

**Proposed dissertation theme for the Doctoral degree Studies (2018-2022) in  
Ecology and Environmental Science at Klaipėda University**

<b>Title</b>	<b>Earth Observation-based assessment of ecological status over surface waters</b>
<b>Brief description of the topic</b>	<p>The increasing human population, industrialization, intensive a land use and climate change enhanced pressure on water ecosystem functioning and therefore requires a sustainable water management. Knowledge about the state of inland and coastal water bodies are therefore of great interest and it is being monitored. A number of European legislations aiming to protect and/or to improve the water quality have been constructed: the EU Directives (WFD, MSFD). In respect to the implementation of the directives, many indicators are being tested and selected as powerful markers of healthy ecosystem, pollution sources that need to be monitored. Algal blooming is one of the factors with the greatest impact on the quality and accessibility of bodies of water in aquatic ecosystems, and on the preservation of existing ecological balances. New and sustainable and operational methods are of great demand. Satellite remote sensing has become a valuable asset for monitoring water bodies and assessment of ecological status in a broad spatial and temporal scale. However, the applicability of data derived from optical remote sensing is limited to areas that are prone to cloud covers as northern latitudes, therefore to enhance the availability of information about ecological processes the use of other sources of information, like radar remote sensing and hydrodynamic modelling, is of great interest.</p> <p>The work will focus on:</p> <p>a) the use of Earth Observation data to investigate water quality and upscaling the ecological processes in aquatic ecosystems with different trophic status and pollution gradients;</p> <p>b) the calibration/validation of the EO data from newest COPERNICUS missions;</p> <p>c) special attention will be given to the algal blooms – the EO-based investigation of status, development, intensity, fate and effect on the aquatic ecosystem (like light conditions).</p> <p>d) in collaboration with Modelling group of Marine Research Institute, a synergistic use of hydrodynamic modelling and EO data for short-term fine scale (spatially and temporally) forecasting and/or hindcasting of cyanobacteria bloom will be tested.</p> <p>e) as final outcome of this research, the recommendations for the ecological monitoring to integrate EO-based information is planned.</p>
<b>Requirements for a candidate</b>	<p>Basic knowledge of aquatic ecology and environmental sciences, experience working in the laboratory, skills in GIS methods. Candidate should be motivated to gain theoretical and practical skills on satellite data processing methods and applications. Good computer knowledge is also needed. Knowledge of the English language is required. The combined usage of GIS methods, satellite data and numerical modelling will give the candidate an excellent background for further studies and a strong CV for occupation in the industry.</p>
<b>Research experience in the institution</b>	<p>A doctorate student will join the research team which has experience in the field of aquatic ecology with an application of Earth Observation data and actively collaborate with scientist from different international institutions (Italy, the Netherlands, Estonia, Sweden), collaborate with Modelling group of Marine Research Institute. This work will be implemented through the participation in the international Horizon 2020 research project (EOMORES, 2016-2019) and national project funded by European Space Agency (TODAY, 2018-2020).</p>
<b>Existing research infrastructure and support</b>	<p>Klaipeda University laboratories are well-equipped with all necessary infrastructure for samples analysis and field work. The archives of satellite data exist. Numerical models are available. Also data collected within the frame of national and international projects is available. The required licensed software is available at KU.</p> <p>Ph.D scholarship includes:</p> <ul style="list-style-type: none"> <li>• Annual stipend: €7,740-8.400 (duration 4 years);</li> <li>• Support for travel and consumables: <u>€6,400 for 4 years</u>;</li> <li>• Health insurance subsidy</li> </ul> <p>Additional:</p> <ul style="list-style-type: none"> <li>• Reduced fee accommodation (€1,360 / year) in the University campus;</li> </ul>

	<ul style="list-style-type: none"> <li>• Student rates for public transport;</li> <li>• Additional travel funding and extra stipend possibilities from National Research Council (subject to individual applications)</li> </ul>
<b>Potential supervisor [contact person for the topic]</b>	Dr. Diana Vaičiūtė, <a href="mailto:diana.vaiciute@jmtc.ku.lt">diana.vaiciute@jmtc.ku.lt</a> , +370 46 398877
<b>Potential scientific advisor</b>	Dr. Mariano Bresciani (IREA-CNR, Italy) and Prof. Georg Umgiesser (KU, Lithuania/ISMAR-CNR, Italy)