LITHUANIAN ENERGY INSTITUTE

ADMISSION TO PHD STUDIES FOR THE YEAR 2026

DOCTORAL RESEARCH TOPIC:

Assessment of pluvial floods and their risk in urban areas under climate change

RESEARCH FIELD:

Environmental Engineering (T 004)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

Climate change is evidence-based process that significantly alters precipitation patterns across regions, leading to an increased frequency and intensity of flooding events. In the Baltic Sea region, scientific evidence confirms that climate-induced changes in rainfall distribution heighten the risk and scale of both fluvial and pluvial floods. Urban environments, with their high population density and impervious surfaces, are particularly vulnerable to precipitation-induced flooding, which can disrupt critical infrastructure and cause substantial economic losses.

In accordance with the EU Floods Directive 2007/60/EC and the EU Water Framework Directive 2000/60/EC, Member States are required to identify, assess, and manage flood-prone areas. In Lithuania, the Hydrometeorological Service identifying the Lithuanian coastal river basin as a distinct management unit. Within this basin, the Akmena-Danė River, which flows through the cities of Kretinga and Klaipėda, is of particular interest due to its hydrological importance and its exposure to the impacts of climate change. Recent increases in extreme rainfall events in coastal areas have raised the risk of pluvial flooding in these urban areas. This situation underscores the urgent need to assess the performance and adaptive capacity of existing stormwater management systems under projected future climate conditions.

Given these challenges, it is essential to implement pluvial flooding into national flood risk maps to enable a more accurate assessment of threats to critical urban infrastructure and human safety. Accordingly, the proposed dissertation aims to identify urban areas at risk of rain-induced inundation and to develop scientifically grounded recommendations for enhancing urban resilience and adaptive capacity in the face of natural hazards and climate change.

The results will contribute to a more accurate assessment of rain driven flood risks in urbanized coastal regions, strengthen the scientific and practical basis for future flood risk mapping in Lithuania, contribute to compliance with EU flood management directives, and provide practical recommendations to municipalities seeking to reduce the negative effects of extreme precipitation and increase the resilience of cities to climate change.

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