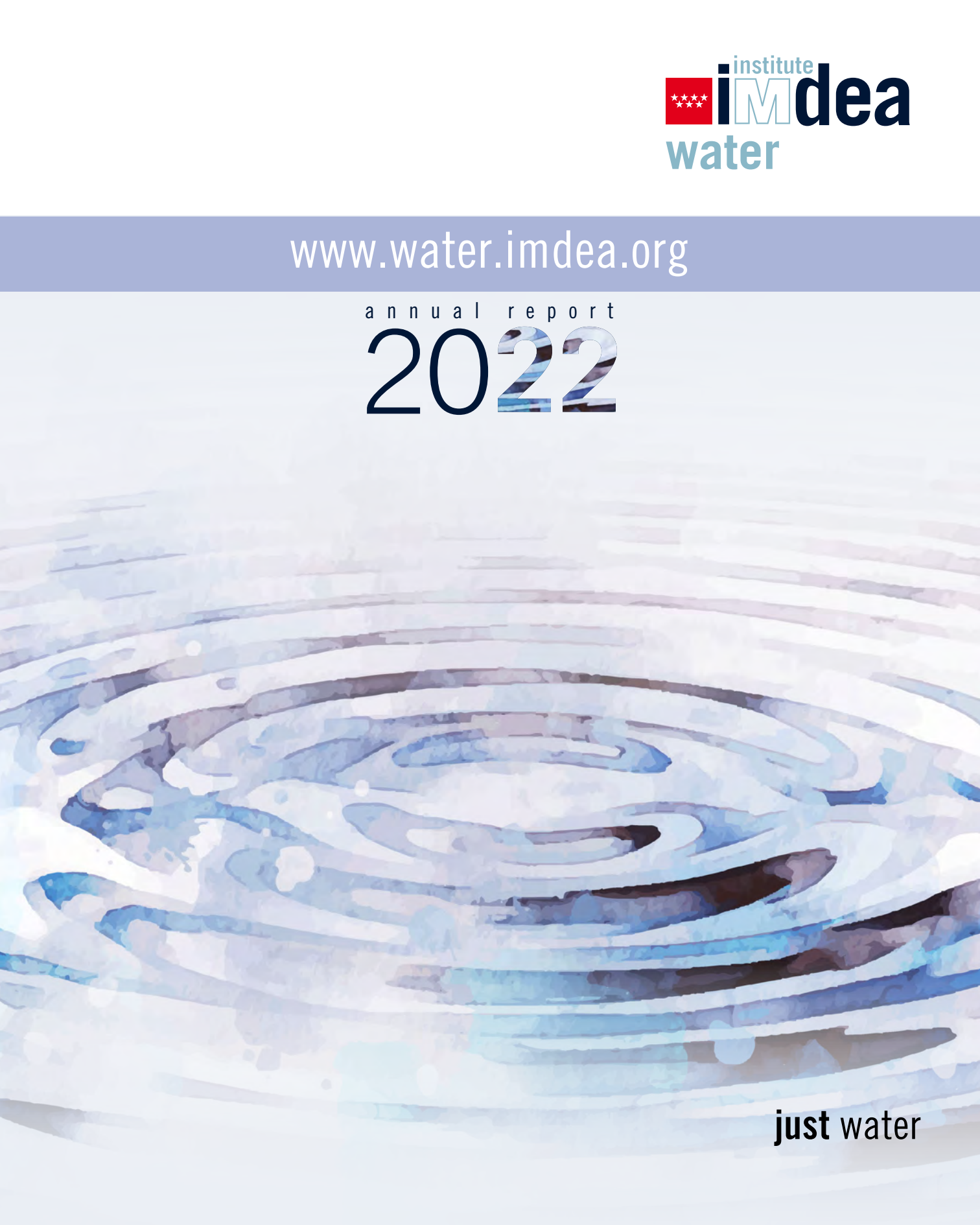
institute IMDEA water

www.water.imdea.org

annual report 2022



just water

Eloy García Calvo
Director, IMDEA Water Institute
(Until November 2022)

annual report

2022

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In 2022, IMDEA Water was able to distance itself from the pandemic, reaching pre-pandemic levels for factors such as risk management and risk-minimizing contingency plans, work and task organization, internal and external communication, and threat and opportunity monitoring.

As in the previous two years, whilst in the midst of the SAR-COV-2 crisis, the Institute's scientific activities continued to grow: 10 active international projects, 14 national and regional projects, and 10 contracts with different institutions, including the EU's Directorate-General for Environment (DG Env) and the European Parliament.

Similarly, we maintained a high level of quality for scientific publication, with 75% of articles having been published in first quartile (Q1) journals. This also applies to other aspects of scientific production.

On the other hand, social interaction indicators continued to evolve more slowly towards pre-pandemic numbers. Indicators such as attendance at events, internships, and outreach and awareness-raising initiatives have yet to reach 2019 values.

It is worth mentioning how the acquisition and implementation of new infrastructure has allowed the Institute to have sufficient quantities of water with different quality levels available, whether it be urban wastewater or waters with high concentrations of sulfates etc. This resulted in high TRLs when testing the technologies under development. The installation of a greenhouse, with climate control systems, and the acquisition of both chemical and biological analytical equipment, were also significant events in 2022.

We continue the preparation work for our new lab dedicated to the analysis of micro and nano plastics. This entails implementing analysis systems which require complex protocols. We hope the service to be fully available during 2023, so as to cater to the needs of both our own researchers and to those who request its services from abroad.

The Metfilter spin-off, which is partly owned by the institute, is present in various sectors. Wastewater and the difficulty of using conventional treatment methods are a common thread throughout all its activities.

On a final note, and with special relevance this year, I would like to express my sincerest gratitude to the Community of Madrid, for its commitment to helping the Institute move forward, to IMDEA Water's advisory and governing bodies, to all our current staff and to all those who, at some point or other, have contributed to our success. We have overcome serious economic and health crises, so thank you to all those who have made it possible for IMDEA Water to be what it is today.

words from the director...

annual report 2022

www.water.imdea.org

editor
IMDEA Water Institute

graphic design
base 12 diseño y comunicación

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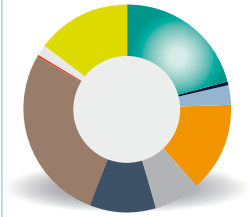
executive summary

Human Capital

- **45** Researches
- **12** Laboratory staff
- **30** Associated researchers
- **9** Administration and management staff

Scientific results



- **54** Articles in journals, 40 in high impact journals (Q1)
- **2** Books
- **8** Books chapters
- **36** Lectures
- **18** Round tables and experts panels
- **27** Participation in Scientific Committees
- **71** Conferences
- **1** Software
- **4** PhD thesis defended
- **38** PhD thesis in progress

Origin of funds

- Total income **3.690.353 €**
- **35%** from projects & contracts
- **10** Active international projects
- **14** National and regional projects
- **10** contracts

1

Spin-off METfilter

with water treatment in 3 sectors (urban, oil & gas, livestock)

4

pilot plants

membrane technology, outdoor mesocosms facilities, microbial electrochemical technologies, land application systems

4

High-level up-to-date specialized laboratories

chemical analysis, soil, biology and microbiology and geomatic

overview

IMDEA Water Institute is a public non-profit organisation promoted by the Madrid Regional Government, engaged in excellent research focused on contributing the innovative elements necessary in a strategic sector, such as water, as well as providing highly competitive postgraduate lectures and courses. Training for scientists and professionals, primordial for IMDEA Water, is carried out by organising and collaborating in doctorate programmes, masters and other courses, thus helping to compensate society for the effort made in maintaining the Institute.

vision

The institute's vision is to become an internationally acknowledged centre of excellence for research and innovation on water issues. Helping Madrid take pride of its place among the regions generating knowledge and facilitating innovation by providing solutions to problems and challenges in water management.

mission

The mission is to foster multidisciplinary research and innovation on water issues, generating affordable and sustainable solutions for water-related issues and management. Likewise, to create an efficient development model for science and technology in collaboration with the production sector.

purpose

Generate knowledge to provide solutions that contribute to the water sustainability of the planet.

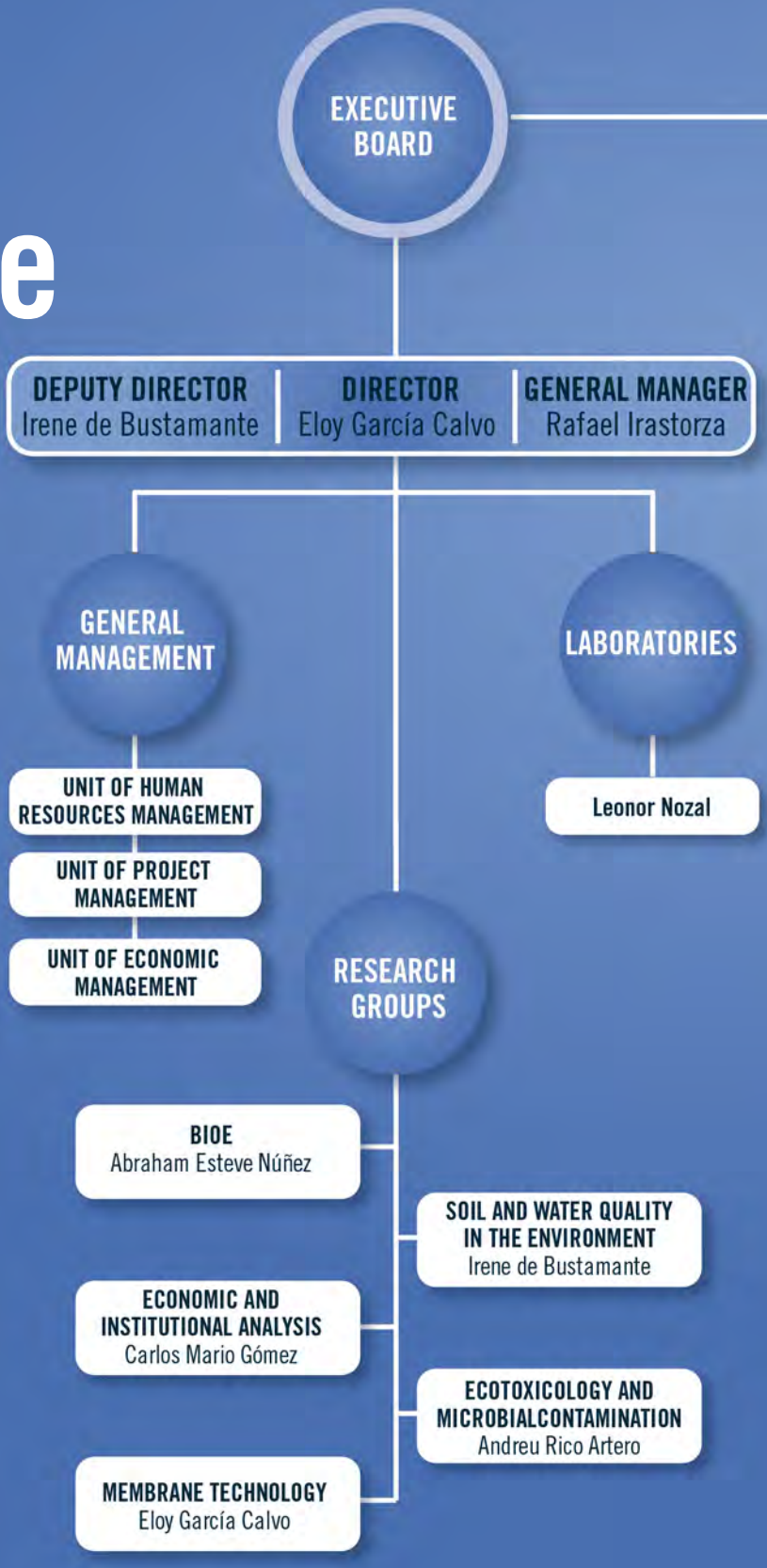
The IMDEA Water Institute has developed prestige and recognition in the areas of sustainable management of water bodies, quality and pollution, water treatment and water reuse and economic and institutional analysis.

RESEARCH GROUPS

- Soil and Water Quality in the Environment
- Membrane Technology
- Bioe
- Economic and Institutional Analysis
- Ecotoxicology and Microbial Contamination

SUSTAINABLE DEVELOPMENT GOALS

our structure



On November 18, 2022, the Board of Trustees appointed Dr Irene de Bustamante as the new director of IMDEA Water

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AQUALIA. INTEGRAL WATER MANAGEMENT

infrastructures and se

Chemical Analysis Lab
Basic Analysis Unit

Basic analysis unit: organoleptic assays (colour and turbidity) and physicochemical testing (pH, conductivity, temperature, redox potential, TKN, total phosphorus, free and total chlorine, alkalinity, TSS, TOC, DBO5, DQO, total nitrogen, etc.).

Chemical Analysis Lab
Chromatography Unit

Liquid Chromatography coupled to Ultraviolet-Visible (HPLCUV): determination of organic pollutants (pesticides, herbicides, phenols, PCBs), pharmaceutical products (antibiotics, sedatives, painkillers), foodstuffs (artificial sweeteners, antioxidants, additives), and quantitative analysis of compounds of interest.

Ion Chromatography: separation and determination of ions based on ion exchange resins.

Chemical Analysis Lab
ICP-MS Unit

Inductively Coupled Plasma Mass Spectrometry (ICP-MS Unit): determination of trace level elements in all types of matrices: semi-quantitative multi-element analysis; quantitative analysis of elements of interest; gauging isotopic ratios of an element; analysis of small sampling volumes; analysis of solid biological, organic, and inorganic samples; environmental applications; determination of metals and pollutants; speciation of metals in complex matrices; and quantification of inorganic nanoparticles.

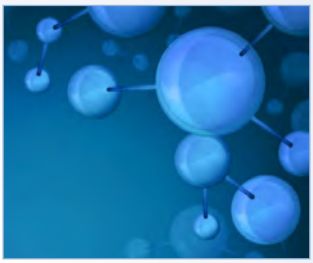
pilot plants

Membrane Technology

cientific equipment

Chemical Analysis Lab

Mass Spectrometry Unit



Mass Spectrometry Unit: analysis of organic micropollutants, determination of impurities in pesticide products, determination of exact mass and fragmentation studies, and identification of compounds or fragments by their mass spectrum.

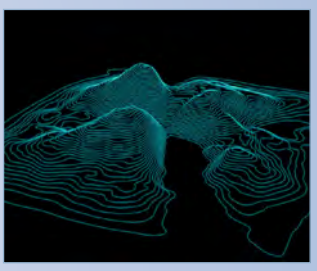
Soil Lab

Determination of physical-chemical properties of soils, sediments, and similar solid matrices: texture, moisture, pH and electrical conductivity, organic matter, total nitrogen, assimilable phosphorus, nitrates, total calcium carbonate, cation exchange capacity and exchangeable bases (Na+, K+, Ca2+, Mg2+), exchangeable aluminium, metals, phosphates retention, assimilable boron, calcium carbonate equivalent content, amorphous content (Si, Al, Fe), total organic carbon content, and moisture retention curve.

Biology and Microbiology Lab

- Monitoring of cyanobacteria blooms and their toxins.
- Analysis of biological and microbiological indicators.
- Determination of minimum inhibitory concentrations of microorganisms.
- Acute and chronic toxicity tests with algae, invertebrates, and fish.
- Microcosm and mesocosm tests at population and community level.

Geomatic Lab



Provides technology-based solutions. Fully equipped with hardware, software, and databases for modelling; development of specific maps using remote sensing techniques, GPS, and conventional documentary sources; automation of data collection; and application of simulation models.

Microbial Electrochemical Technologies

Land Application Systems

Outdoor Mesocosm Facilities

Chemical Analysis Lab
Basic Analysis Unit

In this unit we analyse several physical and chemical parameters laid down in the regulations on control of water quality and dumping.

Equipment

- Particle counter for water samples (0.2 microns and 2 microns). LS_200 model from Particle Measuring System Inc.
- Visible UV spectrophotometer (190-1.100 nm). UV-1800 model from Shimadzu.
- Total Organic Carbon (TOC) Analyzer. TOC-V CSH model.

Applications

- Organoleptic assays: Colour and turbidity.
- Physical-chemical testing: Basic parameters such as pH, conductivity, temperature, redox potential, Total Kjeldahl Nitrogen, total phosphorus, free and total chlorine, alkalinity, suspended solids (TSS), total organic carbon (TOC), DBO_5, DQO, total nitrogen, etc.

Chemical Analysis Lab
Chromatography Unit

Liquid Chromatography coupled to Ultraviolet-Visible (HPLC-UV)

High resolution liquid chromatography (HPLC) is one of the most widely used separation techniques, due to its versatility and broad field of application.

Equipment

The HPLC Model 1200 (Agilent Technologies) apparatus includes a vacuum degasser, quaternary pump, automatic injector, thermostatted column compartment and diode detector (DAD).

Applications

The field of application for this technique is very wide-ranging. Some of the applications are listed here:

- Determination of organic pollutants (pesticides, herbicides, phenols, PCBs).
- Pharmaceutical products (antibiotics, sedatives, painkillers).
- Foodstuffs: artificial sweeteners, antioxidants, additives.
- Quantitative analysis of compounds of interest.

Ion Chromatography

Ion Chromatography is a variant of High Performance Liquid Chromatography (HPLC). Separation and determination of ions is carried out, based on the use of ion exchange resins. This type of chromatography is subdivided into cation and anion exchange chromatography, with the latter featuring most applications.

