

*The **ECOSPHERE research group** aims to study aquatic and valley ecosystems that are continuously challenged by natural and anthropogenic stressors. The research focuses on acquiring fundamental and applied knowledge at different levels of structural and functional organisation in order to underpin environmental management decisions.*

## MASTER THESIS SUBJECT 2023

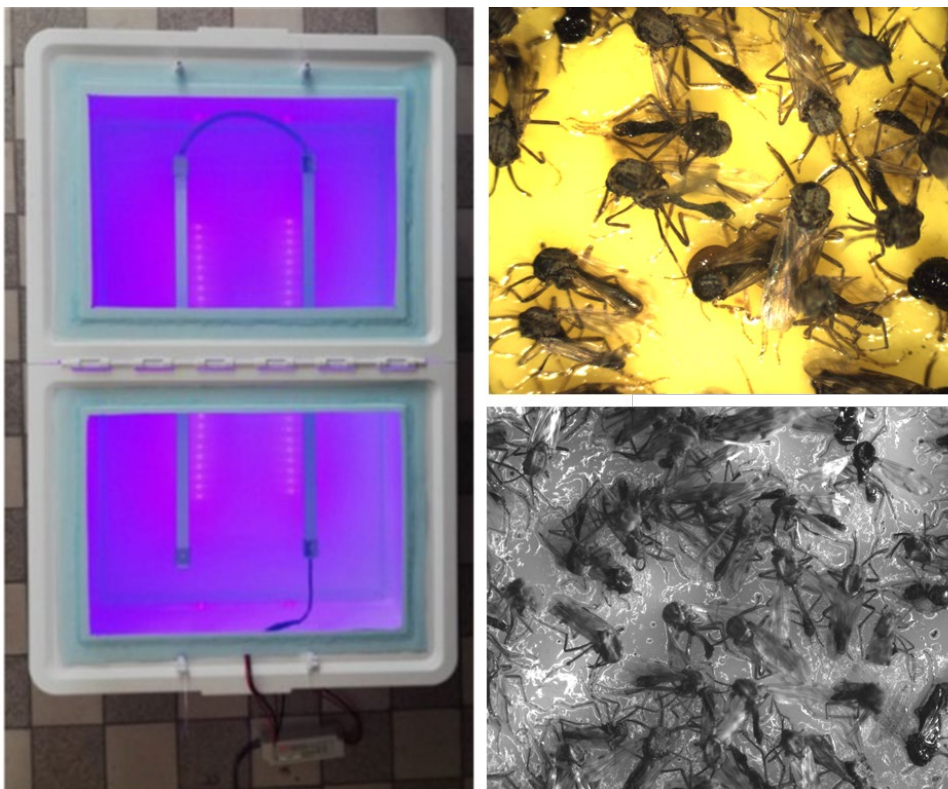
### Monitoring of midges using machine learning

**Research group:** ECOSPHERE

**Hosting laboratory:** CDE – building C

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*Midges are caught with UV traps in tidal marshes and counted manually. We want to teach the computer to do this for us in the future.*

- This topic mostly contains  literature study,  lab work,  field work,  experimental work,  GIS,  numerical modelling,  other: .....
- Possession of driver's license B is  needed,  recommended,  not needed
- Possession of certificates needed:  FELASA C,  other: .....



**Summary** Many tidal wetlands are being restored along the Scheldt river. These designated areas serve as storage capacity of water during storm surges in the estuary. At the same time, they are also a great opportunity for restoration of tidal habitats (tidal flats and tidal marshes). Although they naturally belong to the estuary, sometimes in this newly created nature there is a massive appearance of midges. These are little stinging flies that, when very abundant, can cause nuisance for people living nearby these areas. This may underpin societal support for this type of nature restoration. Probably these outbreaks of midges are only a temporal phenomenon of an ecosystem that is not in equilibrium yet. To effectively manage the population, we need to know where they are exactly, and how large and dynamic the population is.

For this reason, classic traps (using light and/or CO<sub>2</sub>) are placed in the area and in gardens of people. The midges get stuck on a sticky plate and these plates are recovered after some days. Right now, counting and identifying stinging from non-stinging midges is done manually and this is time consuming. We now want to try to automate this by taking pictures of the plates and learn the computer (AI) to recognize stinging midges from other bugs. In this thesis you will be part of this endeavor.

You will help our field technicians to set-out and collect the traps. After that, pictures are taken at the InViLab. On these pictures, midges need to be identified manually to learn the computer what to look at. At the same time, some plates need to be processed manually to compare both outcomes. Finally, the results are put on a map and linked to environmental variables to help water managers and decision makers controlling the outbreaks. This thesis is perfectly suitable for someone interested in AI and in the identification of organisms. Most work is done indoors behind a stereoscope or behind the computer. Computer work can be done from home if desired. A sense for detail and perseverance is recommended.

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