, I work on the development and use of models and other quantitative methods for management advice involving mixoplankton.



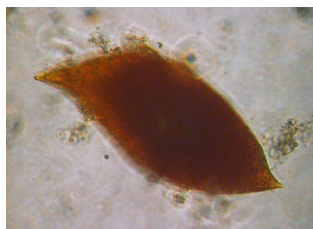
**Uwe JOHN** Alfred-Wegener-Institut (Germany). I study species interaction processes such as competition, infection and grazing, using molecular and genomic approaches. In MixITiN, I aim to elucidate cellular processes of mixotrophy and the associated evolutionary constraints.

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## Newsletter Spring 2019: Under the microscope!



### Protozooplankton - *Gyrodinium spirale*

Protozooplankton are incapable of photosynthesising. This is a medium sized protist (70-100µm), recorded from the North Sea to the North Atlantic, Indian Ocean and Pacific. The pigmentation comes largely from ingested prey. (Image: Jon Lapeyra; ESR10)

### Generalist Non-Constitutive Mixoplankton (GNCM) - *Strombidium conicum*

*S.conicum* (40 - 70 µm) is representative of a common ciliate genus. This one has ejected some trichocysts (harpoon-like structures), trapping some *Teleaulax* cells (its cryptophyte prey). Its photosynthetic ability is acquired from prey such as *Teleaulax*, and many other species. (Image: Maira Maselli; ESR7)

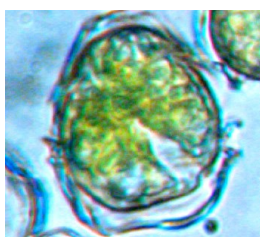


### plastidic Specialised Non-Constitutive Mixoplankton (pSNCM) - *Mesodinium sp.*

Like *Strombidium* (above), a ciliate (15 - 35 µm), but while this species can also eat a wide range of prey items, it can only acquire phototrophy specifically from certain species of *Teleaulax*. (Image: Mena Romano; ESR5)

### endosymbiotic Specialist Non-Constitutive Mixoplankton (eSNCM) - *Collodaria*

Either solitary (200–500 µm) or colonial (in this picture, 4-5 mm but can be several cm in size) this *Collodaria* houses photosynthetic symbionts (dinoflagellates), here visible as tiny golden cells surrounding the collodarian cells in the gelatinous matrix of the colony. This colony of over 200 cells is from the Mediterranean Sea (off Villefranche sur Mer). (Image: Joost Mansour; ESR4 and Andreas Norlin; ESR 6)



### Constitutive Mixoplankton (CM) - *Alexandrium tamarense*

Widely distributed in the North Sea and North Atlantic. The cell (20 - 35 µm) is almost spherical, slightly angular in the ventral view. Many CM species are "Harmful Algae". Although this particular species is non-toxic, it is a member of a genus that includes important Paralytic-Shellfish-Poison producing species. (Image: Jon Lapeyra; ESR10)

### Phytoplankton - *Dictyocha speculum*

Phytoplankton are unable to eat prey. This unflagellate cell (20 - 35 µm) contains many yellow-brown chloroplasts and has a silica skeleton consisting of two differently sized hexagonal rings with six long spines. (Image: Jon Lapeyra; ESR10)