Equipment

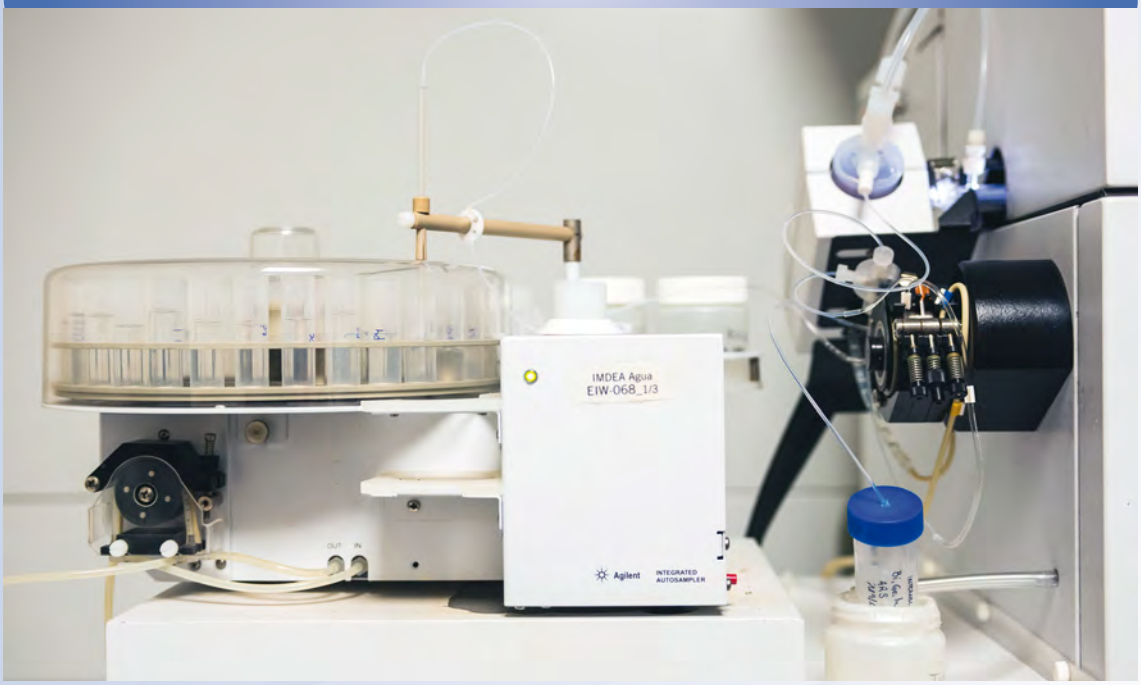
- Dual channel Ion Chromatography system model 861 Advances compact IC (Metrohm), with sequential chemical suppression and samples ultrafiltration. Simultaneous determination of anions and cations with conductivity detector.

Applications

With detection by conductivity.

- Anion analysis (F^-, Cl^-, NO_2^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-}) in aqueous matrices.
- Cation analysis (Na^+, NH_4^+, K^+, Mg^{2+}, Ca^{2+}) in aqueous matrices.

Chemical Analysis Lab
ICP-MS Unit



The analytical technique with the greatest potential for determination of trace level elements in all types of matrices. It is usually necessary to perform a sample digestion.

Equipment

Inductively coupled plasma - mass spectrometer (ICP-MS), model 7700 x (Agilent Technologies). High levels of performance, reliability and automation. Includes a collision cell system in helium mode, greater sensitivity, less background noise, increased removal of spectral interferences and 'no gas' mode. Option of coupling separation techniques such as high performance liquid chromatography (HPLC).

Applications

- The majority of elements in the periodic table can be analysed using this technique.
- Semi-quantitave multi-element analysis. To determine the major and minor elements in a sample. Allows semi-quantitative determinations of elements for which there is no comercial standard with an error lower than 15%.
- Quantitative analysis of elements of interest Linear dynamic range of 8 orders of magnitude (ng/L (ppt) – mg/L (ppm)) and low detection limits (ng/L (ppt)) for most elements
- Gauging the isotopic ratios of an element.
- Analysis of small sampling volumes (<600 µl)
- Analysing solid biological, organic and inorganic samples by acid digestion and microwave treatments.
- Environmental applications (waters, soils, sediments and residues).
- Determining metals and possible contaminants in soils (fertilisers) and inland drinking waters (dumping).
- Speciation of metals in complex matrices.
- Quantification of inorganic nanoparticles.

Chemical Analysis Lab
Mass Spectrometry Unit

Mass Spectrometry (MS) is a highly sensitive instrumental analytical technique able to quali- and quantitatively assess all types of mixtures of substances. In addition, this technique also determines the molecular mass of a compound, as well at the different fragments resulting from controlled break-up of the same, providing highly valuable information on the molecular structure. The ions are separated according to their mass/charge (m/z) ratio and detected.

The great advantage of high-resolution mass spectrometry compared to low resolution is the greater precision and accuracy of the mass, due to the more high-performance features of the time of flight-quadrupole analysers (TOF and QTOF). These allow unequivocal identification of the exact mass of a compound.

Equipment

- Bidimensional Gas Chromatography/ MS (GC x GC/TOF). Pegasus (LECO) and GC model 7890A from Agilent Technologies.
- Gas Chromatography / Triple Quadrupole (GC-MS/MS). GC model 7890A and triple quadrupole detector model 7000 (Agilent Technologies). This system is coupled to a Gerstel twister brand Autosampler.
- Liquid Chromatography (LC-QTOF) equipment. Triple TOF 5600 model (AB sciex).
- Liquid Chromatography /MS (LC-TOF) equipment (model G6280B, Agilent Technologies).
- Liquid Chromatography /Triple Quadrupole (LC-MS/MS) (model 6495A, Agilent Technologies).
- Liquid Chromatography/Triple QUadrupole (LC-MS/MS) (model 6495C, Agilent Technologies).
- Pyrolizer coupled to Gas Chromatography-Mass Spectrometry (Py-GC-MS). Pyrolizer model 6200 (CDS Analytical), GC model 7890B and MS model 5977B (both from Agilent Tecnologies).

Applications

- Analysis of organic micropollutants in waters by GC-MS/MS (organochlorine and organophosphorus pesticides, trihalomethanes, polyaromatic hydrocarbons) by means of LC-MS (TOF) y LC-MS/MS (QTOF) (drug and multi-residue)
- Determination of impurities in pesticide products.
- Assays to determine exact mass and fragmentation studies.
- Identifying compounds, or fragments of the same, by their mass spectrum in comparison with GC-MS libraries.
- New analytical methods are constantly being developed (as the determination of micronanoplastics in environmental samples) to adapt to the new requirements laid down in current legislation regarding water quality and support the research projects involving new environmental concerning issues.

Soil Lab

IMDEA Water has a laboratory dedicated to analysis of soils, sediments and similar solid matrices, such as humus or reactive materials. Activities mainly focus on determining physical-chemical properties for characterisation from an agronomic standpoint. The study of these solid matrixes is of prime importance, as characterising the soil-water system is crucial when assessing the use of water in activities such as irrigation or artificial recharge of aquifers. The impact on soil of water reuse for environmental purposes is highlighted, as it depends on the quality of the water utilised, which will vary depending on its source. This procedure thus helps define the efficacy of treatments whose effluents may be used in one of the environmental uses, or to analyse water quality according to source. In short, soil monitoring is a necessary tool when assessing the management of water resources.

Equipment

- Area for pre-treatment of samples.
- Richards plates to calculate moisture retention.
- Microwave/Oven for digestion and extraction.

Applications

- Texture.
- Moisture, pH and electrical conductivity.
- Organic Matter.
- Total nitrogen, assimilable phosphorus, nitrates.
- Total calcium carbonate.
- Cation exchange capacity and exchangeable bases (Na^{+}, K^{+}, Ca^{2+}, Mg^{2+}).
- Exchangeable aluminium.
- Metals.
- Phosphates retention.
- Assimilable boron.
- Calcium carbonate equivalent content.
- Amorphous content (Si, Al, Fe).
- Total organic carbon content.

Intelligent greenhouse with climate control system

IMDEA Water's top-of-the-range smart greenhouse is specially designed to withstand the demanding conditions of the research environment. It is a Reylux R9 model with a wide wing and gable roof, with a surface area of 100 m^2, a total height to the zenith of 5 m, and a roof and walls made of colourless cellular polycarbonate with protection against UV radiation. It is characterised by its airtightness, insulation and resistance to humidity, which translates into high energy savings.

Applications

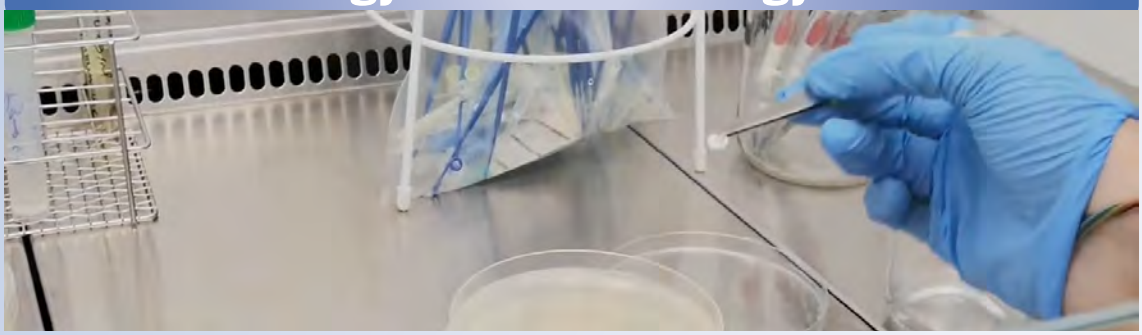
The greenhouse equipment allows various types of tests to be carried out, both in hydroponics and in soil and/or amendment:

- Crop productivity: assessment of the impact of irrigation with water of different qualities, which has been subjected to different treatments, on crop yields in terms of quantity of crop per area of land.
- Plant selection: evaluation of ecophysiological parameters for the selection of plant species, including large plant species (e.g. *Populus spp., Salix spp., Typha spp.*, etc.), for use in Nature-Based Solutions, such as vegetation filters or wetlands.
- Nature-based solutions: small-scale trials of attenuation of chemical (e.g. nutrients, pharmaceuticals, metals, etc.) and biological (e.g. viruses, parasites, antibiotic-resistant bacteria) contaminants, using selected plant species, for water purification and soil phytoremediation.
- Public health risk: tests to assess the risk to food safety arising from the transfer of contaminants into the food chain via edible tissues of horticultural plants (e.g. *Lactuca sativa*, etc.).
- Environmental impact: tests to assess the ecotoxicological impact of pollutants on the soil-plant system, such as soil microbiological activity (e.g. enzymatic activity, microbial biomass, etc.) and different morphological and physiological parameters of plants (e.g. leaf area, etc.).
- Runoff and infiltration: tests using devices that simulate water movement by runoff and/or infiltration processes, with or without vegetation, to assess the mobility of pollutants present in soil or water, such as micronanoplastics.

Equipment

The greenhouse is designed to carry out independent experiments simultaneously with crops of plant species with different lighting needs depending on the growth stage under study. For this purpose, it includes computerized environmental control, cultivation tables with independent LED lighting and drip irrigation system of different classes depending on the requests of researchers and clients. It is also equipped with devices for monitoring pollutants in the water-soil-plant system.

Biology and Microbiology Lab



The Biology and Microbiology Laboratory supports water quality monitoring programs through standardized and innovative methods to achieve the objectives set by the Water Framework Directive (DMA 2000/60/EC).

Equipment

Microscopy unit: the microscopy unit is equipped with high-quality optical microscopes, with high-resolution photo-mounting systems, to facilitate identification and counting microscopic organisms:

- Light microscope.
- Stereo microscopes.
- Digital photo camera.

Cyanobacteria and cyanotoxins unit:

- Incubator for cyanobacteria and bacteria cultures.
- Rotary evaporator with a cooling system, Buchi, for extraction of cyanotoxins.
- Solid Phase extraction equipment, for concentrating toxin extracts.

Molecular biology unit:

- Electrophoresis gels Documentation System.
- Real Time PCR (AB7300) for quantitative and qualitative gene studies.
- Nano-photometer (Epoch) for the quantification of DNA and RNA.
- Gel electrophoresis equipment (Biorad) for DNA and RNA.
- Thermocycler (PCR) for DNA amplification.
- Homogenizer for DNA extraction (Precellys).

Ecotoxicology unit:

- Incubators for testing under standard conditions.
- Cultures of algae, invertebrates and fish.
- Tanks of different sizes for standard and microcosm tests.
- Bathtubs with automatic temperature and lighting regulation.

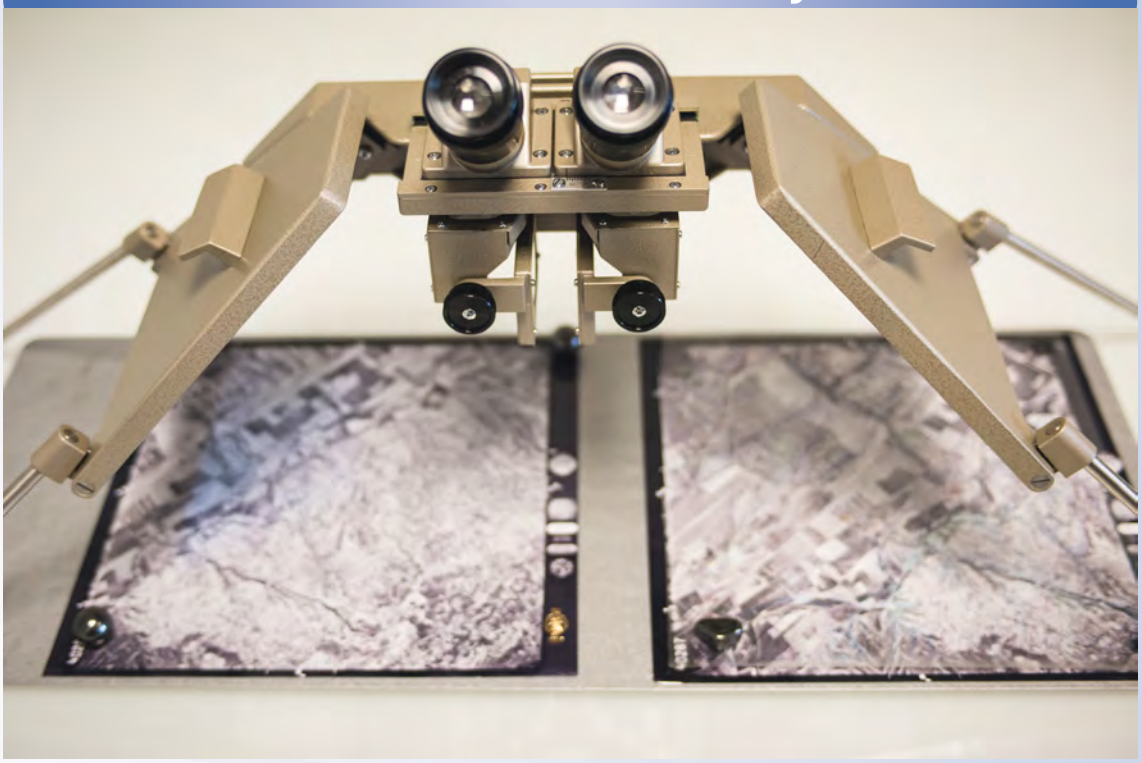
Field equipment for ecological monitoring of rivers:

- Equipment for measuring temperature, conductivity, dissolved oxygen and pH in situ.
- Electrical contact indicator.
- GPS.
- Screens and networks for macroinvertebrate and phytoplankton sampling.
- Flowmeter.

Applications

- Monitoring of cyanobacteria blooms and their toxins (microcystins) in surface waters.
- Analysis of microbiological indicators *(E. coli,* Enterococos, Coliforms, *Clostridium, Pseudomonas aeruginosa)* to determine the quality of drinking and recreational waters.
- Analysis of biological indicators for the determination of the ecological state of the waters.
- Determination of Minimum Inhibitory Concentrations (MICs) of microorganisms (antiobiograms).
- Acute and chronic toxicity tests with algae, invertebrates and fish following standard protocols (ISO, OECD).
- Microcosm and mesocosm tests at population and community level.

Geomatic Laboratory



The Geomatics Unit is a resource that provides an infrastructure dedicated to solutions based on new technologies. The Lab has a complete framework consisting of a set of hardware, software, and databases, with which a wide range of needs are covered, such as:

- Modelling.
- Development of specific maps using remote sensing techniques, GPS and conventional documentary sources.
- Automation of data collection.
- Application of simulation models.

Equipment

- ARCGIS.
- GIS IDRISI.
- GIS ILWIS.
- GIS GVSIG.
- SAGA GIS.
- QUANTUM GIS.
- ERDAS IMAGINE.
- ER-MAPPER.
- OPTICKS.
- Geostatistics SURFER.
- Spatial Metric Analysis -FRAGSTAT.
- Estimation of Soil Parameters, Hydrologic Modelling - HEC and SWMM family.
- Automated water data collection systems.
- Water Erosion Models - WEAP.
- Hydrogeological models: Hydrus 1D, CXTFIT, PHREEQC-2.
- Statistical analysis programs: Tanagra, R.
- Terminals under a central server.
- Peripherals of different sizes, including printers, plotters and a medium format scanner.
- Support materials that aid data collection and its inclusion in drive systems (laptops, pagers, GPS and SLR cameras).

Pilot Plants

Membrane technology

In the laboratory of membrane technology the following equipment can be found:

- Two laboratory-scale cross-flow stainless steel test units for flat-sheet membranes. The systems can be used as a microfiltration, ultrafiltration, nanofiltration or reverse osmosis.
- A spiral wound ultrafiltration and reverse osmosis membrane pilot plants that can be coupled and used in series.
- Three stirred cell (lab scale) for ultrafiltration and nanofiltration membranes.
- A membrane bioreactor for wastewater treatment.
- Laboratory scale electrodialysis system.
- Laboratory scale forward osmosis system.
- Automatic membrane coating device with different coating speeds and different coating thicknesses to prepare membranes for different applications.
- Table to conduct membrane autopsies.

Microbial electrochemical technologies

The Microbial Electrochemical Technologies pilot plant provides an ideal space for companies in the sector that want to perform pre-industrial tests based on the interaction microorganism-electrode.

- Gradostat
- Lab-scale microbial electrochemical reactor for environmental biotechnology studies.
- Electrocoagulation reactor for wastewater treatment and removal of pollutants.

