

## TOPICS for MSc-thesis at AQUATIC ECOLOGY and WATER QUALITY MANAGEMENT group (April 2019)

*(list is not limiting; students can design their own project in consultation with one of the supervisors)*

### 1. Title : Influence of ageing on the vector effect of micro-plastics.

Topic: Micro-plastics and nano-plastics

Main supervisor: Bart Koelmans / Nur Hazimah

Short description: Evaluate the effect of ageing on chemical transfer from micro-plastics in organisms' gut to investigate how much chemicals are bioavailable from environmentally realistic micro-plastics compared to the virgin micro-plastics which have largely been used in most ecotoxicology studies.

### 2. Title : Fate and effects of micro- and nano-plastics

Topic: Micro-plastics and nano-plastics

Main supervisor: Bart Koelmans

Short description: several subjects possible; own ideas? discuss with supervisor.

### 3. Title : Phosphorus sorption capacity of sediment in lakes treated with lanthanum modified bentonite.

Topic: Mitigating eutrophication and cyanobacteria blooms

Main supervisor: Miquel Lurling / Maira Nunes Teixeira Mucci

Short description: Lake de Kuil was successfully treated in 2008 and 2017 with a lanthanum modified bentonite to manage eutrophication and cyanobacterial blooms. Little is known about the phosphorus sorption capacity of the sediment after the treatment. You will do fieldwork and lab experiments.

### 4. Title : Managing Eutrophication: what is the effect of alum and aluminium-modified zeolite treatment in the sediment of lakes?

Topic: Mitigating eutrophication and cyanobacteria blooms

Main supervisor: Miquel Lurling / Maira Nunes Teixeira Mucci

Short description: Eutrophication and cyanobacterial blooms are still a great challenge to lake managers. Alum treatment is currently used as a solution to the problem, mainly in the USA. However, little is known about how alum changes abiotic factors (e.g. pH) in the sediment of the lakes. You will do fieldwork and lab experiments.

### 5. Title : Forming vivianite in lake sediments by adding Iron (II) chloride to manage eutrophication

Topic: Mitigating eutrophication and cyanobacteria blooms

Main supervisor: Miquel Lurling / Maira Nunes Teixeira Mucci

Short description: Managing Eutrophication in a cheap, easy, safe and efficient way is still a challenge. Here, we would like to test if adding Iron (II) chloride directly in the sediments will be able to block phosphorus release by forming vivianite, a hydrated iron phosphate mineral. You will sample cores from different lakes and treat them with different concentrations of Iron (II) chloride.

### 6. Title : Lanthanum release from the mineral, Rhabdophane, under different pH

Topic: Mitigating eutrophication and cyanobacteria blooms

Main supervisor: Miquel Lurling / Maira Nunes Teixeira Mucci

Short description: Lanthanum (La) modified bentonite has been used in lakes to manage eutrophication. The lanthanum in contact with phosphate will form the mineral rhabdophane. Modelling reveals that rhabdophane is stable over a wide range of pH, however this has not been tested experimentally.

### 7. Title : Improving sediment toxicity tests for very hydrophobic substances

Topic: micro-pollutants

Main supervisor: Noël Diepens / Bart Koelmans

### 8. Title : Effects of climate change (increased CO<sub>2</sub> and temperature and their combination) on the structure and functioning of aquatic ecosystems

Topic: Stress ecology and risk assessment

Main supervisor: Paul van den Brink

### 9. Title : Mechanisms of toxicity of neonicotinoid insecticides, like imidacloprid, towards aquatic arthropod species

Topic: Stress ecology and risk assessment

Main supervisor: Paul van den Brink

Short description: The use of neonicotinoid insecticides has raised severe environmental concern. Our study will focus on the mechanistic explanation of the observed toxicity sensitivity difference of arthropod species to neonicotinoids between seasons and climatic regions. Differences in temperature, reproduction stage and the biology properties will be examined as potential explanations. In conclusion, our study will not only generate more knowledge about the neonicotinoids and their potential metabolites but also explore the mechanism behind intra- and inter-species specific differences in sensitivity for neonicotinoids, which will be of vital importance for their ecological risk assessment.

