

Press Release



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ERC Proof-of-Concept Grant to Professor Marios Polycarpou to develop a Risk-Based Cyber-Physical Security Solution for Water Distribution Systems

Professor Marios Polycarpou from the Department of Electrical and Computer Engineer, and the KIOS Research and Innovation Center of Excellence, at the University of Cyprus, has been awarded an European Research Council (ERC) Proof of Concept (PoC) Grant. This grant will allow Prof. Polycarpou and his team to explore the market potential of his ERC-funded research in the area of smart water systems security.

The funded ERC PoC research project entitled "An Integrated Cyber-Physical Security Solution for Water Distribution Systems" (WaterSAFE) aims to enhance protection in drinking water systems from physical threats and cybersecurity attacks, by developing an innovative security-as-a-service solution. This solution will reduce the risk of cyber-physical threats, increase the resilience of water systems, and ultimately enhance tolerance to undesirable events which could affect public health.

This idea originated from the research work conducted as part of the ERC Synergy Grant project *Water-Futures: Designing the Next Generation of Urban Drinking Water Systems* (www.waterfutures.eu), awarded to Prof. Polycarpou in 2020, in collaboration with three other principal investigators from Germany, Greece and the Netherlands. Water-Futures integrates new technologies in automation and machine learning to create more resilient, equitable and efficient water solutions for cities of the future.

The Concept and solution

Nowadays, water distribution systems increasingly rely on internet-enabled technologies and as a result they become more vulnerable to malicious cyberattacks. Such attacks can disrupt operations, compromise water quality, and pose significant risks to public health. To address these challenges, the ERC PoC project WaterSAFE will develop an innovative cyber-physical risk management and incident response system for drinking water distribution systems.

The proposed system is composed of several components, including: a Digital Twin platform to enable emulation of various scenarios; an early warning System for detecting anomalies and unusual patterns in water quality which could be due to contamination events; and a training module to help prepare water operators and IT personnel for responding to cyber-physical threats.

The system will be demonstrated in proof-of-concept on the physical small-scale KIOS Water Security Testbed, under various realistic, as well as in controlled experiments on the large-scale Limassol Smart Water Living Lab. Workshops with stakeholders will evaluate and validate the tool's practical application and business case.

According to Professor Polycarpou, *"The ERC PoC WaterSAFE provides an exciting opportunity to explore the further potential of our ERC research in practice. By developing an integrated platform that simulates water distribution operations and detects cyber-physical threats in real time, we can significantly enhance the preparedness of critical water infrastructures."*

In this endeavor, Professor Polycarpou and his research team, consisting of Assistant Professor Angelos Marnerides, Research Assistant Professor Demetrios Eliades, Senior Research Associate Dr. Kleanthis Malialis and Senior Research Associate Dr. Stelios Vrachimis, will collaborate with PHOEBE Research and Innovations Ltd, a Cypriot SME specializing in IoT analytics solutions in smart building and smart water systems.

It is also worth mentioning that this is the third ERC Proof of Concept Grant awarded to Professor Polycarpou, following two others in 2015 and 2017, as well as two major ERC Grants: an ERC Advanced Grant in 2012 and an ERC Synergy Grant in 2020. This continued success proves his extensive contributions to groundbreaking research and innovation.

ERC announcement: <https://erc.europa.eu/news-events/news/Proof-of-Concept-Grants-2024>

About the ERC

The ERC (<https://erc.europa.eu>), set up by the European Union in 2007, is the premier European funding organisation for excellent frontier research. It funds creative researchers of any nationality and age, to run projects based across Europe. The ERC offers four core grant schemes: Starting Grants, Consolidator Grants, Advanced Grants and Synergy Grants. With its additional Proof of Concept Grant scheme, the ERC helps grantees to bridge the gap between their pioneering research and early phases of its commercialisation.

End of announcement



The WaterSAFE project will receive funding from the European Research Council (ERC) under the European Union's Horizon Europe Framework Programme for Research and Innovation.