- Pre-Industrial microbial desalination stack for sustainable desalination of brackish and sea water using organic matter.
- MET4Nitrogen: It is a treatment system designed for the removal of nitrogen from waters with low loads of organic matter.
- METland® for treating real wastewater and removed of pollutants.
- Electrogenic biofilters for treating different kinds of wastewaters containing organic matter.
- Gas cromatography
- Electrochemical instrumentation.
- Microbial electrochemical fluized bed reactors (MEFBR) for wastewater treatment and to produce valuable products (bioelectrosynthesis).

Outdoor mesocosm facilities

- Artifical ponds: Twenty-four artifical ponds (1 m3) for assessing the fate and effects of chemicals in lentic ecosystems.
- Aritificial channels: Nine artificial channels (5 m length, 30 cm wide) for assessing the fate and effects of chemicals in lotic ecosystems.
- Biodiversity lagoon: artificial lagoon (30 m3) for growing aquatic plants and invertebrates for their use in the experiments.

Land application systems

Pilot plant to carry out wastewater treatment and reuse researchs using nature-based solutions.

- Vegetation filters: two plots of 50 m^2 equipped with: flow meters, irrigation hydrants, impulse pumps, possibility of installing ttanks to test any type of water, piezometers and lysimeters.

- Column leaching equipment: The equipment is used to study the contaminant reactive transport under variable saturated conditions. The system includes the following components:

1. Peristaltic pump to provide at a controlled rate the influent containing the contaminant solution to the system.
2. Flow cell filled up with the reactive porous media through which contaminants infiltrate.
3. Vacuum chamber and pressure regulator (unsaturated conditions only): The flow cell outlet is connected to the vacuum chamber through which the moisture content is modified.
4. Tensiometers with pressure transducers: to measure the soil water tension in the flow cell. The tension is then related to the water content using the porous media-water retention curve.
5. Oxygen dipping probes to monitor the redox conditions in the flow cell. The optical measurement is based on the fluorescence-quenching effect of oxygen.
6. Fraction collector to sample at regular time steps the effluent from the flow cell.

projects and contracts

projects and contracts

1. Projects

1.1. Urban, Industrial and Agricultural Wastewater Treatment

1.1.1. Antibiotics, hormones, persistent and mobile organic contaminants and pathogens, the complex mixture in agriculture and livestock scenario. Risk to health or natural attenuation? (Nat4Health)

Objectives

The general goal of Nat4Health is to determine the risk to human health associated to chemical and biological contaminants of emerging concern (CECs) in agriculture and livestock scenarios and the natural attenuation processes that could buffer the contamination spreading.

General activities

- Development of multimatrix analytical methods for chemical and biological CECs.
- Field reconnaissance about the occurrence and propagation of CECs in agricultural parcels irrigated with WWTP effluents impacted water and their potential entry into the food chain.
- Close-up on CEC removal in soils under different irrigation regime, with special attention on the role played by microbial degradation.
- Evaluation of extensive and intensive livestock as a source of contamination and the potential airborne dissemination.
- Assessment of the health risk derived from the spread of persistent, mobile, and toxic compounds, hormones, antibiotics, antibiotic resistant bacteria, virus, and protozoa.

Expected results

Nat4Health will lay the foundations for creating the technical, diagnostic and risk analysis infrastructure necessary to identify and quantify chemical and biological CECs transmissible through water, food and air and accurately determine their real relevance to human public health.

1.1.2. Electricity driven low energy and chemical input technology for accelerated bioremediation (ELECTRA)

https://www.electra.site/

Objectives

ELECTRA is a 4-year Research Innovation Action consisting of one EU-Chinese- consortium. ELECTRA aims to jointly develop and test highly innovative bioelectrochemical systems in bioremediation at both laboratory scale and environmentally relevant conditions.

General activities

ELECTRA will lift microbial electrochemical systems to a next level for field applications and *in situ* remediation of pollutants. ELECTRA will deliver two sets of 10 innovative environmental MET-based biotechnologies, tailored for different environmental matrixes (wastewater, groundwater, flooded soil…) and accelerating the removal of several classes of pollutants and mixtures thereof.

Expected results

In the environment, electron-flow typically limits degradation, and is difficult to control; this major hurdle can be overcome with electromicrobiology. We expect to develop new solutions minimizing or eliminating energy and/or chemical needs for removing different pollutants from different matrixes.

1.1.3. Control and elimination of chemical and biological risks in the water cycle (CLEAN-CM)

Comunidad de Madrid

UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
Una manera de hacer Europa
Financiado como parte de la respuesta de la Unión a la pandemia de COVID-19

Objectives

Project CLEAN-CM (Call REACT-UE) aims to study methodologies to assess and eliminate biological (with SARS-CoV-2 as a model) and chemical risks in different matrices (wastewater, reclaimed and groundwater).

General activities

- Adaptation of water lines and their treatment to produce different matrices.
- Technical assessment of conventional water treatment processes and those developed at IMDEA Water to eliminate biological and chemical risks.
- Development of in situ monitoring protocols for biological and chemical pollutants

Expected results

- Scientific: creation of a database of the presence of SARS-CoV-2 in wastewater shared through the NORMAN network. Open science and dissemination activities to raise awareness about the impacts of pollutants of emerging concern and inform scientists, professionals, and policy makers about the research results.
- Social: prevention of health crises caused by transmission outbreaks and increase of antibiotic resistance through applying R+D+I.
- Economic: innovation-based growth by reaching a competitive position in the sector through synergies and collaboration with national and international institutions. Creation of employment and talent retention.

1.1.4. Microbial electrochemical reactors based on fluid-like electrodes: a new biotech platform for performing environmental applications (MET-FLUID)

MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
FONDO EUROPEO DE DESARROLLO REGIONAL
AGENCIA ESTATAL DE INVESTIGACIÓN

Objectives

Our project aims to design, construct and operate a microbial electrochemical fluidized bed reactor ME-FBR platform to explore different biotechnological applications with an environmental focus. We have designed a work plan to accelerate the screening of the technology with a sole purpose: to identify potential environmental cases that can lead to successful projects beyond MET-FLUID.

General activities

We are exploring both anodic and cathodic electrochemical performance by using fluid-like electrodes. In this context we are investigating the use of new materials, and microorganism with novel capacities for removing pollutants or synthesize high valuable products.

Expected results

We expect to develop a bioelectrochemical platform for finding new environmental application in the field of bioremediation of bioelectrosynthesis at proof-of-concept level. At the end of the Project the TRL c) should be high enough to suggest a further development.

Comunidad de Madrid

1.1.5. Design and construction of electrogenic wetlands for the removal of emerging pollutants in urban wastewater

Objectives

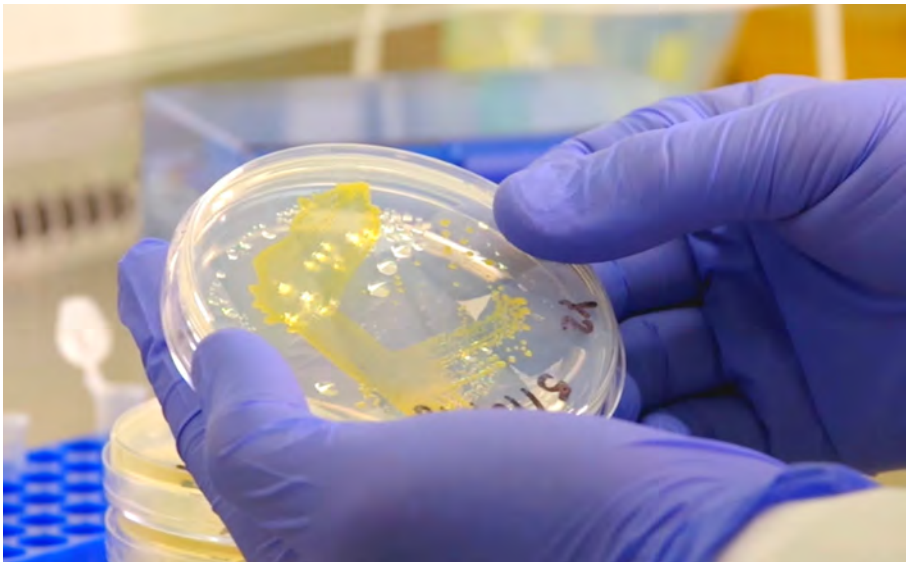
Our project aims to evaluate the role of microbial electrochemistry in the biodegradation of emerging pollutants from real urban wastewater generated at IMDEA Water Institute.

General activities

We have constructed a electrochemically-assisted constructed wetland, so-called METland®, in the facilities of IMDEA WATER with the purpose of treating the dairy production of wastewater from the institute. We are **monitoring the pollutant removal (including COD, nutrients and emerging pollutants) together with ecotoxicological parameters of treated wastewater**.

Expected results

We expect to setup the operation conditions for METland® technology to achieve the optimal removal of pollutants from a real urban wastewater with low COD. The treatment in combination with ultrafiltration should generate a water with re-use quality.



1.1.6. Innovative Strategies based on biotechnology and electrochemistry for producing valuable products from brewery wastewater (BEER4all)

Objectives

The main objective of the project is to develop and validate a wastewater treatment train from the brewing industry for the generation of high added value compounds typical of the Circular Economy (cellular protein for animal feed, fertilizers, energy, reclaimed water) using both electrochemical and bioelectrochemical strategies.

1.1.7. Bioelectrochemical anaerobic oxidation of ammonia for sustainable N removal from wastewater (ELECTRAMMOX)

Objectives

1. Cultivation and characterization of ammonia oxidizing electroactive bacteria from natural environments rich in feammox communities.
2. Bioelectrochemical N removal in mesocosms mimicking METlands.
3. Integration of electrammox bacteria in a pilot scale METland treating real N bearing wastewater.

General activities

In Electrammox we cultivate electroactive ammonia oxidizing microorganisms in microcosms and continuous bioreactors. The cultures will be characterized electrochemically and phylogenetically. Following steps will investigate the application of these enrichment cultures to the removal of N pollution in real domestic wastewater.

Expected results

Electrammox aims at deepening into the diversity of microorganisms able of oxidizing ammonia by utilizing a solid electron acceptor. We expect demonstrate the feasibility of applying bioelectrochemical systems for the removal of ammoniacal pollution of wastewater.

1.1.8. New strategies for the sustainable production of reused water by means of modular electroactive wetland: METlands (Mobimet)

Objectives

The project aims to convert a sustainable decentralized solution for treating wastewater, METland®, into a mobile and modular platform to maximize the number of early adopters and to accelerate the market uptake. It is expected to reach TRL 8 and adapt METland® to produce re-use water ready to be safely used for irrigation.

1.1.9. Photo microbial electrochemical fluidized bioreactor (photoME-FBR): a new strategy for treating industrial wastewater and producing high-valuable products (photoELECTRA)

Objectives

The aim is to validate different environmental applications for purple phototrophic bacteria through the design, construction, and operation a photoME-FBR capable of i) electrobioremediation of industrial wastewater from oil&gas, food&beverage, pharma sector; and ii) synthesis of valuable products like bioplastic or microbial protein.

1.1.10. Sustainable bioconversion of CO2 using Microbial Electrochemical Tools based on fluid-like electrodes (BIOCO2MET)

Objectives

The objective is to design, construct and operate a Microbial electrochemical fluidized bed reactor (ME-FBR) to carry out a microbial electrosynthesis process for the conversion of CO2 into two different target added-value products such as volatile fatty acids (acetic, propionic, and butyric acids), alcohols (ethanol and butanol). In addition, the project will explore a 3D vision system to monitor the performance bioreactor operation on real time.

1.2. Reclaimed Water Reuse

1.2.1. Generating biomass with regenerated waters: Opportunity for the Circular Bioeconomy (BIOARBIO)

Comunidad de Madrid

Objectives

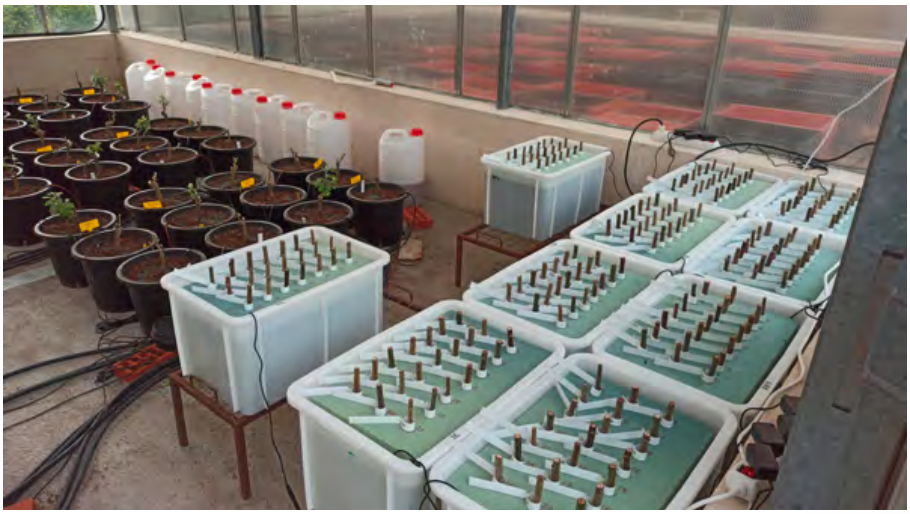
The main objective is to develop a process for the regeneration and reuse of water from beer industry, based on technologies that imitate nature such as vegetation filters, within a context of circular economy and biosustainability, and in which biomass production is produced.

General activities

Evaluation of different amendments that improve the attenuation of pollutants.
Identification of pollutant abatement processes
Characterization of plant material of the genus Populus (autochthonous species and productive hybrids) based on the potential for adaptation to cultivation conditions through the use of water from the agri-food industry as a substitute for conventional irrigation.
Assessment of vegetation filter efficiency in terms of pollutant removal, aquifer recharge, biomass production and mitigation of the carbon footprint of the plantation.

Expected results

Pollutant leaching mitigation.
Recovery of the water resource.
Reduced costs of industrial wastewater treatment.



1.3. Economic and Institutional Analysis

1.3.1. Water Security for the planet (Water4All)

https://www.water4all-partnership.eu/

Objectives

The Water4All Partnership - Water Security for the Planet - is co-funded by the European Union within the Horizon Europe programme. Its objectives are to tackle water challenges for facing climate change, help to achieve the UN SDGs and boost the EU's competitiveness and growth. It aims at enabling water security at a large scale in the long term and tackling water issues in a holistic frame.

General activities

IMDEA will be leading subtask D3.3 ("investment programmes development") as part of Pillar D (Demonstration activies for implementing solutions at large scale). It includes: 1) Guide and support innovators to demonstrate and validate innovations; 2) Support WOLLs (Water Oriented Living Labs) and Demo initiatives to build accelerator programmes providing financial support to businesses in the water sector to try and demonstrate on-site solutions; 3) identification of strategic financing frameworks and investment programmes; 4) Support the creation/participation in task forces with key actors for harmonisating investment and social and economic development programmes.

Expected results

The activities will contribute to informing and engaging in existing development and investment programmes on innovations developed to allow innovators to access to funds for the validation, demonstration, and market uptake.

1.4. Membrane Technology

1.4.1. Immobilized Laccases for the degradation of aromatic compounds from wastewaters (LIDA)

http://www.cyted.org/es/lida

Objectives

The network is composed by 15 research groups 7 Ibero-American countries. The main objective of LIDA network is to develop sustainable strategies based on immobilized novel laccase enzymes for the degradation of phenolic and aromatic compounds from different industrial wastewaters.

General activities

The network organizes different dissemination and training activities and promotes the exchange of professors and PhD students between the research groups participating in the project. LIDA networks looks for new funding opportunities to carry out research projects.

Expected results

The network will boost the cooperation between research institutes and industries, creating new consortiums, research projects and promoting the scaling up of sustainable enzymatic systems for water treatment.

1.4.2. Hybrid wastewater treatments based on recycled membranes with the objective of zero liquid discharge (ZLD) (INREMEM 2.0)

Objectives

The main objective of INREMEM 2.0 is the recovery of valuable compounds such as water, nutrients (phosphates or nitrates) and other salts (NaCl), from wastewater with high salinity content, using hybrid systems based on recycled membranes coming from discarded RO membranes.

General activities

INREMEM 2.0 proposes the combination of different hybrid systems based on recycled membranes (Membrane Bioreactor, Nanofiltration, Membrane Distillation and Electrodialysis) with the aim of treating wastewaters with high salinity content**.** In addition, the project will perform the Life Cycle Assessment and the Life Cycle Costing of the proposed hybrid systems.

Expected results

INREMEM 2.0 will obtain high quality water fit for crop irrigation and valuable compounds from high salinity wastewaters. In this sense, INREMEM 2.0 promotes the movement of membrane technology and wastewater treatments towards the concept of zero liquid discharge (ZLD) and circular economy.

1.4.3. Preparation of H2020 project: Life cycle thinking for membrane technology (MEMCYCLE)

Objectives

The main objective of MEMCYCLE is to contribute in changing the actual economic model towards a circular economy model by creating a missing link of membrane waste management focused on end-of-life membrane sorting, disassembly/separation, recycling and re-introduction of the recycled material into the market.

General activities

MEMCYCLE will allow the meeting of different stakeholders, from producers to end-users with the advice of an interdisciplinary panel of experts. These alliances will also be a motivation for posterior collaborations, research actions and synergies that can be extrapolated to other fields or technologies valuable in the circular economy transition within the water sector.

Expected results

MEMCYCLE will provide important social and environmental benefits. It will increase the sustainability of water treatments based on membranes, improving their durability and it will reduce the environmental costs associated with this technology reducing wastes.

1.5. Ecotoxicology

1.5.1. Exploration of wastewater as a complementary, rapid, and objective indicator of the consumption of substances of abuse (ESARNET2)

Objectives

The objective of the ESARNET2 project is to monitor and quantify the use of licit and illicit drugs by the Spanish population.

General activities

Monitoring of drugs or drug markers in wastewater in different WWTPs to calculate temporal consumptions patterns in at least 25% of the Spanish population.

