

SCIENTIFIC PORTFOLIO

Environmental Decision Support Systems (EDSS)

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Name of scientists in charge

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Technology description

- > Development and implementation of environmental decision support systems for a sustainable management of the urban water cycle (sewer systems, wastewater treatment and 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.

Most relevant projects

- > **DrinkIA** – Development of an EDSS for the operation of Abrera and Cardedeu drinking water treatment plants. ATLL. 2014-2020.
- > **WATSON**- Toward the development of an EDSS for water treatment works: from basic research to optimal operation at full-scale – Spanish Ministry of Science. Programme “Retos I+D+I”. 2018-2020.
- > **EdiCitNet** - Edible Cities Network - Integrating Edible City Solutions for social resilient and sustainably productive cities – European Commission. H2020-SCC-NBS-2017. 2018-2023.
- > **SANITAS** – Sustainable and Integrated Urban Water Systems Management. European Commission. VII FP Marie Curie Initial Training Network (coordinators). 2011-2015.

Most relevant publications

- > Baserba, M., Vinardell, S., Molinos-Senante, M., Rosso, D., Poch, M., **The Economics of Wastewater Treatment Decentralization: A Techno-economic Evaluation**, *Environmental Science and Technology*, Volume 52, Issue 15, 7 August 2018, Pages 8965-8976.
- > 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.
- > Atanasova, N., Dalmau, M., Comas, J., Poch, M., Rodriguez-Roda, I., Buttiglieri, G., **Optimized MBR for greywater reuse systems in hotel facilities**, *Journal of Environmental Management*, Volume 193, 15 May 2017, Pages 503-511
- > Castillo, A., Vall, P., Garrido-Baserba, M., Comas, J., Poch, M., **Selection of industrial (food, drink and milk sector) wastewater treatment technologies: A multi-criteria assessment**, *Journal of Cleaner Production*, Volume 143, 1 February 2017, Pages 180-190.
- > S. Morera, Ll. Corominas, M. Poch, M.M. Aldaya, J. Comas. **Water footprint assessment in wastewater treatment plants**. *Journal of Cleaner Production*, Volume 112, Part 5, 20 January 2016, Pages 4741-4748.
- > Verdaguer, M., Clara, N., Monclús, H., Poch, M., **A step forward in the management of multiple wastewater streams by using an ant colony optimization-based method with bounded pheromone**, *Process Safety and Environmental Protection*, Volume 102, 1 July 2016, Pages 799-809.
- > M. Verdaguer, J. Suy, M. Villaret, N. Clara, M. Bofill, M. Poch. **An exact approach for the prioritization process of industrial influents in wastewater systems** (2015). *Clean Technologies and Environmental Policy*, June 2015.
- > Garrido-Baserba, M., Hospido, A., Reif, R., Molinos-Senante, M., Comas, J., Poch, M. **Including the environmental criteria when selecting a wastewater treatment plant** (2014). *Environmental Modelling and Software*, 56, June 2014, 74-87.