International Conference EWaS 3rd

Special Session title: Water4Cities- Holistic Surface Water and Groundwater Management for Sustainable Cities

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Brief Description and topics: Modern cities need to cope with a number of challenges: ongoing urbanization, resource depletion and emissions, an ageing and deteriorating urban water supply infrastructure and the effects of climate change. To handle these issues and move towards sustainable growth, cities need to become smart and facilitate their innovation potential through the use of Information and Communication Technologies; this will let us reduce the urban water footprint overall. In order to move towards this direction we need to optimize the operation of water utilities, thus save water and energy, and minimize network leakages and non-revenue water. Optimization algorithms, network intelligence, and the installation of pressure and flow sensors throughout the network can significantly improve performance and save water and energy. The use of relevant ICT and social computing can be instrumental in raising awareness of stakeholders on the significance of water resources optimal management in sustainability, and can be used to change behaviors and attitudes among citizens.

This workshop is hosting works aligned to the Water4Cities—Marie Currie Actions and Horizon 2020 funded programme—research objectives, which are thoroughly linked to the aforementioned context:

Investigating new process and models for urban water cycle monitoring: The vision towards a real-time monitoring and decision support tool for urban water management requires a thorough analysis of the processes across the water lifecycle (surface water and groundwater supply, water reuse and recycling; waste water treatment, including recovery of resources; water and energy integration) in an effort to extract valuable data for post-analysis by relevant stakeholders and identify possible optimization opportunities.

Designing the necessary methodology for the analysis and optimization of urban water: This objective is related to the construction of a theoretical framework, upon which a decision support system can be implemented. Research work under this objective focuses on the design and mathematical formulation of complex models and optimization problems, depicting the interrelationships of various parameters in the calculation of key performance indicators for water use/pollution. Beyond, the evaluation of water-related parameters (e.g., water quality, water quantity), presented works can also focus on the consideration of the energy use within the optimization problems to provide a holistic solution minimizing overall environmental impact (both from water and energy perspective).

Researching optimization capabilities in data transmission protocols to support real-time water lifecycle monitoring: A proposed platform will need to monitor and control qualitative and quantitative degradation of water and determine its status in real time. Therefore, the communication and transfer of sensor data to the analytics platform is critical for the performance and reliability of the proposed system. Special focus of the research objective relates to the energy harvesting of water flows to prolong the lifetime of wireless sensors.

Design novel data analytics, data visualization algorithms and decision support tools for optimized urban water management: The main research objective towards that direction is the investigation of novel data analytics and data visualization algorithms supporting the water lifecycle monitoring and optimization services.