Expected results

A database of drug concentrations and consumption data per province and statistical analyses to compare these results with other monitoring sources.

1.5.2. Effects of global change on the emission, fate, effects and risks of chemicals in aquatic ecosystems (ECORISK2050)

https://ecorisk2050.eu/

Objectives

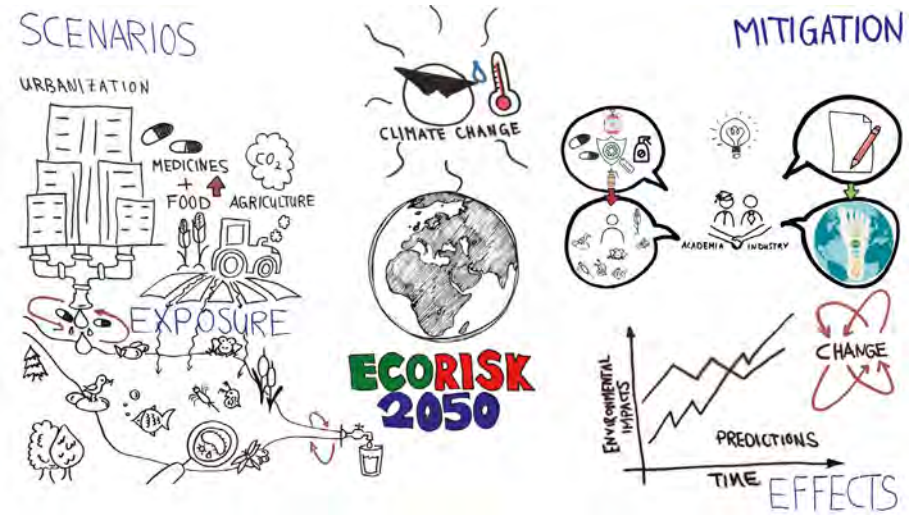
ECORISK2050 aims a) to assess how the input of chemicals from agriculture and urban environments and their fate, transport and effects are affected by global climate change; b) to identify potential adaptation and mitigation strategies, and c) to develop a set of tools for use by industry and policy makers.

General activities

The project will organize training activities and secondments for 13 early stage researchers dedicated to tackle different aspects of the fate, effects and risks of chemicals in the environment. Knowledge gained by experiments and modelling approaches developed within the project will help to forecast future risks of chemical pollution.

Expected results

The project will deliver the next generation of scientists, consultants and industry and governmental decision-makers who have the knowledge and skill sets required to address the changing pressures that chemicals emitted by agricultural and urban activities pose to aquatic systems on the path to 2050.



1.5.3. Pesticide risk assessment for amphibians and reptiles (PERIAMAR)

https://periamar.com/

Objectives

The PERIAMAR COST action aims to develop a strategy to coordinate efforts in order to address the research needs relative to pesticide risk assessment for amphibians and reptiles at the European level.

General activities

The action will integrate expertise provided by herpetologists, ecologists, toxicologists, environmental chemists and risk assessors trough several meetings and workshops, and will provide opportunities for early researcher and senior researcher exchange across more than 20 institutions in Europe.

Expected results

The action will stimulate networking and training in order to maximize the capacities of the scientific community to prevent amphibian and reptile declines because of environmental pollution, and will contribute to the development of sustainable pesticide regulations and policies.

1.5.4. Smart tools and technologies to assess the environmental fate and risk of contaminants under climate change (CICLIC-ECOREST)

https://www.proyectociclic.com

Objectives

The CICLIC project aims to develop smart environmental technologies and tools that can be used to monitor the occurrence, fate and impacts of contaminants in Mediterranean wetland ecosystems in a scenario of climate change.

General activities

The project is formed by three sub-projects (WETANPACK, TRAPPER, ECOREST), which will perform field assessments and monitoring in the Albufera Lake (Valencia) and the Llobregat delta (Barcelona). In-situ chemical and biological monitoring will be performed to parameterize models and risk scenarios.

Expected results

CICLIC proposes an innovative toolbox that will include aspects regarding massive data analysis, novel contaminant monitoring and analytical techniques, wastewater reuse and analysis, metabolomics, environmental and ecological modelling, ecotoxicological tools, and ecosystem vulnerability and resilience analysis.

1.6. Micro and Nanoplastics

1.6.1. Plastic in Agricultural Production: Impacts, Lifecycles and Long-Term Sustainability (PAPILLONS)

https://www.papillons-h2020.eu/

Objectives

To assess the use, environmental fate and risks of plastic and microplastics in European agriculture.

General activities

The project includes large-scale experiments to assess the fate and effects of microplastics on several agricultural and environmental endpoints as well as surveys to monitor consumption patterns and microplastic occurrence in different agricultural set-ups.

Expected results

Risk mitigation and management measures to be incorporated into new European policies on plastic use in agriculture.

1.6.2. Quantification, treatment and environmental impact of micronanoplastics in WWTPs (nanoCLEAN)

Objectives

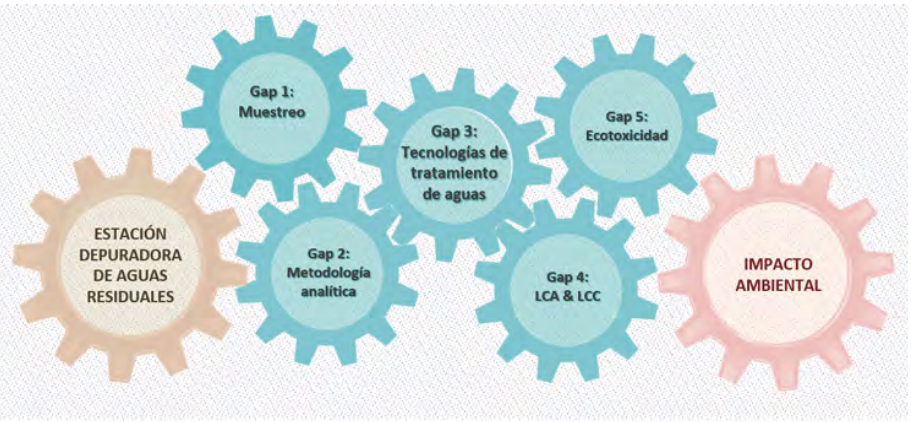
nanoCLEAN aims to implement efficient membrane technology (MBR-UF) to remove micronanoplastics (MNPs) from WWTPs as well as developing new sampling and a sensitive quantification analysis supported by Life Cycle Assessment and Life cycle Costing.

General Activities

- Development of Pyr-GC-MS for MNPs identification and quantification.
- Implementation of pressure driven membranes for MNP sampling.
- Removal of MNPs from WWTP effluents by MBR.
- Environmental impact and Life Cycle costing of implemented integrated systems.
- Dissemination and communication of results.

Expected results

nanoCLEAN will generate frontier knowledge that will help to normalize and standardize MNP quantification as well as obtaining high quality water free of MNPs. nanoCLEAN will create special awareness regarding MNP contamination.



1.6.3. Thematic Network of Micro- and Nanoplastics in the Environment (EnviroPlaNet)

https://www.enviroplanet.net/

Objectives

The network coordinates interdisciplinary Spanish research groups working on the contamination of microplastics. The aim is to improve key aspects related to the methodological dispersion of sample sampling and analysis or lack of consistency in toxicological and ecotoxicological studies.

General Activities

- To organize scientific meeting and specialized courses.
- To organize common sampling campaigns and writing common scientific publications and reports.
- Special issue editions in high impact scientific journals.
- Tromotion of the presence of the network members in international initiatives.

Expected results

- Enhanced communication between research groups.
- Boost research activities at national level that contribute to achieve new knowledge of microplastics.
- Improvement of the competitive position of Spanish research at international microplastic scientific community level.

1.6.4. Quantification of micronanoplastics in reclaimed water and agricultural ecosystems. Environmental risk assessment (µNanoCare)

Objectives

1) to develop an effective and innovative sampling and analytical methodology to quantify micro-nanoplastics (MNPs);
2) to identify eco-efficient wastewater treatments capable to minimize their discharge;
3) to assess their exposure and associated ecotoxicological risks

General activities

1) State of the art of MNPs quantification techniques and their limitations
2) Method development of MNP separation and analysis
3) Presence of MNPs and degradation study during wastewater treatment
4) MNP fate, toxicity and environmental risk
5) Study of wastewater treatment feasibility to remove MNPs

Expected results

1) an analytical method to quantify MNPs based on TDS-GC/MS
2) a separation system of MNPs during sampling using membrane technology
3) a comparison of different tertiary treatments to remove MNPs including their eco-efficiencies
4) an environmental risk assessment of MNP in agricultural systems

1.7. Tool Development for Water Resource Management

Objectives

The general aim of the research line is the development of digital spatial tools to support the management of water resources, through the correct assessment of the present state of the resource and its possible evolution in different scenarios.

General activities

Tasks areas are related to the spatial-temporal analysis and management of water resources through different tasks as:

a) Model development using remote sensing information.
b) Development of instruments for decision support.
c) Construction of automatic data collection systems.
d) Development of on-line participatory platforms.

Expected results

Expected results are related to digital products such as algorithms development derived from remote sensing imagery analysis, decision support systems for water management and best practices, development of water models using GIS techniques or construction of collaborative web maps.

1.8. Hydraulic Heritage

Objectives

Research into water heritage aims to resolve conflicts between the existence of heritage structures and the current social need for development and growth. Specific objectives concentrate on the evaluation, visibility and potential development as socio-economic resource of water heritage.

General activities

Four main working lines have been created:

a) Inventory of heritage systems using digital technologies.
b) Development of spatial structures for decision making.
c) Analysis of socio-economic values to support for endogenous economic development.
d) Assessment of heritage and traditional landscape impacts.

Expected results

Research and technical development undertaken pursuit results related to the development of action plans related to the integral consideration of water heritage, the application of virtual and augmented reality and the construction of collaborative on-line tools.

1.9. Water and Energy

1.9.1. Attracting Talented Researchers within the Spanish Campus of International Excellence 'Smart Energy' and the region of Madrid (GOT ENERGY TALENT)

http://gotenergytalent.uah.es/

Objectives

GOT ENERGY TALENT is a highly competitive, merit-based fellowship programme aimed at incorporating postdoctoral talent to enable them to conduct their own research project and bringing it closer to the society.

General activities

GOT ENERGY TALENT will bring in 34 experienced researchers to develop a 24-month stay through 2 open calls at international level, over its 60 months of implementation. The postdoctoral fellows will have a full trans-national mobility experience and access to the research facilities of the organizations partnering the programme. IMDEA Water is a host institution.

Expected results

The project address to produce a positive effect not only in terms of excellent science and talent attraction but also by strengthening the regional economy and promoting international networking.

2. Contracts

2.1. Economic and Institutional Analysis

2.1.1. Framework Service Contract in five (5) lots for provision of external expertise on regulatory and policy issues in the field of environmental policies, climate change, sustainable development, public health and food safety: (Lot II: climate change). European Parliament

Objectives

A framework contract to provide support to the work of the Committee on the Environment, Public Health and Food Safety (ENVI) in the European Parliament regarding the impacts, benefits and costs of issues and policies related to climate change (Lot II).

General activities

Support in terms of briefings, in-depth analysis, studies and workshops to be held.

Expected results

Full assistance to the Parliament implementation assessments, Committees´ own initiatives and Commission initiatives.

2.1.2. Framework Contract on economic analysis of environmental policies and analytical support in the context of Better Regulation. DG Environment, European Commission

Objectives

A framework contract to the European Commission to support economic analysis of European environmental policies.

General activities

Support in consultation processes (design, assistance, analysis reports…) and in the evaluation of environmental policies and regulations (background documents, assessment reports, elaboration of strategic documents…).

Expected results

Full assistance to the Commission in the process of carrying out economic analysis of environmental policies (to be designed to deliver their objectives in a cost-effective manner and considering the linkage economy-environment and also measuring progress consistently with environmental directives and the work on Circular Economy) within the framework of Better Regulation (the Agenda to design and evaluate EU policies and laws transparently and backed up by the citizens and stakeholders).

Support Study for the impact assessment on the revision of the Urban Wastewater Treatment Directive - Directive 91/287/EEC

Objectives

An assignment within the referred FC to support the European Commission with an assessment of impacts of a range of options for the review of the UWWTD keeping consistency with other regulations (Water Framework Directive, Drinking Water Directive, Sewage Sludge Directive and Water reuse regulation).

General activities

Definition of an impact assessment methodology, collection of thematic information (EU-27) to inform the analysis of impacts and performing the analysis of impacts.

Expected results

In coordination with JRC and OCDE, the study will provide sound evidence for the assessment of policy options for the review of the Urban Wastewater Treatment Directive.

Support to the evaluation of the Sewage Sludge Directive - Directive 86/278/EEC

Objectives

An assignment within the referred FC to support the European Commission undertaking a study for an evaluation of the Sewage Sludge Directive.

General activities

Review its implementation, assessing its effectiveness, efficiency, coherence, relevance and EU added value, and support the stakeholder consultation. Carrying out an exploratory study comparing different scenarios, preparing the implementation report (period 2016-2018, EU-27) and updating the questionnaire.

Expected results

The assignment will produce an evaluation of the SSD and will be an useful input providing sound evidence for the assessment of the necessity for a possible review of the Sewage Sludge Directive.

2.1.3. Framework Contract on evaluation, review and development of EU water policy. DG Environment, European Commission

Objectives

Supporting the evaluation, review and development of freshwater policy for Europe.

General activities

Support to: working/expert groups; organisation of workshops; development of guidance documents and technical reports on issues related to implementation EU water policies and other specific areas; policy development; evaluation of the WFD and REFIT process of the FD.

Expected results

Full assistance to the Commission in issues dealing with: the CIS of the WFD (Water Framework Directive) and FD (Floods Directive); integrated assessment of the implementation of the EU water legislation (WFD, priority substances Directive, GWD and FD) and 2nd River Basin Management Plans (RBMPs) and the 1st Flood Risks Management Plans (FRMPs); WFD/FD implementation in Member States; infringement cases, evaluation of the WFD and the REFIT (Regulatory Fitness and Performance Programme) of the FD.

Economic data related to the implementation of the Water Framework Directive and the Floods Directive and the financing of measures

Objectives

An assignment within the referred FC to provide a comprehensive overview of publicly available economic data related to the implementation of the EU water policy (2nd RBMPs and 1st FRMPs) and to the financing of measures, now and in the future, at national level.

General activities

The study will compile and provide a comprehensive analysis of information on water tariffs, financial, environmental and resource cost recovery across 27 countries.

Expected results

Detailed information to inform Member State follow-up actions and Sustainable Finance and as an input to a joint study between the European Commission and the OECD on investment needs and the economics of the WFD (Water Framework Directive) and the FD (Floods Directive).

Water Framework Directive Common Implementation Strategy support for period 2020-2021

Objectives

An assignment within the referred FC to support the work of the CIS Working Groups (Ecostat, Groundwater, Chemicals, Floods) and Ad-Hoc Task Groups (Water Reuse and Economics ATG) of the Water Framework Directive.

General activities

Attendance at meetings, taking minutes and conclusions and other support to groups; provision of analytical, technical and scientific papers; and contribution to the identification of priority areas for the next programme to be developed through interaction with DG Environment.

Expected results

The activities carried out within the framework of this contract will contribute to meet the objectives of the CIS work programme for the referred period.

2.1.4. Framework contract for "Water for the Green Deal' - Implementation and development of the EU water and marine policies". DG Environment, European Commission

Objectives

A framework contract to the European Commission in activities related to the implementation and development of the EU water and marine policies (WFD, FD, GD, EQSD, DWD, UWWTD, BWD, MSFD and Water Reuse Regulation).

General activities

(1) work and advice on scientific, socio-economic, economic and technical issues relevant to the referred Directives;
(2) technical assistance for in-depth assessments of the implementation of the Directives in EU MS and for assessing information on the replies to legal noncompliance cases;
(3) evaluations of the fitness of the Directives and impact assessments and legislative support;
(4) organisation of consultation processes (workshops /meetings/conferences) and associated supporting documents and reports.

Expected results

Full assistance to the Commission in issues dealing with the water and marine polices.

Water Framework Directive Common Implementation Strategy support for Work Programme 2021-2024

Objectives

An assignment within the referred FC to provide support and advice to the Clean Water Unit in DG Environment on scientific, socio-economic, and technical issues related to the topics dealt with within the CIS. It includes support to the 5 Working Groups (Ecological Status, Ecostat), Groundwater, Chemicals, Floods, and Data and Information Sharing) and Ad-hoc Task Groups (Water Reuse and Economics) and other activities under the CIS Work Programme.

General activities

Attendance at meetings, taking minutes and conclusions and other support to groups; provision of analytical, technical and scientific papers and factsheets; and contribution to the identification of priority areas for the next programme to be developed through interaction with DG Environment.

Expected results

The activities will contribute to meet the objectives of the CIS (Common Implementation Strategy of the Water Framework Directive) work programme for the referred period.

2.1.5. Update of the economic analysis needed for the preparation of the third River Basin Management Plans (RBMP) in Bulgaria. World Bank

THE WORLD BANK
IBRD · IDA

Objectives

A study aimed at updating the economic analysis needed for the preparation of the 3rd RBMPs (River Basin Management Plans) in Bulgaria, based on the stocktaking and gap analysis review of the 2nd RBMPs and the European Commission´s Member State Assessment Report on the second planning cycle.

General activities

Economic analysis of water use; CEA; affordability analysis of main and supplementary measures; CBA of supplementary measures; assessment of HMWBs; Baseline BAU scenario; environmental costs assessment; resource cost assessment with any increasing pressures under BAU scenario; financial cost recovery of water services; water pricing and fees and extent of non-recovered financial costs of water services and environmental and resources costs.

Expected results

Full updated economic analyses as an input to overall work programme to prepare 3rd cycle RBMPs.

2.1.6. Update of river basin management plans and associated programmes of measures for the 4 river basins in Bulgaria. World Bank

Objectives

A study aimed at providing technical support to contribute to the correct and timely implementation of the European water legislation in Bulgaria in particular, successful and timely update of River Basin Management Plans (3rd cycle).

