

## RESEARCH PORTFOLIO

Environmental Decision Support Systems

November 2023

### Name of scientists in charge

- > **Dr Manel Poch**, Full Professor, [manuel.poch@udg.edu](mailto:manuel.poch@udg.edu)
- > **Dr Joaquim Comas**, Associate Professor, [joaquim.comas@udg.edu](mailto:joaquim.comas@udg.edu)
- > **Dr Ignasi Rodríguez-Roda**, Full Professor, [ignasi.rodriguezroda@udg.edu](mailto:ignasi.rodriguezroda@udg.edu)
- > **Dr Hèctor Monclús**, "Ramón y Cajal" fellow, [hector.monclus@udg.edu](mailto:hector.monclus@udg.edu)

### Technology description

- > Development and implementation of environmental decision support systems for a sustainable management of the urban water cycle (drinking water and distribution network systems, sewer systems, wastewater treatment, recovery systems and receiving media).



### Research expertise

- > Knowledge management and development and implementation of multi-criteria Environmental Decision Support Systems (EDSS) to support decision making in water-related systems.
- > Integration of Artificial Intelligence (AI) techniques with conventional modelling techniques and control algorithms in EDSS to support the management of complex environmental systems, especially in water (drinking water treatment plants) and wastewater management processes (e.g. membrane bioreactors) and fluvial ecosystems.
- > Planning, design, operation and maintenance of small and decentralized, including natural systems, medium and large wastewater treatment systems.
- > Multi-criteria (technical and socio-economical) and life cycle analysis of urban water systems (UWS).
- > Integrated control of the urban water cycle (sewer system, wastewater treatment plant and receiving media) to improve ecological status of water bodies.
- > Knowledge-based modelling of drinking water treatment systems.
- > Environmental decision support systems applied in Drinking Water Treatment Plants for operation strategies, minimization of influent impacts and evaluation of organic matter fractioning.

## Projects

- > **WATSProof** - Implementation and validation of an environmental decision support system for the control and management of drinking water treatment plants. Spanish National Research Agency. Programme "Prueba de Concepto" 2021-2023
- > **SHERLOCK** - A StEp forward in the Resilient management Of Drinking Water Utilities. From applied research to full-scale validation. Spanish National Research Agency. Programme "Proyectos I+D+I. Retos". 2021-2024.
- > **DrinkIA-FISERSA**. Use of artificial intelligence techniques and organic matter fractionation to improve the ozonation step in the drinking water plant of Figueres. FISERSA. 2021-2024. Industrial Doctorate (AGAUR).
- > **RITA** - urban water cycle Resilient To pandemics. AGAUR. Programme PANDÈMIES2020. 2021-2022.
- > **DrinkIA-supply** – Development of an EDSS for the management and optimization of water distribution network. Ens d'Abastament Ter-Llobregat (ATL). 2021-2022.

## Awards

- > **Prize to Young Talent in Sustainable Water Management 2018** from the Botín Foundation.

## Publications

- > Galizia A., Mamo J., Blandin G., Verdaguer M., Comas J., Rodríguez-Roda I., Monclús H., **Advanced control system for reverse osmosis optimization in water reuse systems**, *Desalination*, Open Access, Volume 51815, December 2021, Article number 115284.
- > Suquet J., Godo-Pla L., Valentí M., Ferrández L., Verdaguer M., Poch M., Martín M.J., Monclús H., **Assessing the effect of catchment characteristics to enhanced coagulation in drinking water treatment: RSM models and sensitivity analysis**, *Science of the Total Environment*, Open Access, Volume 79910, December 2021, Article number 149398.
- > Palma-Heredia D., Verdaguer M., Molinos-Senante M., Poch M., Cugueró-Escofet M.À., **Optimised blending for anaerobic co-digestion using ant colony approach: Besòs river basin case study**, *Renewable Energy*, Volume 168, Pages 141 - 150, May 2021.
- > Godo-Pla L., Emiliano P., Poch M., Valero F., Monclús H., **Benchmarking empirical models for THMs formation in drinking water systems: An application for decision support in Barcelona, Spain**, *Science of the Total Environment*, Volume 7631, April 2021, Article number 144197.
- > Poch M., Garrido-Baserba M., Corominas L., Perelló-Moragues A., Monclús H., Cermerón-Romero M., Melitas N., Jiang S.C., Rosso D., **When the fourth water and digital revolution encountered COVID-19**, *Science of the Total Environment*, Open Access, Volume 74420, November 2020, Article number 140980.
- > Morera S., Santana M.V.E., Comas J., Rigola M., Corominas L., **Evaluation of different practices to estimate construction inventories for life cycle assessment of small to medium wastewater treatment plants**, *Journal of Cleaner Production*, Volume 2451, February 2020, Article number 118768.
- > Verdaguer, M., Molinos-Senante, M., Clara, N., Santana, M., Gernjak, W.f., Poch, M. **Optimal fresh water blending: A methodological approach to improve the resilience of water supply systems**, *Science of the Total Environment*, Volume 624, 15 May 2018, Pages 1308-1315.