Proposed thesis topics for the Doctoral degree studies (2020-2024) in Ecology and Environmental Science at Marine Research Institute (Klaipėda University)

Nr.5

Title	**Impact of hazardous micropollutants on aquatic ecosystems and their reduction through advanced technologies in wastewater treatment plants**
Brief description of the topic	At Europe Union level, the aim is to reduce contamination of aquatic ecosystems by the hazardous pollutants and in a long-term perspective to prevent their discharge to the environment. Although hazardous pollutants can be spread from both point and diffusive sources, but in urbanized areas it primarily comes from municipal sewage treatment plants (STP). Most of STP's are equipped with conventional three tiered cleaning steps: mechanical, biological and chemical. However, they together have limited capacity to remove or retain organic micropollutants in sewages and some of them enter the environment. New technological solutions (activated carbon/active material, ozone treatment) are being developed to prevent discharge of organic micropollutants from STP. However, costly installation and maintenance of these new technologies on a large scale prevents further progress in waste treatment therefore, pollutants continue to accumulate in the environment. Possible alternative methods may include an innovative and less expensive - advanced oxidation method, which has the potential to destroy organic micropollutants into less or non-toxic compounds. However, this method still remains scarcely applied *in situ*. The aim of current PhD project is to identify the main micro-pollutants entering the ecosystem from treatment plants and their impact on the different components of the aquatic ecosystem. Capacity and efficiency of selected hazardous micropollutants removal from sewage, applying advanced sewage treatment methods will be evaluated
Requirements for a candidate	Successful candidate must to hold master's degree in a relevant field (analytical, engineering or marine chemistry). Applicant should have the interest and ability to learn new research methods as needed for attaining the tasks, should be able to work independently as well as in an interdisciplinary team; hence good communication skills are important. Good English language skills are necessary. Working experience and knowledge's in gas/liquid chromatography and mass spectrometry is considered as advantageous.
Existing research experience	PhD student will join the team of Marine Research Institute, which performs high-level interdisciplinary research in different aquatic ecosystems. The thesis will be carried out in close collaboration with Kaunas Technology University, which has experience in developing new technologies for water purification and wastes treatment. Therefore, excellence of team relies on a combination of technical and scientific *know-how*. The thesis will be founded by AB Grigeo Klaipėda with agreement to Klaipeda University and partly by Interreg Latvia-Lithuania project „MEDWwater – Pharmaceuticals in wastewaters – levels, impacts and reduction".
Existing research infrastructure and support	Marine Research Institute operates the cutting-edge of analytical and experimental facilities that serves for observational and experimental research from the gene to the ecosystem level in both aquatic and terrestrial environments. The existing collaboration with Kaunas Technology University will provide access to unique technological infrastructure needed for achieving specific tasks..
Potential supervisor (Contact person)	Dr. Mindaugas Žilius
Potential scientific advisor	Two advisors will be define later