General activities

(1) Review of 2nd cycle RBMPs;
(2) Integration of all studies;
(3) Compilation of pressures & impacts analyses;
(4) Summary of characterization of SWBs and GWBs;
(5) Identification and characterization of protected areas;
(6) Update of environmental objectives;
(7) Risk assessment and gap analysis;
(8) Justification of exemptions;
(9) Development of PoMs;
(10) Development of draft RBMPs;
(11) Support to the public consultation process;
(12) Development of final draft RBMPs.

Expected results

Draft River Basin Management Plans (RBMPs) and Programme of Measures (PoMs) for the 4 river basins in Bulgaria.

2.2. Reclaimed Water Reuse

2.2.1. Sustainable desert ecosystem management with use of treated wastewater for forage irrigation in Kuwait. Kuwait Institute for Scientific Research (KISR)

Objectives

The project is aimed to evaluate:
a) quality of TWW, produced in different water treatment plants in Kuwait;
b) forage biomass yield and nutritional quality responses to TWW irrigation
c) potential accumulation of emerging contaminants in the soil and forage biomass.

General activities

a) Summarize existing information
b) Sampling TWW, chemical analysis and results assessment
c) Field experiments at KISR
d) Evaluation of forage nutrition qualities
e) In-vitro and in vivo studies
f) Soil Health Assessment of Intensive Agricultural Practices on Desert Native Ecosystem.

Expected results

The deliverables will demonstrate the safe use of TWW for forage irrigation, as an economically appealing alternative to discharge of this resource into sea, without causing degradation of soil quality, ecosystem sustainability or risk of food safety.

2.3. Ecotoxicology

2.3.1. Implementation of the Ecotoxicology and Environmental Monitoring Unit at IKIAM. IKIAM

Objectives

To develop and implement an Ecotoxicology and Environmental Monitoring Unit at the Regional University of the Amazon of Ecuador (IKIAM) capable of evaluating the water quality status of the Napo River making use of advanced ecotoxicological methods.

General activities

Researchers from Ecuador and Spain will work together in the standardization of toxicity test protocols with Amazonian organisms, the identification of the pollution sources of the Napo River, the evaluation of concentrations of pesticides and metals and the design of toxicity studies to assess the contamination risks on populations and communities.

Expected results

This project will contribute to the consolidation of the ecotoxicology research line at IKIAM and will collaborate with National Laboratory of Reference in Waters (LNRA) of Ecuador to improve the prospective risk assessment of chemical substances. It will make a proposal for the inclusion of new toxicological tests in the Ecuadorian regulation.

3. Other innovation grants and international initiatives

3.1. Economic and Institutional Analysis

3.1.1. OECD Water Governance Initiative. Water Policy Dialogues Brazil, Argentina and Peru. (2016-2022) https://www.oecd.org/regional/regional-policy/water-governance-initiative.htm

Objectives

IMDEA is one of the 100+ members of the OECD GWI (the most relevant policy forum on water governance worldwide with public, private and civil society stakeholders). The GWI shares knowledge and good practices on water governance, advices governments in water reforms implementation and supports the OECD Principles on water governance.

General activities

IMDEA participates twice a year in the meetings of the GWI to share good practices supporting better governance in the water sector at global scale. In 2018, IMDEA also provided expertise within the framework Country-Specific Policy Dialogues to the Governments of Argentina and Peru.

Expected results

The Policy Dialogues assess multi-level governance and issues identified by the governments (i.e. water abstraction charges in Brazil, economic regulation of water and sanitation services in Argentina and Peru or the use of economic policy instruments in Peru).

3.1.2. Mission Assembly on Healthy Oceans, Seas, Coastal and Inland Waters, EU Horizon Europe Programme, DG RTD - DG for Research and Innovation, European Commission

Objectives

Gonzalo Delacámara is one of the 25 high-level experts providing ideas, knowledge and expertise to the Mission Board. The Missions links different disciplines, policymakers, stakeholders and citizens, and leverage public and private investments to enable large-scale transformations in key areas.

General activities

Gonzalo provides support for defining long term impacts and a set of activities at European and international level to realise them, identifying possible solutions to broad challenges and supporting European research and innovation leading to effective solutions.

Expected results

To know, restore and protect our ocean and waters by 2030 (Mission Starfish 2030) by reducing pressures on aquatic environments, restoring ecosystems and harnessing their goods and services through 5 objectives (knowledge, regeneration, zero pollution, decarbonisation and governance) and 17 targets.

3.1.3. International Desalination Association (IDA), Special Advisory Board https://idadesal.org/

Objectives

Gonzalo Delacámara chairs IDA´s Advisory Committee on Development Agencies and Public Institutions. IDA is the only global and leading association on desalination and water reuse technologies, serving more than 2,600 core members in 60+ countries with 4,000 members and 16 affiliate associations.

General activities

To provide support to IDA in terms the elaboration of a mapping of relevant Development Agencies and Institutions, in contacting them and in the development of joint strategies.

Expected results

To achieve fruitful contact and active engagement with Development Agencies and Public Institutions and expand IDA activities in new fields.

3.1.4. Water Europe (WE, former European Water Supply & Sanitation Technological Platform, WssTP), Cluster leadership of the 'Value of Water'

https://watereurope.eu/

Objectives

Gonzalo Delacámara led the Water Europe's (Horizontal) Vision Leadership Team (HVLT) on the Value of Water and also was appointed as a member of the Board of Directors. WE, with 220 members (companies, RDI settings, utilities, suppliers, SMEs, users, authorities and organizations) aims at improving the coordination, collaboration, performance and competitiveness of water and related sectors in the EU and beyond.

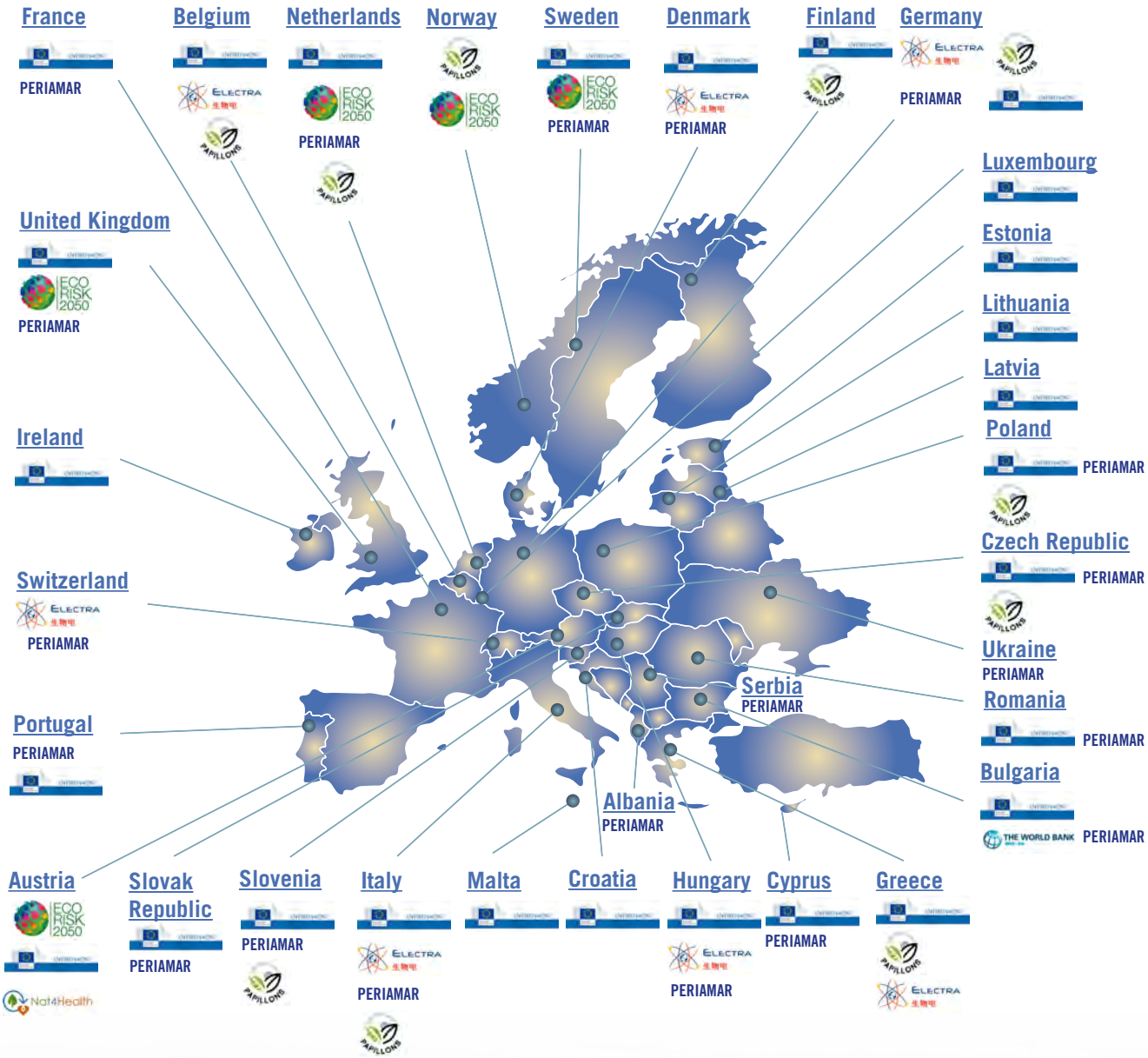
General activities

Connecting HVLT´s mission to global, EU and national initiatives on the value of water, providing inputs to WE positions and EU processes, participation in events, publications on the value of water, identifying good practices, linking with the remaining 8 HVLTs and the 18 Working Groups of WE.

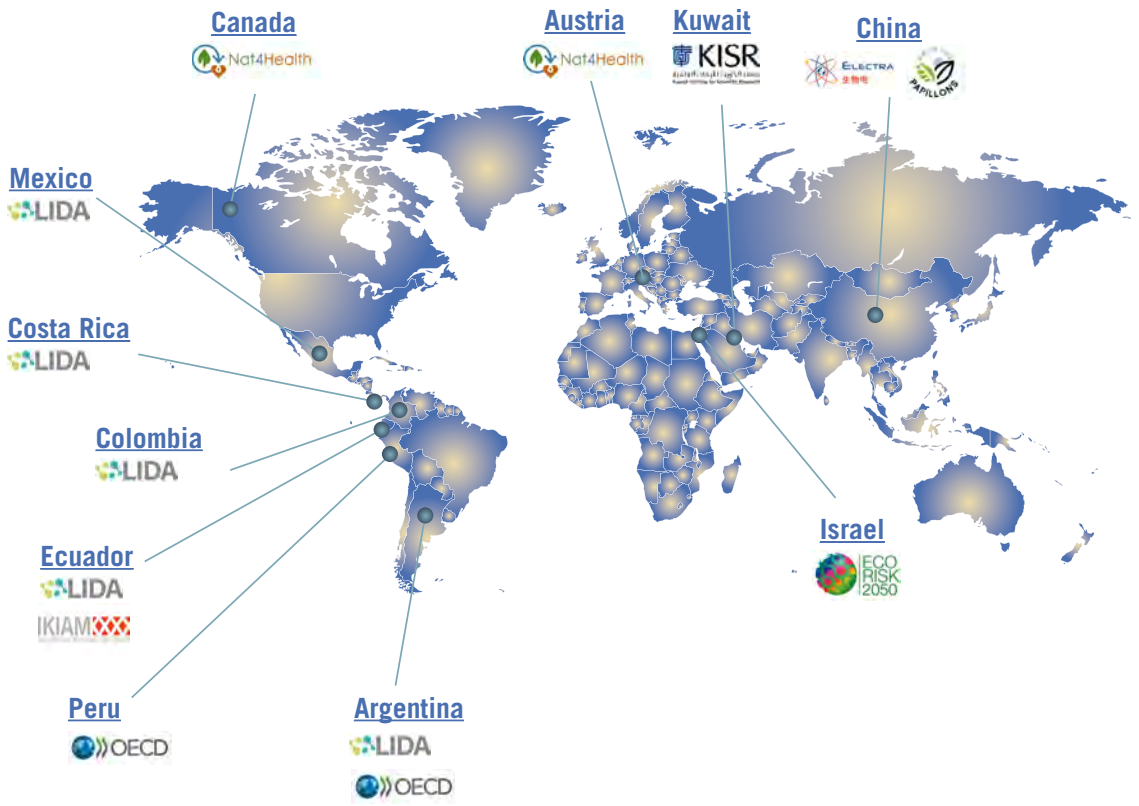
Expected results

Help to drive the transition to a Water-Smart Society by defining actions to foster and accelerate the process of bringing successful innovation to market in Europe and beyond (with collaborative initiatives within industry sectors, enabling RTD projects and innovation and raising sector relevance).

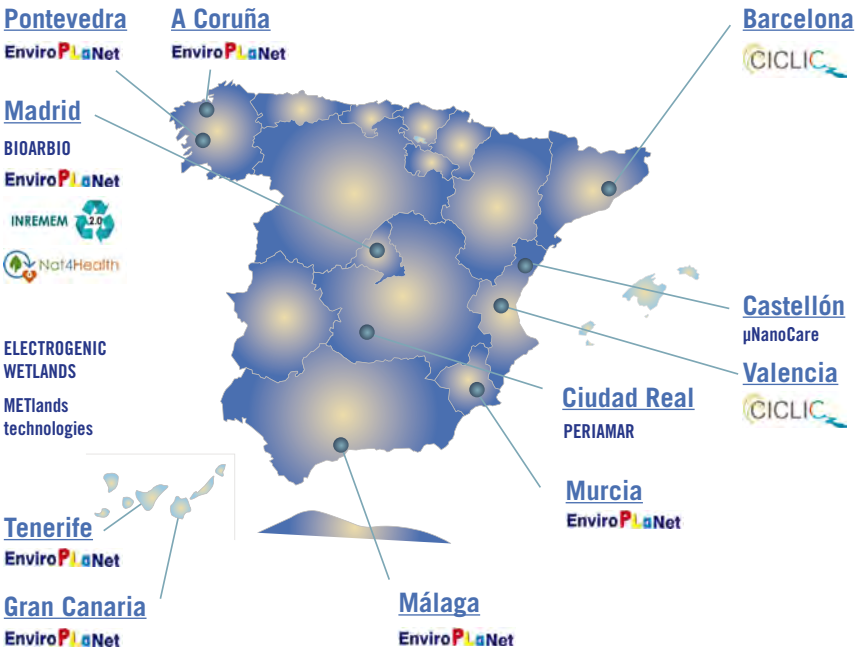
European collaboration in projects, contracts and other european initiatives



International collaboration in projects, contracts and other international initiatives



Spanish collaboration in projects, contracts and other initiatives



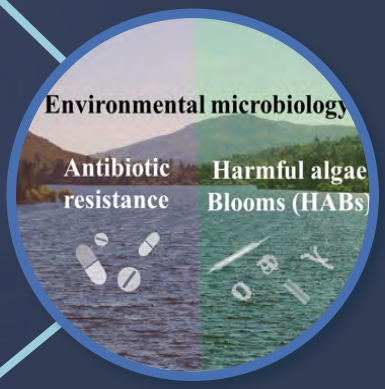
research groups

Membrane Technology

Soil and Water Quality in the Environment

research groups

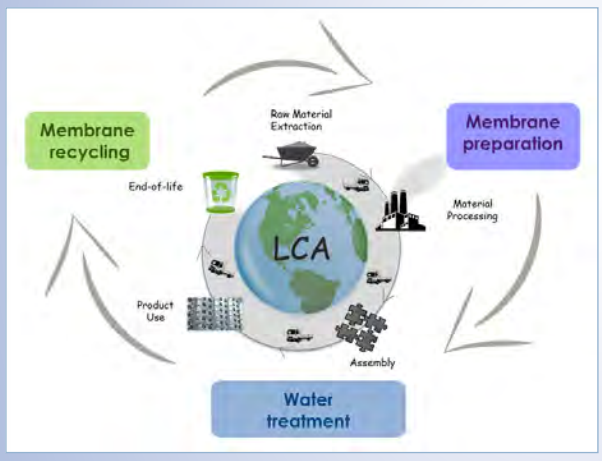
Bioe



Ecotoxicology and Microbial Contamination

Economic and Institutional Analysis

Membrane Technology



The group is focused on studying the whole membrane process life cycle: from membrane preparation to their use in water treatment until their recycling.

- Development of new generation antifouling membranes by surface modification and the addition of functionalized groups and nanoparticles.
- Evaluation of different types of membranes (reverse osmosis, nanofiltration, ultrafiltration) in water treatment.
- Modification of recycled membranes and their implementation in urban wastewater treatment by membrane bioreactors (MBR) and desalination by electrodialysis (ED).

