Proposed thesis topic for the Doctoral degree studies (2021-2025) in Ecology and Environmental Science at Marine Research Institute (Klaipėda University)

Title	**Monitoring and management of macro-litter in coastal zones**
Brief description of the topic	Objectives are a) the development of innovative methods for monitoring macro-litter on beaches and in coastal waters based on aerial and underwater drones, b) the test of these methods for investigating state and spatio-temporal pollution pattern in different coastal zones worldwide and c) the exemplary analysis of macro-litter sources as well as possible mitigation measures. The topic addresses the research needs resulting from the European Marine Strategy Framework Directive. The work shall enable transferable approaches to assess the effectiveness of pollution reduction measures, includes an assessment of the potential role of environmental labels and/or a coastal environment health index for reducing pollution and shall help to transfer European knowledge and approaches to countries with serious marine litter problems. The practical relevance for Lithuanian seaside resorts are improved litter management and emission reduction approaches as well as information about underwater macro-litter pollution. The underwater and multi-spectral aerial drones, as well as the mobile infrared spectrometer expand the coastal sea research capacity and complement ongoing monitoring activities at the Marine Research Institute.
Requirements for a candidate	Good knowledge of marine litter monitoring methods; experience with Geo-Information-Systems; good technical skills; experience in international and interdisciplinary research; very good language skills, especially in English, and the ability to work independently.
Existing research experience	The working group on 'Coastal and Marine Management' has a long-lasting experience in national and international marine litter research and is involved in national and international marine litter policy implementation. Recent relevant publications: ➢ Schernewski, G., et al. (2018). Beach macro-litter monitoring on southern Baltic beaches: Results, experiences and recommendations. J Coast Conserv, 22, 1: 5–25 ➢ Haseler, M., Weder, C., Buschbeck, L., Schernewski, G. (2019): Cost-effective monitoring of large micro- and meso-litter in tidal and flood accumulation zones at south-western Baltic Sea beaches. Mar. Poll. Bull. 149 ➢ Haseler, M., … Schernewski, G. (2020). Marine litter pollution in Baltic Sea beaches - application of the sand rake method. Front. Mar. Sci. 8: 599978 ➢ Schernewski, G., et al. (2020). Transport and behavior of microplastics emissions from urban sources in the Baltic Sea. Front. Environ. Sci. 8: 579361, ➢ Schernewski, G., et al. (2021). Urban Microplastics Emissions: Effectiveness of Retention Measures and Consequences for the Baltic Sea. Front. Mar. Sci. 8: 594415. ➢ Piehl, S…. Schernewski, G. (2021). Combined Approaches to Predict Microplastic Emissions Within an Urbanized Estuary. Front. Environ. Sci.
Existing research infrastructure and support	The work shall be linked to the international project: "Sustainable waste management systems in the tourism sector for the protection of marine ecosystems". The necessary research and technical infrastructure, including a range of different aerial and under-water drones and the mobile infrared spectrometer, will be provided.
Supervisor	Prof. Dr. habil. Gerald Schernewski gerald.schernewski@io-warnemuende.de