

## Introduction

**NOWELTIES - Joint PhD Laboratory for New Materials and Inventive Water Treatment Technologies.** Harnessing resources effectively through innovation is a Marie Skłodowska Curie Action European Joint Doctorate (EJD) project (programme Innovative Training Networks (ITN) of Horizon 2020). Its primary objective is to organize a platform that will provide cutting edge training opportunities for the education of tomorrow's water treatment experts.

## Objective

**Future challenges**, including climate change and the resulting unpredictability of precipitation patterns and temporal or permanent water scarcity, generate a high diversity of demands on water treatment technologies obliging them to be able to cater towards a variety of source and target water qualities across multiple scales, depending on application.

It is evident that this will generate a market pull towards the development of new water treatment technologies, employing new materials or improving the integration of existing technologies. However, the integration of research and innovation within the water sector **needs to be supported by education of a new generation of interdisciplinary trained wastewater professionals able to face future challenges and implement wastewater-related directives in practice.**

**The primary objective of NOWELTIES is to organize a platform (European Joint Doctorate)** that will provide cutting edge training opportunities for the education of tomorrow's water treatment experts. The core activity is the research programme (composed of 14 individual research projects) aimed at development of inventive water treatment technologies (advanced biological treatments, inovative oxidation processes, hybrid systems) that allow catering for the varied treatment demands for a plethora of interconnected streams arising from recycling loops.

**These technologies will be able to control contamination by organic micropollutants (OMPs)** and improve recovery of water across a diversity of scales enabling a smart combination of decentralized and centralised approaches. Besides a holistic training in the field of wastewater treatment dealing with state-of-the-art technologies, experimental techniques and knowledge management methodologies, NOWELTIES will provide a unique training approach to learning complex complementary skills leading to independent and critical thinking which seeks for originality and innovation.

## Contact

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# Nowelties

European Joint Doctorate

Joint PhD laboratory for new materials and  
inventive water treatment technologies.  
Harnessing resources effectively  
through innovation.

Coordinator:



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# 14 | research projects

- ESR 1** Understanding biotransformation mechanisms of OMPs during anoxic biological wastewater treatment  
University of Santiago de Compostela (USC), Spain
- ESR 2** Studying the bioavailability and biodegradability of OMPs during treatment  
RWTH Aachen University, (RWTH), Germany
- ESR 3** Coupling the new concept of sequential biofiltration with in situ electron acceptor delivery for enhanced OMP removal and effective attenuation of disinfection by-product precursors  
Technical University of Munich (TUM), Germany
- ESR 4** Design, development and characterization of atmospheric plasma system for wastewater treatment  
Institute of Physics (IPB), Belgrade, Serbia
- ESR 5** Understanding transformation of OMPs during plasma treatment and its ecotoxicological implications  
Catalan Institute for Water Research (ICRA), Girona, Spain
- ESR 6** Application of UV-LEDs AOPs for the efficient removal of OMPs from wastewater  
Faculty of Chemical Engineering and Technology (FKIT), University of Zagreb, Croatia
- ESR 7** Surface modification and functionalisation of adsorbent materials  
Faculty of Technology and Metallurgy (TMF), University of Belgrade, Serbia
- ESR 8** A green microwave - assisted synthesis of Au/TiO<sub>2</sub>/graphene oxide nanohybrids for visible light-induced photocatalysis  
Faculty of Mechanical Engineering and Naval Architecture (FSB), University of Zagreb, Croatia
- ESR 9** Removal of OMPs by nanophotocatalysts and nanobiocatalysts immobilized into magnetic supports  
University of Santiago de Compostela (USC), Spain



- ESR 10** Novel TiO<sub>2</sub>-based composite co-catalysts for solar driven water purification  
Faculty of Chemical Engineering and Technology (FKIT), University of Zagreb, Croatia
- ESR 11** Studying the enhancement of the removal of OMPs from wastewater by adding powder activated carbon in an MBR  
University of Ferrara (UNIFE), Italy
- ESR 12** Design of hybrid nano-engineered bioprocesses for wastewater treatment  
Catalan Institute for Water Research (ICRA), Girona, Spain
- ESR 13** Development of hybrid system by integrating nanocatalyst and adsorptive composites in situ in sequential biofiltration systems  
Technical University of Munich (TUM), Germany
- ESR 14** Hybrid ozone-ceramic membrane process: increasing hydroxyl radical yield and OMP reduction while reducing membrane fouling  
Catalan Institute for Water Research (ICRA), Girona, Spain

> Project ID: 812880  
> H2020 MSCA EJD project

## Beneficiaries



**ICRA**  
Catalan Institute for Water Research, Girona, Spain



**USC**  
University of Santiago de Compostela, Spain



**RWTH**  
RWTH Aachen University, Germany



**TUM**  
Technical University of Munich, Germany



**UNIZAG - FKIT**  
Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia



**UNIZAG - FSB**  
Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb, Croatia



**TMF**  
Faculty of Technology and Metallurgy, University of Belgrade, Serbia



**IPB**  
Institute of Physics Belgrade, Serbia



**UNIFE**  
University of Ferrara, Italy

## Partner Organisations

- UdG** | University of Girona - Spain
- FHNW** | University of Applied Sciences and Arts, Northwestern Switzerland - Switzerland
- HERA** | HERA LDT - Italy
- Cetaqua** | Cetaqua, Santiago de Compostela - Spain
- Aqualia** | FCC Aqualia - Spain
- CWT** | Comprehensive Water Technology - Croatia