Membrane Technology

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Researcher

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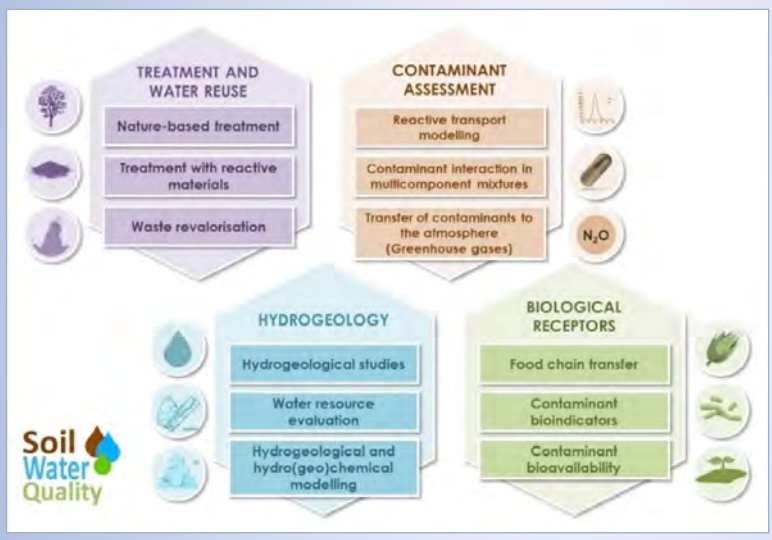
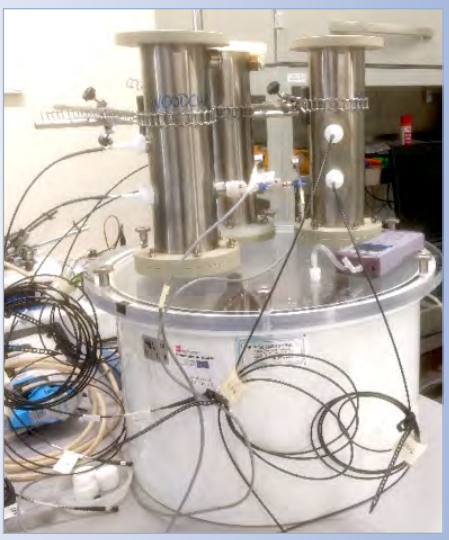
Soil and Water Quality in the Environment





The research activity of our group is dedicated to environmental contamination in soil and water compartments and to adapt nature-based solutions to treat contaminated water. In particular, we investigate:

- The adaptation and improvement of non-conventional treatment technologies based on natural attenuation processes such as land application systems (Nature-based solutions);
- The transfer and interaction between chemical substances (mainly nutrients, metals and contaminants of emerging concern) in multiple scenarios developing specifically designed experiments and reactive transport models;
- The bioavailability of contaminants in soils by the use of bioindicators and the study of their transfer into the food chain through crop consumption.
- The quantity and quality of water resources through hydrogeological studies based on the application of multiple tools (numerical, hydrochemical and hydrogeochemical models).

https://www.soilwaterquality.es/

Soil and Water Quality in the Environment

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Researcher

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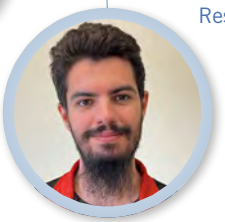

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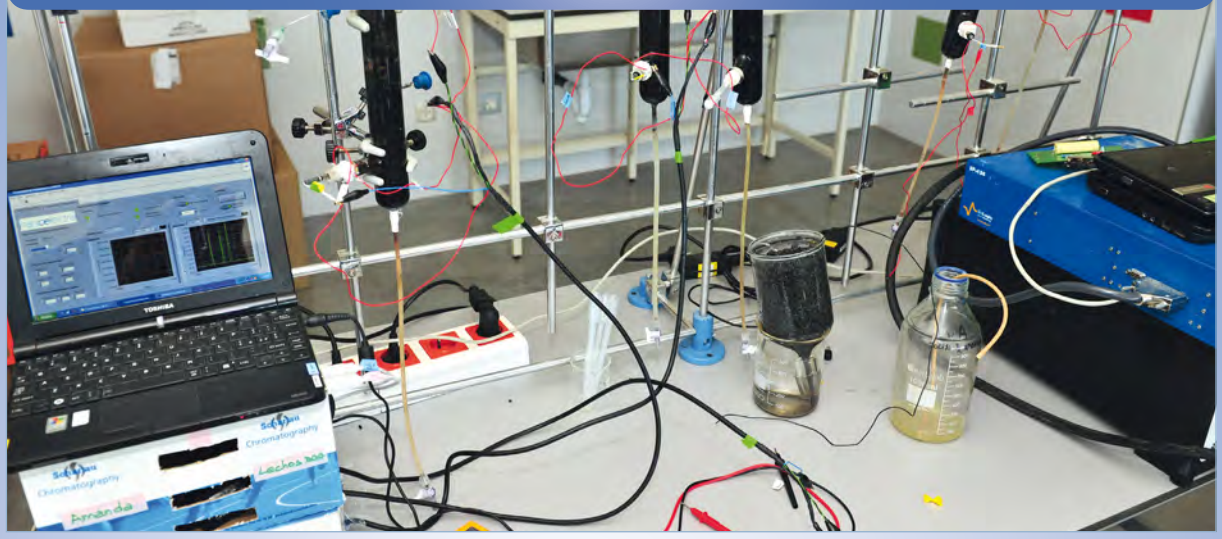
Predoctoral Researcher

Bioe



bioe
biotechnology for a sustainable sustainable environment

Our research group is fully devoted to merge microbial, electrochemical and engineering tools to restore polluted environments (soil and water) by exploring the world behind the microbial electrochemical technologies (MET).

Our activities are divided into:

- Physiology and biochemistry of microbial electrogenesis
- Environmental microbial electrogenesis
- Microbial electrogenesis and bioengineering

http://bioelectrogenesis.es/

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Bioe

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Ecotoxicology and Microbial Contamination

The Ecotoxicology and Microbiological Contamination group addresses three areas of research:

1. Assessment of the risks to ecosystems determined by pollutants and their interactions with the environment, considering the vulnerability of people, populations and communities to chemical and non-chemical stressors.

2. Technology-based solutions for industries in the water sector in relation to the proliferation of harmful algae caused by cyanobacteria.
   - Design of monitoring programs for the development of blooms of toxic cyanobacteria in reservoirs.
   - Development of technology for the specific and sensitive detection of microcystins in water.
   - Development of technology for the efficient and economical removal of microcystins during water treatment using biofilms.

3. Studies of the impact of contaminants (antibiotics and biocides) on microorganisms and resistance to antibiotics in aquatic environments:
   - Potential effect of contaminants on bacterial populations.
   - Detection of antibiotic resistant bacteria and resistance genes.
   - Fitness cost linked to the acquisition of antibiotic resistance.
   - Resistance gene transfer and the role of contaminants.

Ecotoxicology and Biological contamination

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Economic and Institutional Analysis

Analysis of the design and implementation of economic policy instruments for sustainable water management

- Individual & collective economic behaviour in relation to water
- Economic policy instruments-EPIs (pricing mechanisms, markets of tradable permits, risk-management schemes and cooperation-based mechanisms)

Integrated water resources management: economic dimensions

- Environmental & natural resources economics
- Climate change adaptation (CCA) and Disaster risk reduction (DRR)
- Nexus approach (water-energy-food-biodiversity-climate)
- Hydro-economic modelling & analysis & prioritisation of water investments.
- Regulatory impact assessment (RIA) and links between environmental policy & macroeconomic performance
- Cost-benefit analysis (CBA), Cost-effectiveness analysis (CEA), Cost-recovery analysis, New decision-making theories
- Integrated assessment frameworks (i.e. social-ecological modelling) and economic valuation of ecosystem services
- Economic regulation of the urban water cycle

Economic regulation of the urban water cycle

Water Governance

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Associated Researcher

Dr. Carlos Mario Gómez Gómez
Main Researcher

Gonzalo Delacámara Andrés
Researcher

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Technical of economic management

Lucía Alvaredo Olmos
R&D Technical support

Josefa Simón Recio
Secretary

Research results and knowledge dissemination

1. Scientific Papers

1.1 Articles in journals

1. **Amariei, G., Jiménez-Jiménez, S., García, M.Á., Marina, M.L., Boltes, K. (2022)**
First eco-toxicological evidence of ivabradine effect on the marine bacterium Vibrio fischeri: A chiral view.
Science of The Total Environment, 838. p. 156617. ISSN 00489697

2. **Aruchamy, K., Dharmalingam, K., Lee, C.W., Mondal, D., Nataraj, S.K. (2022)**
Creating ultrahigh surface area functional carbon from biomass for high performance supercapacitor and facile removal of emerging pollutants.
Chemical Engineering Journal, 427. p. 131477. ISSN 13858947

3. **Beere, H.K., Pakhira, S., Yadav, P., Singh, A., Upadhyay, S.N., Naik, P.B., Nataraj, S.K., Ghosh, D. (2022)**
Realizing Favorable Synergism Toward Efficient Hydrogen Evolution Reaction with Heterojunction Engineered Cu 7 S 4 /CuS 2 /NiS 2 and Functionalized Carbon Sheet Heterostructures.
Advanced Materials Interfaces, 9 (35). p. 2201478. ISSN 2196-7350

4. **D'Souza, G.B., Kumar, A., Kamath, S.V., Maraddi, A.S., Nataraj, S.K. (2022)**
Designing engineered biopolymer mesh filter for robust sequestration of chromium (VI), fluoride and other emerging pollutants: A sustainable approach.
Chemical Engineering Journal, 443. p. 136462. ISSN 13858947

5. **Díaz-Cubilla, M., Letón, P., Luna, C., Marrón, M., Boltes, K. (2022)**
Effect of Carbamazepine, Ibuprofen, Triclosan and Sulfamethoxazole on Anaerobic Bioreactor Performance: Combining Cell Damage, Ecotoxicity and Chemical Information.
Toxics, 10 (1). p. 42. ISSN 2305-6304

6. **Essalhi, M., Ismail, N., Tesfalidet, S., Pan, J., Wang, Q., Cui, Z., García-Payo, M.C., Khayet, M., Mikkola, J., Sarmad, S., Bouyer, D., Zhao, Y., Li, B., André Ohlin, C., Tavajohi, N. (2022)**
Polyvinylidene fluoride membrane formation using carbon dioxide as a non-solvent additive for nuclear wastewater decontamination.
Chemical Engineering Journal, 446. p. 137300. ISSN 13858947

7. **Fu, Y., Zhao, Y., Yao, K.M., Addo-Bankas, O., Ji, B., Yuan, Y., Wei , T., Esteve-Núñez, A. (2022)**
A review on antibiotics removal: Leveraging the combination of grey and green techniques.
Science of The Total Environment, 838 (3). p. 156427. ISSN 00489697

8. **García-Pacheco, R., Galizia, A., Toribio, S., Gabarró, J., Molina, S., Landaburu, J., Molina, F.J., Blandin, G., Monclús, H., Rodríguez-Roda, I., Comas, J. (2022)**
Landfill Leachate Treatment by Using Second-Hand Reverse Osmosis Membranes: Long-Term Case Study in a Full-Scale Operating Facility.
Membranes, 12 (11). p. 1170. ISSN 2077-0375

9. **González-Gaya, B., García-Bueno, N., Buelow, E., Marin, A., Rico, A. (2022)**
Effects of aquaculture waste feeds and antibiotics on marine benthic ecosystems in the Mediterranean Sea.
Science of The Total Environment, 806. p. 151190. ISSN 00489697

10. **Hadi, S., Taheri, E., Amin, M.M., Fatehizadeh, A., Khayet, M. (2022)**
Magnetized Activated Carbon Synthesized from Pomegranate Husk for Persulfate Activation and Degradation of 4-Chlorophenol from Wastewater.
Applied Sciences, 12 (3). p. 1611. ISSN 2076-3417

11. **Huidobro, B., López-Heras, I., Alonso-Alonso, C., Martínez-Hernández, V., Nozal, L., De Bustamante, I. (2022)**
Analytical method to monitor contaminants of emerging concern in water and soil samples from a non-conventional wastewater treatment system.
Journal of Chromatography A, 1671. p. 463006. ISSN 00219673

12. **Iepure, S., Gomez-Ortiz, D., Lillo, J., Rasines-Ladero, R., Di Lorenzo, T. (2022)**
Applying Electrical Resistivity Tomography and Biological Methods to Assess the Hyporheic Zone Water Exchanges in Two Mediterranean Stream Reaches.
Water, 14 (21). p. 3396. ISSN 2073-4441

13. **Ismail, N., Pan, J., Rahmati, M., Wang, Q., Bouyer, D., Khayet, M., Cui, Z., Tavajohi, N. (2022)**
Non-ionic deep eutectic solvents for membrane formation.
Journal of Membrane Science, 646. p. 120238. ISSN 03767388

14. **Kamath, S.V., Manohara, H.M., Aruchamy, K., Maraddi, A.S., D'Souza, G.B., Santhosh, K.N., Mahadevaprasad, K.N., Nataraj, S.K. (2022)**
Sorption based easy-to-use low-cost filters derived from invasive weed biomass for dye contaminated water cleanup.
RSC Advances, 12 (15). pp. 9101-9111. ISSN 2046-2069

15. **Kamath, S.V., Mruthunjayappa, M.H., Mondal, D., Nataraj, S.K. (2022)**
Nanocomposite-based high-performance adsorptive water filters: recent advances, limitations, nanotoxicity and environmental implications.
Environmental Science: Nano, 9 (7). p. 2320. ISSN 2051-8153

16. **Khayet, M., Aytaç, E., Matsuura, T. (2022)**
Bibliometric and sentiment analysis with machine learning on the scientific contribution of Professor Srinivasa Sourirajan.
Desalination, 543. p. 116095. ISSN 00119164

17. **Landaburu, J., Molina, S. (2022)**
Polymeric Membranes for Micronanoplastic Sampling and Removal from Water Effluents.
Polymer Science: Peer Review Journal, 4 (4). ISSN 2770-6613

18. **Lejarazu-Larrañaga, A., Landaburu, J., Senán, J., Ortiz, J.M., Molina, S. (2022)**
Thin Film Composite Polyamide Reverse Osmosis Membrane Technology towards a Circular Economy.
Membranes, 12 (9). p. 864. ISSN 2077-0375

19. **Lejarazu-Larrañaga, A., Ortiz, J.M., Molina, S., Pawlowski, S., Galinha, C.F., Otero, V., García-Calvo, E., Velizarov, S., Crespo, J..G. (2022)**
Nitrate Removal by Donnan Dialysis and Anion-Exchange Membrane Bioreactor Using Upcycled End-of Life Reverse Osmosis Membranes.
Membranes, 12 (2). p. 101. ISSN 2077-0375

20. **Llamas, M.I., Jiménez-Gavilán, P., Luque-Espinar, J.A., Benavente-Herrera, J., Candela, L., Sanmiguel-Martí, M., Rambla-Nebot, J., Aranda-Mares, J.L., Vadillo-Pérez, I. (2022)**
Hydrogeological, hydrodynamic and anthropogenic factors affecting the spread of pharmaceuticals and pesticides in water resources of the Granada plain (Spain).
Journal of Hydrology, 610. p. 127791. ISSN 00221694

21. **Lopez-Herguedas, N., González-Gaya, B., Castelblanco-Boyacá, N., Rico, A., Etxebarria, N., Olivares, M., Prieto, A., Zuloaga, O. (2022)**
Characterization of the contamination fingerprint of wastewater treatment plant effluents in the Henares River Basin (central Spain) based on target and suspect screening analysis.
Science of The Total Environment, 806. p. 151262. ISSN 00489697

22. **Maasri, A., Jähnig, S., Adamescu, M.C., Adrian, R., Baigun, C., Baird, D., Batista-Morales, A., Bonada, N., Brown, L., Cai, Q and Campos-Silva, J., Clausnitzer, V., Contreras, McB and Cooke, S., Datri, T., Delacámara, G., et al. (2022)**
A Global Agenda for Advancing Freshwater Biodiversity Research.
Ecology Letters, 25 (2). pp. 255-263. ISSN 1461-023X

23. **Mahto, A., Halakarni, M.A., Maraddi, A., D'Souza, G., Samage, A.A., Thummar, U.G., Mondal, D., Nataraj, S.K. (2022)**
Upcycling cellulose acetate from discarded cigarette butts: Conversion of contaminated microfibers into loose-nanofiltration membranes for selective separation.
Desalination, 535. p. 115807. ISSN 00119164

24. **Martín-Sanz, J.P., De Santiago, A., Valverde, I., Quintana, J.R., González-Huecas, C., López-Lafuente, A.L. (2022)**
Comparison of soil quality indexes calculated by network and principal component analysis for carbonated soils under different uses.
Ecological Indicators, 143. p. 109374. ISSN 1470160X

25. **Martínez-Megías, C., Rico, A. (2022)**
Biodiversity impacts by multiple anthropogenic stressors in Mediterranean coastal wetlands.
Science of The Total Environment, 818. p. 151712. ISSN 00489697

26. **Mozo, A., Morón-López, J., Vakaruk, S., Pompa, Á.G., González-Prieto, Á., Pascual, J.A., Gómez-Canaval, S., Ortiz, J.M. (2022)**
Chlorophyll soft-sensor based on machine learning models for algal bloom predictions.
Scientific Reports, 12 (1). ISSN 2045-2322

27. **Mruthunjayappa, M.H., Nataraj, S.K., Mondal, D. (2022)**
Bioinspired engineering protein nanofibrils-based multilayered self-cleaning membranes for universal water purification.
Journal of Hazardous Materials, 424. p. 127561. ISSN 03043894

28. **Mruthunjayappa, M.H., Nataraj, S.K., Mondal, D. (2022)**
New prospects on solvothermal carbonisation assisted by organic solvents, ionic liquids and eutectic mixtures – A critical review.
Progress in Materials Science, 126. p. 100932. ISSN 0079-6425

29. **Nagraj, R., Puttaswamy, R., Yadav, P., Beere, H.K., Upadhyay, S.N., Nataraj, S.K., Pakhira, S., Ghosh, D. (2022)**
Aging-Responsive Phase Transition of VOOH to V10O24·nH2O vs Zn2+ Storage Performance as a Rechargeable Aqueous Zn-Ion Battery Cathode.
ACS Applied Materials & Interfaces. ISSN 1944-8244

30. **Naik, P.B., Yadav, P., Nagaraj, R., Puttaswamy, R., Beere, H.K., Maiti, U.N., Mondal, C., Nataraj, S.K., Ghosh, D. (2022)**
Developing High-Performance Flexible Zinc Ion Capacitors from Agricultural Waste-Derived Carbon Sheets.
ACS Sustainable Chemistry & Engineering, 10 (4). pp. 1471-1481. ISSN 2168-0485

31. **Navarro, N.I., Semerad, J., Pivokonsky, M., Cajthaml, T., Filip, J., Busquets-Fité, M., Dvorak, J., Rico, A., Prochazkova, P. (2022)**
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2. IT platform

1. Interactive virtual visit to the IMDEA Water Institute. European Researchers' Night in Madrid.

3. Publishing advise

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11. **Esteve-Núñez, A.**
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17. García Calvo, E.