- 10. Title : Effects of antibiotics used in aquaculture on the structure and functioning of aquatic ecosystems with a special reference to the microbial community**  
Topic: Stress ecology and risk assessment  
Main supervisor: Paul van den Brink  
Short description:
- 11. Title : Spatial modelling of lake ecosystems with PCLake (2D)**  
Topic: modelling aquatic ecosystems  
Main supervisor: Jeroen de Klein  
Short description: PCLake has been a valuable tool for detecting critical nutrient loads for lakes. This is done in 0D, so as completely mixed systems. In large heterogeneous lakes it makes more sense to model this more spatially (2D). You will build a case of a specific lake to show the added value of 2D modelling.
- 12. Title : Application of PCLake+ (deep lakes) to a typical deep lake**  
Topic: modelling aquatic ecosystems  
Main supervisor: Jeroen de Klein / Annette Janssen  
Short description: PCLake+ is a newly developed version of the lake ecosystem model PCLake. It models deep lakes with stratification. We will build a case study on Rappbode Reservoir (Germany), a deep water body up to 80 meters, to test the performance of the model.
- 13. Title : Greenhouse gas emissions from riparian areas along streams**  
Topic: water quality (fieldwork, modelling)  
Main supervisor: Jeroen de Klein  
Short description: For biodiversity and peak flow reduction Water boards have restored natural streams by redesign and reconnecting floodplain areas. This will also lead to increased residence time and built up of organic sediments. In anaerobic conditions (high temperature, low waterdepth) this might lead to more CO<sub>2</sub> and CH<sub>4</sub> emissions. The aim of the project is to actual measure GHG emissions in different seasons and relate them to environmental conditions.
- 14. Title : Effect of floating solar panels on lake water quality**  
Topic: modelling aquatic ecosystems  
Main supervisor: Jeroen de Klein / Edwin Peeters  
Short description: Due to energy transition there is a pressure to install solar panels on surface water. But, what kind of effects might this have on the water quality ? You will study this using the lake ecosystem model PCLake.
- 15. Title : Tool for detecting changes in macroinvertebrate monitoring data**  
Topic: aquatic ecology  
Main supervisor: Edwin Peeters  
Short description: Water boards record aquatic invertebrates. Data is usually stored in a database. How can the water board authority detect whether newly added monitoring data deviate and indicate a possible change in water quality? (data analysis and tool development).
- 16. Title : Behavioural responses of crayfish**  
Topic: aquatic ecology  
Main supervisor: Edwin Peeters  
Short description: we're interested in an ecological footprint of crayfish species in the Netherlands and especially the behaviour of these crustaceans. (experimental study)
- 17. Title : Analysing effect of Nature Friendly Banks on aquatic organisms**  
Topic: aquatic ecology  
Main supervisor: Edwin Peeters  
Short description: Water boards have constructed nature friendly banks and have monitored plants and animals. These data are available for analyses to study the effects of these measures in river and lakes.
- 18. Title : Invasive seagrass expansion in the Caribbean and impacts of temperature, eutrophication and grazing (fieldwork).**  
Topic: marine ecology  
Main supervisor: Marjolijn Christianen  
Short description: In this project, you will investigate the impact of grazing and nutrients on the ecosystem services and the resilience (ability to recover from disturbance) of seagrass in Bonaire. Additionally, there are many options to design and carry out side experiments of your choice.
- 19. Title : Introduction of European flat oyster to the North Sea, facilitation of the native by the invasive oyster?**  
Topic: marine ecology  
Main supervisor: Marjolijn Christianen  
Short description: In this project, you will investigate how to restore oyster reefs and how these can impact ecosystem services. Additionally, there are many options to design and carry out side experiments of your choice.