

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

Nr 7

Title	Ecological modeling for eutrophication studies in three European coastal waterbodies
Brief description of the topic	<p>Eutrophication is a severe problem that coastal water bodies in the Baltic States experience. Trying to control it will have benefits in various areas such as ecosystem services, water quality, human wellbeing etc.</p> <p>Through the application of a common hydrodynamic and ecological modelling framework (the SHYFEM model) to the Curonian Lagoon, it will be possible to investigate how much eutrophication is dependent on nutrient input from the drainage basin and the Baltic Sea. Climate change and future land use will also affect eutrophication. These scenarios should be investigated, as well as any extra measures that will be needed to achieve good water quality status.</p> <p>In order to apply the scenarios three pilot studies with different characteristics have been chosen that cover a full spectrum of ecosystem environments. These are the Curonian Lagoon (Lithuania), the Venice Lagoon (Italy), and the Mar Menor (Spain). For all of these pilot sites applications of hydrodynamic and ecologic models exists. The study aims to inter-compare these coastal environments through the application of numerical models, and the use of common evaluation techniques to quantify eutrophication.</p>
Requirements for a candidate	<p>Good English language skills are necessary. Understanding laws of physics, basic ecology and willingness to conduct individual research are essential. Applicant should have experience in analysis of environmental data, as well as willingness to work with various datasets. Knowledge and experience in programming and/or scripting languages will be given a preference during evaluation. The candidate will also need to have a high willingness to mobility that will allow longer stays in Venice (Italy) and/or Murcia (Spain).</p>
Existing research experience	<p>PhD student will enter the modelling team with experience in applying multiple models to analyse the environmental conditions and making predictions. In particular, the modelling group of the Marine Research Institute has the following objectives: Create excellence in the field of numerical modelling of the coastal zone and transitional waters for Lithuania and other countries; Bring together modelers and non-modelers and show the advantage of using models that can help the interpretation of observations and supplement them with other useful data; Create a framework of models that will be able to compute, forecast and predict important parameters, also as a tool for identification of pollution and environmental impact.</p>
Existing research infrastructure and support	<p>This research will not require any special laboratory infrastructure. Analytical facilities will be provided by Marine Research Institute. The software necessary to conduct the research is in open access or will be provided by the institute. The candidate will have an opportunity to join several national and international (H2020) projects as a junior researcher with the appropriate remuneration.</p>
Potential supervisor [contact person for the topic]	<p>Dr. Georg Umgiesser (georg.umgiesser@ismar.cnr.it) tel.: +39-339-4238653</p>
Potential scientific advisor	<p>dr. Ali Ertürk dr. Petras Zemlys dr. Arturas Razinkovas-Baziukas dr. Angel Perez-Ruzafa</p>