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18. Lejarazu-Larrañaga, A.

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20. Martínez-Hernández, V.

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21. Ortiz, J.M.

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22. Ortiz, J.M.

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23. Redondo, P.E.

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KIWK-projectteam Ketenverkenner. Online. Países Bajos. 03/02/2022.

24. **Rico, A.**
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26. **Rico, A.**
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27. **Sorando, R.**
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28. **Vega, C.**
Efectos de fungicidas azoxystrobin sobre las comunidades acuáticas del P. N. de l'Albufera.
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5. Round tables and experts panels

1. **Barroeta, B.**
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2. **Barroeta, B.**
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Asociación Española para el Avance de la Ciencia. 21/04/2022.

3. **De Bustamante, I.**
Mesa redonda: La hidrogeología en la educación superior. Curso Internacional Aguas Subterráneas: Exploración, Evaluación, Caracterización y Gestión.
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4. **Delacámara, G.**
Panel de expertos: El desafío de la gestión del agua.
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5. **Delacámara, G.**
Debate: Descarbonizar: La urgencia de la utopía.
MADBLUE Summit 2022. 27/04/2022.

6. **Delacámara, G.**
Mesa redonda online: Mainstreaming Nature-based Solutions for Water and Climate Security: The Next Decade (Part 2).
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7. **Delacámara, G.**
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Escenarios Hídricos 2030. Chile. 21/04/2022.

8. **Delacámara, G.**
Mesa redonda: Situación constitucional de los recursos hídricos.
Ciclo de charlas "Tomándole el pulso al texto constitucional". Universidad de Chile. 05/04/2022.

9. **Delacámara, G.**
Panel de expertos. Implicaciones económicas del cambio climático.
Banco de España. 22/03/2022

10. **Delacámara, G.**
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16th Meeting of the OECD Water Governance Initiative. 20/02/2022.

11. **Esteve-Núñez, A.**
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12. **Esteve-Núñez, A.**
Jornadas Life Clean Up – Networking Days.
Charla en Sesión 1: H2020 ELECTRA. Electricity driven Low Energy and Chemical input Technology for Accelerated bioremediation. Online. 01/06/2022

13. **Sanz, J.**
Jornada sobre HRS4R organizada por REGIC (Red de Entidades Gestoras de Investigación Clínica).
Online. 29/09/2022

14. **García-Calvo, E.**
Mesa redonda: Perspectivas en la Gestión y Valorización de Salmueras.
"Jornada Técnica Valorización en desalación: Recuperación de energía y productos". AEDyR. Málaga. 23/11/2022.

15. **Vighi, M.**
Evaluación de riesgo: Aspectos básicos y herramientas actuales para su ejecución.
En "Taller: Evaluación del riesgo para químicos utilizados en la salmonicultura". INTESAL Salmón Chile, Eula-Chile e IMDEA Agua. Chile. 15/11/2022.

16. **Vighi, M.**
Una mirada europea para la evaluación de productos de uso veterinarios.
En "Taller: Evaluación del riesgo para químicos utilizados en la salmonicultura". INTESAL Salmón Chile, Eula-Chile e IMDEA Agua. Chile. 15/11/2022.

6. Participation in Scientific Committees

1. **Barroeta, B.**
Member of the organizing committee. BioComunica22
Congreso anual de la Asociación de Comunicadores de Biotecnología. Barcelona. 17/10/2022.

2. **Barroeta, B.**
Member of the organizing committee. ISMET8 International Society for Microbial Electrochemistry and Technology
Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

3. **Barroeta, B.**
Member of the technical committee. CT-44: Comunicación Ambiental.
CONAMA 2022.

4. **Barroeta, B.**
Newsletter committee.
International Society for Microbial Electrochemistry and Technology - ISMET.

5. **Barroeta, B.**
Outreach & Public Engagement Committee.
International Society for Microbial Electrochemistry and Technology - ISMET.

6. Barroeta, B.
Publishing coordinator. ISMET News. Biannual Newsletter.
International Society for Microbial Electrochemistry and Technology - ISMET.

7. Barroeta, B.
Secretaria. Junta Directiva de la Asociación de Comunicadores de Biotecnología
ComunicaBiotec. 16/10/2022 – 15/10/2025.

8. Berná, A.
External evaluator of projects in the public call for the granting of aid for carrying out R&D Projects for young doctors of the Rey Juan Carlos University (Spain).

9. Boltes, Karina.
Coordinator of GT12-Water, Development and Life.
Working Groups Agenda 2030 of the University of Alcalá (Spain).

10. De Bustamante, I.
Member of the scientific comittee. XI Congreso Iberoamericano de Educación Científica - CIEDUC 2022.
UNESCO. Antigua Guatemala (Guatemala). 28/11 - 01/12/2022.

11. Esteve-Núñez, A.
CONAMA. Espacios de oportunidad para las soluciones basadas en la naturaleza en el ecosistema urbano (ST-13).

12. Esteve-Núñez, A.
Conference chair of the Scientific & Organising Committee. ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference.
Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

13. Esteve-Núñez, A.
Member of the technical committee. CT-13: Espacios de oportunidad para las soluciones basadas en la naturaleza en el ecosistema urbano.
CONAMA 2022.

14. Esteve-Núñez, A.
Project Ambassador H2020 HYDROUSA.

15. Delacámara, G.
Jurado de la Semifinal del Agritech Startup Europe Accelerathon 2022.
Fundación Finnova. 25/01/2022.

16. Delacámara, G.
Líder de la Vision Task sobre "Value of Water" de la plataforma Water Europe (anteriormente WssTP -Water supply and sanitation Technology Platform-).

17. Delacámara, G.
Miembro de la Junta Directiva (Board Member) de Water Europe de la plataforma Water Europe (anteriormente WssTP -Water supply and sanitation Technology Platform-).

18. Delacámara G.
Miembro de la Mission Assembly on Healthy Oceans. Seas, Coastal and Inland Waters, EU Horizon Europe Programme, DG RTD - DG for Research and Innovation, European Commission.

19. Delacámara, G.
Miembro de la Water Governance Initiative, OCDE.

20. Delacámara, G.
Miembro del Consejo Asesor de AMWAS ("A Mediterranean Water And Journalism Platform on Sustainable Development").

21. **Delacámara, G.**
Miembro del External Science Advisory Council (ESAC) de KWR Watercycle Research Institute. Países Bajos.

22. **Delacámara, G.**
Miembro del Grupo Espejo de España, Mission Assembly on Healthy Oceans. Seas, Coastal and Inland Waters, EU Horizon Europe Programme, DG RTD - DG for Research and Innovation.

23. **Delacámara G.**
Miembro del Special Advisory Board, International Desalination Association (IDA).

24. **Delacámara, G.**
Miembro (Visionary) del Future UniLab (Think Tank of Una Europa).

7. Conference

7.1 Oral Commucations

1. **Berná, A., Vázquez, J., Esteve-Núñez, A.**
Smart IoT biosensing: Advanced microbial electrochemical sensor with remote diagnosis capabilities.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

2. **Berenguer, R., Ramírez, M., Llorente, M., Ortiz, J.M., Esteve-Núñez, A.**
New insights into carbon properties to promote microbial electroactivity for wastewater Treatment.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022

3. **Budach, A., Prado, A., Esteve-Núñez, A., Miltner, A., Kästner, M.**
Effect of hydraulic conditions on PFR reactors with electro-conductive filterbeds to improve OC degradation.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

4. **Chaparro, L., Boltes, K., Berná, A., Esteve-Núñez, A.**
Detoxificación de aguas residuales reales en celdas de combustible microbianas de doble compartimento.

Workshop Remtavares: Nuevos avances en las tecnologías para el tratamiento de aguas residuales y la valorización de residuos. URJC. 02/12/2022.

5. Esteve-Núñez, A.
Findings from the pilot testing.
H2020 ELECTRA M45 Progress Meeting. Chania, Crete (Greece). 19/09/2022.

6. Esteve-Núñez, A.
The METLAND electroactive biofilters to eliminate organic micropollutants in municipal wastewater.
H2020 ELECTRA Stakeholders Workshop. Chania, Crete (Greece). 20/09/2022.

7. Hernández-Ibáñez, N., Ródenas, P., Ortiz, J.M., Arévalo, J., Monsalvo, V., Esteve-Nuñez, A., Rogalla, F.
Microbial desalination cell for low energy drinking water production in Canary Island.
EDS Conference: Desalination for the Environment: Clean Water and Energy. AEDyR. LAs Palmas de Gran Canaria, Las Palmas (Spain). 20 -23/06/2022.

8. Huidobro, B., López-Heras, I., Martínez-Hernández, V., Nozal, L., De Bustamante, I., Meffe, R., Pradana, R.
Análisis de contaminantes de preocupación emergente y sus productos de transformación en el medioambiente.
X Reunión de la Sociedad Española de Espectrometría de Masas (SEEM). Córdoba. 01 - 03/06/2022.

9. Ka Y Law, C., Kundu, K., Bonin, L., Peñacoba, L., Bolea, E., Vanhaecke, F., Rabaey, K., Esteve-Núñez, A., De Gusseme, B., Boon, N.
Production of biogenic palladium nanoparticles through electrochemical systems for the catalytic removal of micropollutants in wastewater.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

10. Koelmans, A.A., Redondo, P.E., Mohamed Nor, H., Gouin, T.
On the likelihood of ecological risks from microplastics in the Laurentian Great Lakes.
Online. MICRO 2022 Conference. Lanzarote. 14 - 18/11/2022.

11. Lejarazu-Larrañaga, A., Ortiz, J. M., Molina, S., Pawlowski, S., Galinha, C.F., Velizarov, S., Crespó, J.G., García-Calvo, E.
Eliminación de Nitrato en Aguas de Consumo mediante Diálisis de Donnan empleando Membranas de Intercambio Aniónico recicladas.
XLII Reunión del Grupo Especializado de Electroquímica de la RSEQ. E.T.S. Ingenieros Industriales y de Telecomunicación (ETSIIT), Universidad de Cantabria. Santander. 06 - 08/07/2022.

12. Manchón, C., Muniesa, F., Serna, D. Asensio, Y., Wardman, C., Esteve-Núñez, A.
Fluid-like electrodes overcome the biofilm-based paradigm for growing electroactive planktonic Purple Phototrophic Bacteria.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

13. Martínez-Hernández, V., Landaburu, J., Rico, A.
Microplastics research at the IMDEA Water Institute.
Reunión anual de EnviroPlaNet. Universidad Politécnica de Cartagena, Murcia (Spain). 02 y 03/06/2022.

14. Molina, S., Rodríguez-Sáez, L., Ocaña, H., Landaburu, J.
Removal of nanoplastics bymicrofiltration and ultrafiltration membranes.
EuroMembrane 2022. EMS (European Membrane Society). Sorrento, Nápoles (Italia). 20 - 24/11/2022.

15. **Muniesa, F., Manchón, C., Torruella, D., Pun, Á., Generelo, L, Esteve-Núñez, A.**
Producción de polihidroxibutirato (PHB) bajo condiciones de estimulación electroquímica en bacterias fotótrofas rojas obtenidas a partir de agua residual de industria cervecera.
Workshop Remtavares: Nuevos avances en las tecnologías para el tratamiento de aguas residuales y la valorización de residuos. URJC. 02/12/2022.

16. **Ortiz, J.M.**
Introduction of partners: IMDEA Water.
Horizon Europe TRINEFLEX Kickoff Meeting. Aimen Technology Center. O Porriño, Pontevedra. 16 - 17/09/2022.

17. **Ortiz, J.M.**
Microbial Electrochemical Technologies for a sustainable future of water sector: from the concept to real implementation.
Online. Programa de Posgrado en Química y Biotecnología, Universidad Federal de Alagoas, Maceió (Brazil). 05/10/2022.

18. **Pompa, A., Molina, S., Lejarazu-Larrañaga, A., Landaburu, J.**
Polymeric Membranes Recycling.
SEJIPOL2022. 6th Young Polymer Scientists Seminar. ICTP-CSIC. Madrid. 25/10/2022.

19. **Pradana, R., González, I., Oliveira, N., González-González, B.D., de Bustamante, I., Sixto, H.**
Looking for Salicaceae plant material suitable for cultivation with industrial wastewater: towards multipurpose plantations.
8th INTERNATIONAL POPLAR SYMPOSIUM (IPS-VIII): Poplars and Willows in the Era of Global Change: Agroforestry, Environmental Improvement, and Ecosystem Services to Enhance Livelihoods.

20. **Ramírez, M., Ródenas, P., Aliaguilla, M., Bosh-Jimenez, P., Borràs, E., Hernández, N., Zamora, P., Monsalvo, V., Rogalla, F., Ortiz, J.M., Esteve-Núñez, A.**
Desalinización microbiana para la producción de agua potable con bajo consumo energético.
XLII Reunión del Grupo Especializado de Electroquímica de la RSEQ. E.T.S. Ingenieros Industriales y de Telecomunicación (ETSIIT), Universidad de Cantabria. Santander. 06 - 08/07/2022.

21. **Redondo, P.E., Rico A., Koelmans A.A.**
Environmental Risk Assessment of Microplastics for Freshwater Benthic Species Using Strict Quality Criteria and Data Alignment.
Online. SETAC Europe 32nd Annual Meeting. Copenhagen (Denmark). 15 - 19/05/2022.

22. **Redondo, P.E., Rico A., Koelmans, A.A**
Risk assessment of microplastics in freshwater sediments guided by strict quality criteria and data alignment methods.
Online. MICRO 2022 Conference. Lanzarote. 14 - 18/11/2022.

23. **Redondo, P.E.**
Risk assessment of microplastics in freshwater sediments guided by strict quality criteria and data alignment methods.
Sediment Matters Webinar. SETAC. Online. 03/11/2022.

24. **Ramírez, M., Ródenas, P., Aliaguilla, M., Bosh-Jimenez, P., Borràs, E., Hernández, N., Zamora, P., Monsalvo, V., Rogalla, F., Ortiz, J.M., Esteve-Núñez, A.**
Microbial desalination cell for low energy drinking water: the roadmap towards sustainable desalination.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

25. **Rusconi, G., Bombelli, P, Körner, F., Trasatti, S.P., Idá, A., Esteve-Núñez, A., Schievano, A.**
e-Soil – Electro-active artificial soil for soilless farming: nutrients cycling from food industry wastewaters.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

26. **Torruella, D., De Deus, A., Berná, A., Vázquez, J., Esteve-Núñez, A.**
Microbial electrochemical sensors for detecting petroleum hydrocarbon spill: From lab to outdoor experiences.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

27. **Vázquez, J., Berná, A., Esteve-Núñez, A.**
Sensores electroquímicos microbianos en una EDAR: Detección en tiempo real de episodios que afectan a la calidad de los efluentes.
Workshop Remtavares: Nuevos avances en las tecnologías para el tratamiento de aguas residuales y la valorización de residuos. URJC. 02/12/2022.

7.2 Posters

1. **Berná, A., Vázquez, J., Manchón, C., De Deus, A., Esteve-Núñez, A.**
IoT Microbial Electrochemical Sensor: Real Time Analysis of Water Quality.
CIRMAT: Simposio nuevos desarrollos para una economía circular. XX Jornada de Materiales. Universidad Carlos III de Madrid. 24/02/2022.

2. **Fernández-Retuerto, B., Sánchez, M.B.**
The Differential Effect of Triclosan Concentrations on the Emergency of Resistant Bacteria.
SETAC Europe 32nd Annual Meeting. Copenhagen (Denmark). 15 - 19/05/2022.

3. **Gonzalez-Gaya, B., Sánchez, M.B., Buelow, E., Rico, A.**
Is the current lower tier threshold concentration for veterinary antibiotics sufficiently protective for freshwater biofilms?
SETAC 32nd Annual Meeting. Copenhagen (Denmark). 15 - 19/05/2022.

4. **Lejarazu-Larrañaga, A., Molina, S., Ortiz, J. M., Navarro, R., Zhao, Y., Pawloski, S., Galinha, C. F., Otero, V., Velizarov, S., Crespo, J.G., García-Calvo, E.**
Circular economy in membrane technology: upcycling end-of-life reverse osmosis membranes for sustainable electrochemical water treatment.
CIRMAT: Simposio nuevos desarrollos para una economía circular. XX Jornada de Materiales. Universidad Carlos III de Madrid. 24/02/2022.

5. **López-Heras, M.I., Arcas, A., Nozal, L., Ayala, L., Meffe, R., De Santiago, A., De Bustamante, I.**
A suspect screening workflow for the identification of contaminants of emerging concern, including persistent and mobile compounds, in surface water used for crop irrigation.
18th International workshop on emerging high-resolution mass spectrometry (HRMS). ICRA-CERCA e IDAEA-CSIC. Barcelona. 10 y 11/10/2022.

6. **Muniesa, F., Manchón, C., Esteve-Núñez, A.**
Photoelectroheterotrophic production of polyhydroxybutyrate (PHB) in purple phototrophic bacteria.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

7. **Pompa, A., Molina, S., Landaburu, J.**
Performance evaluation of MBR in treating plastic nanospheres of polystyrene.
EuroMembrane 2022. EMS (European Membrane Society). Sorrento, Nápoles (Italy). 20 - 24/11/2022.

8. **Pompa, A., Molina, S., Lejarazu-Larrañaga, A., Landaburu, J., García-Calvo, E.**
Validation of recycled nanofiltration and anion-exchange membranes for the treatment of high-salinity urban wastewaters for crop irrigation.
EuroMembrane 2022. EMS (European Membrane Society). Sorrento, Nápoles (Italy). 20 - 24/11/2022.

9. **Pompa, A., Ortiz de Lejarazu, A., Molina, S., Landaburu, J., García-Calvo, E.**
Validation of recycled membranes in saline wastewater treatment.
37th EMS Summer School 2022: Membrane Engineering and the 4 Natural elements: Earth, Air, Water, Fire. European Membrane Society. Alentejo (Portugal). 29/05 - 03/06/2022.

