

Integrated management framework for pluvial flood risk mitigation and adaption in urban areas

Summary

The overall goal of the project is to develop an integrated management and assessment framework for municipalities and water utilities to reduce pluvial flood risks in urban areas. This includes analyzing the risks, mitigation and adaption measures and providing an integrated framework and decision support tools for increasing the resilience of urban areas. The project addresses the following research questions: What are the main hazards in urban areas triggering pluvial floods? What are the solutions (including technical) to cope with the challenges and increase resilience? How can the developed decision support tools be integrated to the current decision support process? How to pilot the developed solutions in real urban environment?

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| Research field: | Environmental, marine and coastal technology |
| Supervisor: | Prof. Dr. Ivar Annus |
| Availability: | This position is available. |
| Offered by: | School of Engineering Department of Civil Engineering and Architecture |
| Application deadline: | Applications are accepted between June 01, 2022 00:00 and June 30, 2022 23:59 (Europe/Zurich) |

Description

The new EU Strategy on the Adaptation to Climate Change calls for smarter, faster, and more systematic responses to the effects of climate change. The member states are commissioned to “prevent the un-adaptable and adapt to the un-preventable”. Plenty of policy level guidelines and tools exist for applying various adaptation frameworks for adapting cities to climate change, considering the climate scenarios, potential risks and human development pathways. The European Commission along with the European Environmental Agency streamlined the iterative framework in the form of the Climate-Adapt Support Tool, which includes specific features for city-scale adaptation. However, when preparing cities for flooding events that are caused by intense short-term precipitation, such general frameworks fail to consider all of the key factors exacerbating the flood risk in urban areas.

The goal of this PhD project is to develop an integrated framework for reducing the pluvial flood risks in urban areas through data-based decision making and novel technical solutions mimicking inter alia nature's response to different hazards. In addition, the benefits of the existing tools need to be examined to detect the burdens that hinder the implementation. Multi-hazard multi-benefit solutions are expected that take into consideration the impact of pluvial flood risk management in urban planning and infrastructure performance in general.

The framework has to be piloted in Estonian municipalities.

Responsibilities and (foreseen) tasks

- Assessment of existing pluvial flood risk management frameworks and tools;
- Development of an integrated management framework for smart climate proof cities;
- Development of GIS analysis tools for data-based decision support and visualization of results;
- Modelling of urban water systems;
- Validation of the developed approach in real life case studies;
- Integrating the developed framework to the decision support process in pilot municipalities and water utilities.

Applicants should fulfil the following requirements:

- a master's degree in water engineering or environmental engineering
- a clear interest in the topic of the position
- excellent command of English
- strong and demonstrable writing and analytical skills

- capacity to work both as an independent researcher and as part of a team
- capacity and willingness to provide assistance in organizational tasks relevant to the project
- knowledge in basic hydraulics and hydromechanics, city planning and development
- knowledge of Estonian and EU legislation on city planning (national and regional level) and stormwater management.

The following experience is beneficial:

- GIS analysis
- Data analysis, big data
- Modelling in SWMM

The candidate should submit a research plan for the topic, including the overall research and data collection strategy. The candidate can expand the listed research questions and tasks, and propose theoretical lenses to be used.

We offer:

- 4-year PhD position in Urban Water Systems research group with a profound portfolio of ongoing pan-European and national projects on pluvial flood risks, mitigation and adaption measures and smart cities
- Work environment in the innovative campus of TalTech
- Participation in international projects
- Participation in international conferences and events
- Full-time employment
- Starting date September 2022.

About the department

The Urban Water Systems research group in the Department of Civil Engineering and Architecture has special expertise in the field of urban water systems. Open to cooperation, the unit has been coordinating and participating in numerous national and international projects during the last 15 years dealing with urban water systems funded by national R&D, European Union programs and by the European Commission. Workgroup members are active in the field of fluid dynamics in hydraulic networks with more specific interest in developing methods, concepts and technical solutions for pluvial flood risk assessments, mitigation and adaption in urban areas. Workgroup has close co-operation with potential stakeholders (municipalities and water companies in the Baltic Sea region, Ministry of Environment etc.) which supports the academic knowledge transfer to the stormwater quantity and quality management and control process.

Additional information

For further information, please contact Prof Ivar Annus ivar.annus@taltech.ee



To get more information or to apply online, visit <https://taltech.glowbase.com/positions/564> or scan the the code on the left with your smartphone.