

*The ECOSPHERE research group aims to study both aquatic and valley ecosystems that are continuously challenged by natural and anthropogenic stressors. Its 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 2024

### Effects of single and mixture exposures on freshwater macroinvertebrates

Research group: ECOSPHERE

Hosting laboratory: ECOSPHERE at Campus Groenenborger

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Individual and sub-individual responses of freshwater invertebrates are followed when exposed to single and mixture exposure conditions.

- 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

The overall aim of the QTOX project is to develop mechanistic knowledge and data efficient modelling tools to bridge the gap between standard toxicity data (typically acute effects of single chemicals) and ecologically relevant end points arising from chronic, time variable exposures to chemical mixtures. The scope includes characterisation of the mechanistic processes which describe the successive events from exposure to ecosystem-level effects and the development of models for extrapolation of adverse effects across levels of biological organisation under environmentally realistic conditions.

Within this thesis you will establish physiological-based descriptors for extrapolation of adverse effects between biological species both within and between taxonomic groups. The tasks include delineating the suite of chemical and biological descriptors that are determinants of the rate of biouptake, extent of bioaccumulation, and sensitivity to toxicants for a range of taxa. Dynamic energy budget (DEB) and toxicokinetic-toxicodynamic (TKTD)-related parameters will be measured for macroinvertebrates (ventilation rate, feeding rate, growth rate, egestion rate, reproduction) under dynamic and mixture exposure conditions. Biological species sensitivity distributions will be constructed for a range of responses and dose parameters, and linked with the development of models for higher levels of biological organization.

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