10. **Ramírez, M., Ortiz, J.M., Ródenas, P., Zamora, P., Monsalvo, V., Rogalla, F., Esteve-Núñez, A.**
Microbial Desalination for Low Energy Drinking Water.
CIRMAT: Simposio nuevos desarrollos para una economía circular. XX Jornada de Materiales. Universidad Carlos III de Madrid. 24/02/2022.

11. **Ramírez, M., Ortiz, J.M., Ródenas, P., Zamora, P., Monsalvo, V., Rogalla, F., Esteve-Núñez, A.**
Real saline water desalination using brewery wastewater as an energy source in microbial desalination cell.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

12. **Rusconi, G., Bombelli, P, Körner, F., Trasatti, S.P., Idá, A., Esteve-Núñez, A., Schievano, A.**
e-Soil – Electro-active artificial soil for soilless farming: nutrients cycling from food industry wastewaters.
ISMET8 - International Society for Microbial Electrochemistry and Technology - Global Conference. Technical University of Crete, Ghent University, University of Alcalá. Chania, Crete (Greece). 19 - 23/09/2022.

13. **Salehi-Siavashani, N., Vaquero, G., Elorza, F.J., Gómez, M., Candela, L., Serrat-Capdevila, A.**
Data integration at the transboundary Chad Aquifer Formation for groundwater flow understanding.
49 IAH Congress. Wuhan (China). 18 - 23/09/2022.

14. **Salehi-Siavashani, N., Vaquero, G., Elorza, F.J., Gómez, M., Candela, L., Serrat-Capdevila, A.**
The lake Chad trasnboundary aquifer. Groundwater fluxes estimation between sharing countries.
Sustain 2022. Valencia. 05 - 08/09/2022.

8. Intellectual Property

1. Monitor CianoMOD: Plataforma software de monitorización del afloramiento de algas y cianobacterias Pompa Pernía, A., Morón López, J. Pascual, J.A., Carreño, F., Rodríguez, C., Fernández, M., Vaquero, J. Fundación IMDEA Agua y URJC. Nº: 765-743567 Date: 07/04/2022

9. Fellowships

Ana García Arcos
Category: Research Support from Statal Programme INVESTIGO
Fund: Contract financed by the European Union – Next Generation EU, through the "Investigo Program", within the framework of the Recovery and Resilience Mechanism of the European Union.

Anamary Pompa Pernía
Category: Predoctoral researcher
Fund: Grant PRE2019-088421 funded by MCIN/AEI/10.13039/501100011033 and by ESF Investing in your future

Antonio Berná Galiano
Category: Researcher from *Juan de la Cierva Incorporación* Programme
Fund: Grant IJC2018-038314-I funded by MCIN/AEI/10.13039/501100011033

Ariadna García-Astillero Honrado
Category: Research support
Fund: Grant PTA2018-016257-I funded by MCIN/AEI/10.13039/501100011033

Blanca Huidobro López
Category: Predoctoral researcher from National Science Programme "Funds for the training of doctors" FPI
Fund: Grant BES-2017-082064 funded by MCIN/AEI/10.13039/501100011033 and by ESF Investing in your future

Daniel Franco López
Category: Research Support from Statal Programme INVESTIGO
Fund: Contract financed by the European Union – Next Generation EU, through the "Investigo Program", within the framework of the Recovery and Resilience Mechanism of the European Union.

Gloria Teijón Ávila
Category: Research Support
Fund: Grant PTA2020-019363-I funded by MCIN/AEI/10.13039/501100011033

Imane Fellahi
Category: Research Support from Statal Programme INVESTIGO
Fund: Contract financed by the European Union – Next Generation EU, through the "Investigo Program", within the framework of the Recovery and Resilience Mechanism of the European Union.

Lorena Martínez García
Category: Research Support from Statal Programme INVESTIGO
Fund: Contract financed by the European Union – Next Generation EU, through the "Investigo Program", within the framework of the Recovery and Resilience Mechanism of the European Union.

Luis Simón Monllor Alcaraz
Category: Laboratory technician
Fund: Grant PEJ2018-002847-A funded by MCIN/AEI/10.13039/501100011033 and by ESF Investing in your future

Melina Celeste Crettaz Minaglia
Category: Research Support
Fund: Grant PTA2020-019286-I funded by MCIN/AEI/10.13039/501100011033

Paula Redondo Hasselerharm
Category: Researcher from Juan de la Cierva Trainning Programme
Fund: Grant FJC2020-045328-I funded by MCIN/AEI/10.13039/501100011033 and by the European Union NextGenerationEU/PRTR

10. Phd Thesis

PhD thesis defended

1. **Amaia Ortiz de Lejarazu Larrañaga.** Anion-exchange membranes from end-of-life reverse osmosis membranes: Indirect recycling approach for a circular water sector. Directed by Serena Molina Martínez and Juan Manuel Ortiz Díaz-Guerra. 18/03/2022.

2. **Sergio Martínez-Campos Gutiérrez.** Plastic as vectors of microorganism in the aquatic environment. Directed by Roberto Rosal García and Francisco Leganés Nieto. 09/09/2022

3. **Franceso Polazzo.** Multiple stressor effects on aquatic communities' vulnerability. Directed by Andreu Rico Artero. 09/09/2022

4. **Theresa Schell.** Sources, pathways and risk of microplastics in freshwater ecosystems. Directed by Andreu Rico Artero. 23/09/2022

PhD thesis in progress

1. **Akram Gashtasebi**. Microbial Electrochemical Strategies for recovering nutrients after treating and re-using urban wastewater from a University Campus. Directores: Abraham Esteve Núñez y Karina Boltes Espínola.

2. **Alain Oviedo Pila**. La traída de aguas superficiales a Madrid desde los antiguos proyectos, hasta la entrada del Canal de Isabel II entre 1858 y 1936. Directora: Irene de Bustamante Gutiérrez.

3. **Alex Fabián Palacios Carranza**. Análisis económico del uso del agua subterránea y el impacto en los sistemas de riego del cantón Quero (Ecuador). Director: Alberto del Villar García.

4. **Álvaro Pun García**. Eliminación de contaminantes emergentes del agua en sistemas bioelectroquímicos. Directores: Abraham Esteve Núñez y Karina Boltes Espínola.

5. **Anamary Pompa Pernía**. Tratamientos terciarios de aguas residuales mediante sistemas basados en membranas recicladas. Directoras: Serena Molina Martínez y Junkal Landaburu Aguirre.

6. **Andrés de Deus Villagra**. Estrategias 3D de "cableado" redox en bacterias electroactivas para recuperar ambientes contaminados. Director: Abraham Esteve Núñez.

7. **Andrés Eduardo Escare Ruminot**. Metodología para la estimación de la huella hídrica en campañas de exploración de cobre en escenarios de variabilidad geológica. Director: Christian Salazar Soto.

8. **Blanca Huidobro López**. Regeneración de aguas mediante un nuevo concepto de filtros verdes. Condiciones hidrogeológicas. Directoras: Irene de Bustamante Gutiérrez y Leonor Nozal Martínez.

9. **Carlos Edo Cuesta**. Occurrence and environmental fate of microplastics as emerging anthropogenic pollutants. Directores: Roberto Rosal García y M.ª Soledad Faraldos Izquierdo.

10. **Carlos Manchón Vállegas**. Depuración de aguas residuales y recuperación de nutrientes mediante bacterias fotótrofas rojas en reactores electroquímicos. Director: Abraham Esteve Núñez.

11. **Claudia Martínez Megías**. Ecotoxicological techniques for assessing resilience to climate change and chemical stress at the ecosystem of La Albufera (Valencia, Spain). Director: Andreu Rico Artero.

12. **Colin Daniel Wardman**. Electroactive Biofilters and Adapting Microbes for their use. Director: Abraham Esteve Núñez.

13. **Cynthia Emilia Rieckhof Rivas.** Destino y transporte de los micronanolásticos a través del suelo y su potencial llegada al agua subterránea. Directors: Mª de las Virtudes Martínez Hernández and Raffaella Meffe.

14. **Eduardo Noriega Primo**. Tecnologías electroquímicas microbianas aplicadas al tratamento de aguas residuales industriales. Director: Abraham Esteve Núñez.

15. **Elena María Chaves Chaves**. Desarrollo de una metodología para evaluar el efecto de las inundaciones en la movilización de la contaminación asociado a entornos rurales y urbanos de Costa Rica. Director: Francisco Carreño Conde.

16. **Felicia Mabel Díaz Cubilla**. Efecto de contaminantes emergentes sobre procesos anaerobios de tratamiento de agua residual. Directores: Pedro León García y Karina Boltes Espínola.

17. **Jacquelyne del Rosio Chagua Flores**. Estudio hidrogeológico, disponibilidad y calidad del agua subterránea en la cuenca Sama, Tacna, Perú. Directora: Irene de Bustamante Gutiérrez.

18. **Jorge Carlos Delgado García**. Análisis de las implicaciones de la viabilidad de reutilización del agua en la edificación. Director: Fernando Da Casa Martín.

19. **Jorge Senán Salinas**. Análisis de Ciclo de Vida en la transición a la Economía Circular. Caso de estudio: El reciclaje en la tecnología de membrana. Directores: Eloy García Calvo y Junkal Landaburu Aguirre.

20. **José María Campo Carrera**. Aplicaciones del avance en el conocimiento del fenómeno del niño y las influencias del cambio climático, en la hidrología operativa en la costa de Ecuador. Director: Ángel Luis Udías Moinelo.

21. **Laura Katherin Chaparro Díaz**. Eliminación de contaminantes emergentes mediante una nueva generación de reactores bioelectroquímicos. Directora: Karina Boltes Espínola.

22. **Lesly Antonieta Ayala Cabana.** Contaminantes de preocupación emergente en el escenario agrícola, ¿riesgo para la salud o atenuación natural?. Directors: Ana de Santiago Martín and Raffaella Meffe

23. **Laura Rodríguez Sáez**. Uso de membranas recicladas de ultrafiltración en biorreactores de membrana para tratamiento de aguas residuales. Directoras: Junkal Landaburu Aguirre y Serena Molina Martínez.

24. **Lucía Barbero Morales**. Regeneración de aguas mediante filtros verdes. Condicionantes hidrogeológicos Directoras: Irene de Bustamante Gutiérrez y Virtudes Martínez Hernández.

25. **María Llorente Remartínez**. Reactores electroquímicos microbianos basados en electrodos fluidizados: una nueva plataforma Biotech para el desarrollo de aplicaciones ambientales. Director: Abraham Esteve Núñez.

26. **Marina Bastante Rabadán.** Eliminación bioelectroquímica de micro y nanoplásticos del agua residual. Director: Ana Karina Boltés Espínola

27. **Marina Ramírez Moreno**. Comportamiento electroquímico de celdas de desalinización microbiana a escala laboratorio. Directores: Juan Manuel Ortiz y Abraham Esteve Núñez.

28. **Mario Jiménez Conde**. Biofiltros electrogénicos con sustratos vegetales para la reducción de nitratos en aguas. Director: Abraham Esteve Núñez.

29. **Mario Márquez Gallegos**: Sistema urbano de drenaje sostenible como alternativa de control y regulación de aguas de lluvia en la ciudadela Urdesa de ciudad Guayaquil. Directores: Irene de Bustamante Gutiérrez y Juan Antonio Pascual Aguilar.

30. Marisela Uzcategui Salazar: Estimación del riesgo hidrogeológico a la contaminación a partir de un modelo de relación de parámetros e índices de calidad de las aguas subterráneas. Director: Javier Lillo Ramos.

31. Mercedes Echegaray Giménez. La gobernanza del agua en España. Directores: Irene de Bustamante Gutiérrez.

32. Nafiseh Salehi Siavashani. Assessment of groundwater hydrology of the quaternary aquifer of Lake Chad basin. Director: Lucila Candela Lledó.

33. Raisa Gabriela Salvi Taga. La Modelización Numérica como Herramienta para Describir el Destino de los Contaminantes de Preocupación Emergente a través del Suelo. Directoras: Raffaella Meffe y Virtudes Martínez Hernández.

34. Raúl Jerónimo Pradana Yuste. Generando biomasa con aguas regeneradas; oportunidad para la bioeconomía circular. Directores: Irene de Bustamante Gutiérrez, Borja Daniel González y Hortensia Sixto Blanco.

35. Sara Martínez Pérez. Environmental fate and risks of micronanoplastics in the soil-water interface. Directores: Andreu Rico Artero y Mª Virtudes Martínez Hernández.

36. Sara Pelegrín Mc Carthy. Planificación hidrológica comparada: España y Reino Unido. Herramienta para cumplir los ODS 2030 y cambio climático. Directores: Irene de Bustamante Gutiérrez y Antonio de Lucas Sepúlveda.

37. Sergio Álvarez Blanco. Modelización de recursos hídricos en España mediante uso de Hydro-BID. Directors: Juan Antonio Pascual Aguilar and Juan José Castro Ríos.

38. Ting Wei. Eliminación de contaminantes emergentes y recuperación de nutrientes a través del tratamiento de aguas residuales por la tecnología metland®. Director: Abraham Esteve Núñez.

39. Virginia Gálvez Blanca. Distribución ambiental y toxicidad de microplásticos y nanoplásticos. Directors: Roberto Rosal García and Alice Petre Bujan.

11. Internships

Student: Giovanni Rusconi
Research: Biotechnology
Centre: Milán University, (Italy)
Date: 01/02/2022 - 30/03/2022

Student:José Luis Corvea Porras
Research:
Centre: Inversiones Gamma, S.A. (Cuba)
Date: 07/03/2022 - 05/04/2022

Student: Rene Heyse
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology
Date: 10 - 14/07/2022.

Student: Vera Schlierenkamp
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology).
Date: 10 - 14/07/2022.

Student: Heikel Schimmel
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology).
Date: 05 - 14/10/2022

Student: Dymphina Johanna Burger
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology).
Date: 05 - 14/10/2022

Student: Ana Paulina Heidtmann
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology).
Date: 05 - 14/10/2022

Student: Sara Louise Bauke
Research: Papillons Project
Centre: University of Bonn (Institute of Crop Science and Resource Conservation, working group of Soil Science and Soil Ecology).
Date: 05 - 14/10/2022

12. RTD activities organization

1. Working day: 'Impactos de la contaminación y el cambio climático en el Parque Natural de l'Albufera''. Organized by Parque Natural de l'Albufera, CIDE-UV, IDAEA-CSIC, IMDEA Agua, Universitat de València. Valencia. 01/12/2022.

2. Workshop organization: "Evaluación del riesgo para químicos utilizados en la salmonicultura". INTESAL Salmón Chile, Eula-Chile e IMDEA Agua. Chile. 15/11/2022.

3. Co-organized of "NORMAN Workshop: Improving the use of (semi-)field data for the risk assessment of chemicals". Wageningen University snd IMDEA Agua. Online. 21 - 22/11/2022.

13. Awards, Merits and Recognitions

1. European Project MIDES is selected and presented in the Spanish Pavilion at Dubai Expo 2020.El proyecto europeo MIDES seleccionado y presentado en el pabellón español de la Expo Dubai 2020. October 2021 - March 2022.

2. The Royal Spanish Society of Chemistry awards the Prize to Marina Ramírez Moreno for the best communication in poster format Desalination for Low Energy Drinking Water. CIRMAT: Symposium new developments for a circular economy. Carlos III University, Madrid.24/02/2022.

3. The Spanish Society of Mass Spectrometry (SEEM) awards the Prize for the best oral communication at the X Meeting of the SEEM to Blanca Huidobro López for Análisis de contaminantes de preocupación emergente y sus productos de transformación en el medio ambiente. 03/06/2022.

4. Raúl Pradana Yuste, representing the Eulen-IMDEA Water - INIA-CSIC Consortium, wins the first AEIPRO Award for Excellence in Projects 2022 in the Research Projects category, presenting the project Generando Biomasa con Aguas Regeneradas: Oportunidad para la Bioeconomía Circular (BIOARBIO). XXVI International Conference on Project Management and Engineering. Terrassa. 07/07/2022.

5. The proposal coordinated by Abraham Esteve "CO2 Fuel - Síntesis de biocombustibles a partir de CO2 utilizando un reactor bioelectroquímico", is a finalist in EDPR University Challenge Awards 2022. Madrid. 03/11/2022.

6. Recognition as a Teaching Innovation Group of Excellence UAH-GI20-147 Challenges for the teacher in Chemical and Environmental Engineering - ENViromental CHallENGes. Boltes, K., Barroeta, B., Petre, A.L., Letón, P., Perdigón, J.A. Vicerrectorado de Innovación Docente y Transformación Digital. UAH. 30/11/2022.

7. University of Alcalá awards Eloy García Calvo with the Research and Transfer Award, in the category of Research Excellence. 14/12/2022.

14. Other Institutional Activities

- Member of Research Laboratories Network (REDLAB). http://www.madrimasd.org/Laboratorios/default.asp

- Participation. XXII Science and Innovation Week. Madrid, Spain. 2022

- Participation. XIII European Researchers' Night. Madrid. Spain. 2022

- Member of Euraxess Service Network. Local Contact Point

- Participation. Feria Madrid Es Ciencia 2022

- Participation. Feria Transfiere 2022

- Participation. Feria P4i Patents4innovation 2022

15. Platforms and associations

16. Measures COVID-19

An external certifying company has verified the protocol ("Protocol of preventive action measures against COVID-19") that IMDEA Water has implemented to guarantee a safe work environment.

IMDEA Water has created a Monitoring Committee and a Crisis-Response Team with the aim of taking the necessary measures to facilitate the activity of the center in all its areas.

Taking into account the guidelines of the health authorities in relation to COVID-19, the monitoring committee has implemented the following plans:

17. IMDEA Water in the Media

A total of 53 news items was published in 78 different media outlets (62 of these in the regional and national area and 16 in the international area). In addition, 28 interviews and video stories were published in the media, including COPE, SER, RTVE, El Mundo or El País.

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2022

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