

# Data driven e-services for water management

- ★ Water management is a complex area of research and crosses several disciplinary boundaries, so close collaboration is essential to the development of innovative, effective solutions that are supported by e-services. We spoke to **Professor Mariana Mocanu** about the Data4Water project's work in coordinating and supporting research in an increasingly important area of scientific endeavour

**A clean and** reliable supply of water is taken for granted in large parts of the world, yet water is becoming increasingly scarce in some locations and concern is rising over the continued depletion of our resources, leading scientists to investigate new methods of managing them more effectively. This is a complex area, requiring a high level of expertise in several different areas of technology, a context in which the work of the Data4Water project takes on clear importance. "The primary focus in this project is not research, but rather coordination and support that helps researchers to exchange information, to network, and to participate in various training programmes," explains Professor Mariana Mocanu, the coordinator of the project. Data4Water is a twinning initiative funded under the Horizon 2020 programme, aiming to strengthen links between different institutions, which Professor Mocanu says will help boost research capacity in Romania, a key priority for the project.

"Twinning projects like this give us the opportunity to join advanced research groups, and also to develop a more sustainable research base," she outlines.

## Sharing expertise

The project will play an important role in these terms, bringing together partners from four different European countries, with the wider goal of sharing expertise and laying the foundations for future research into services to support water management. Based herself at the University POLITEHNICA of Bucharest, Professor Mocanu says the project will make an important contribution to the development of a research base, looking at the key issues around water management. "We try to encourage young people, at an early stage in their careers, to get involved in research in this area. We aim to involve them in this project and give them the opportunity to attend conferences, workshops and hands-on training schemes," she continues.

This approach is designed to give students a solid grounding in the water management field, and also the technologies and methods that could be used to help address the wider issues around it. The project is playing a key role in training the next generation of researchers to deal with key challenges in the field. "Training is an important pillar of the project. Over the course of this project

we will hold three summer schools, each covering a specific topic. The participants will get technical support from the project partners," outlines Professor Mocanu. The participants are also encouraged to publish papers and several are already in the pipeline. These papers will be made available on the Knowledge-Lake platform, which is designed to facilitate collaboration between researchers. "The Knowledge-Lake platform has two main functions. The first is to host our research papers, so that they're available to our partners," says Professor Mocanu.

The second key function is to offer project partners the opportunity to collaborate at networking events, reflecting the importance of inter-disciplinary collaboration to the wider development of the water management field. Further training opportunities are also available through the project, including exchange programmes and workshops, so that researchers are aware of the wider picture in the field. "Training is also offered on artificial intelligence methods for instance, which are used in the development of water management solutions," continues





Professor Mocanu. The next step is to apply this knowledge to the development of effective new e-services. "We have worked on some projects on cyber-physical systems, and certain mechanisms can be applied in various disciplines. You need to have deep knowledge, and also to understand the field in which the system will be applied," points out Professor Mocanu. "There may be certain constraints in the field of application. So it's not enough to just develop tools, the tools have to be effective in the field."

now able to harness the power of technology to build a deeper overall picture. "Using ICT gives us the possibility to deal with complex processes that influence each other, so we can see the whole picture," stresses Professor Mocanu.

A great deal of information has been gathered by project partners, for example data on water levels at specific points in the river Danube, which can inform the development of e-services for water management. One service which has

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### Water management

The wider goal in the water management field is to develop effective, reliable e-services that enable us to make better use of the resources available, which by nature involves elements of different disciplines. While Professor Mocanu's background is in computer science, she says collaboration with colleagues in other disciplines has given her a deeper perspective on how ICT could be applied to water management. "We had some contact with our colleagues in civil engineering, who specialise in hydrology. They gave us some case studies and explained to us where improved ICT could prove relevant in water management. So we looked at how we could combine our expertise," she outlines. While historically knowledge of issues around water management was limited to specific sectors, researchers are

been developed is a monitoring system, connected to an alarm, which Professor Mocanu says can provide alerts if the water quality changes. "If there is an accident, or the hydrocarbon level goes over a certain threshold, then an alarm is raised. We also have some services that compute the water and pollutant propagation," she explains. From this point it is possible to compute the risk that polluted water will reach a specific location downstream; Professor Mocanu and her colleagues aim to develop services for wider use. "We tried to avoid using expensive software, by instead using pre-stored cases of propagation, and picking up insights from a kind of database of propagation cases. With our service it's cheaper and easier to issue warnings, which helps in terms of making it more widely available," she outlines.

## DATA4WATER

Excellence in Smart Data and Services for Supporting Water Management

### Project Objectives

The overall objective of the project is to strengthen research in the field of smart data driven e-services in water resources management, made available to international community and/or specific stakeholders such as companies, citizens and authorities.

### Project Funding

This project has received funding from the EU Research and Innovation programme Horizon 2020, Call: H2020-TWINN-2015, under grant agreement No 690900.

### Project Partners

University Politehnica of Bucharest (UPB) **Romania (Coordinator)**, University of Milano-Bicocca (UNIMB) **Italy**, Fraunhofer Institute FOKUS (FOKUS) **Germany**, IHE Delft (IHE) Institute for Water Education **Netherlands**.

### Contact Details

Project Manager,  
Professor habil. Mariana Mocanu, PhD,  
University Politehnica of Bucharest  
Faculty of Automatic Control and  
Computers, Department for Computers  
Room ED402  
313 Splaiul Independentei,  
Sector 6,  
Bucharest, 060042  
**T:** +40.21.4029646  
**E:** d4w@cs.pub.ro  
**Knowledge-Lake:** <http://data4water.pub.ro/>  
**W:** <http://data4water.eu>

Professor habil. Mariana Mocanu, PhD



**Professor habil. Mariana Mocanu, PhD**, head of the Computer Science Department at the University Politehnica from Bucharest coordinates the team for Interoperable products and services for decision support, based on geospatial data, and has a long experience in developing information systems for industrial and economic processes, as well as in project management. Her teaching and research is focused on software engineering, systems integration, cyberphysical systems and logic design. Prof. Mariana Mocanu was involved in several national and European research projects, being now principal coordinator of the H2020 - Twinning project: Excellence in Smart Data and Services for Supporting Water Management - Data4Water.

